Effects of advanced nursing care on quality of life and cost outcomes of women diagnosed with breast cancer


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 advanced practice nurses (APNs) for the management of women diagnosed with breast cancer. Follow-up APN care was delivered during clinic, hospital, telephone and home visits. APN care consisted of assessment, diagnosis, outcome identification, planning, coordination, symptom management, health education, consultation and research.

Type of intervention
Other: Supportive care.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised women diagnosed with breast cancer. Women with a history of cancer, co-morbidities that limited functional ability, or severe psychiatric illness were excluded.

Setting
The setting was an integrated health care system. The economic study was conducted in the USA.

Dates to which data relate
The effectiveness and resource use data were gathered from 1995 to 1997. 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 conducted prospectively on a sub-sample of patients that were used in the effectiveness study.

Study sample
The use of power calculations was not reported. Of 558 women initially identified between 1995 and 1997, 85 were excluded because they were not referred by their physicians and a further 177 patients did not meet the eligibility criteria. Of the remaining 296 patients, 211 agreed to participate. There were 106 women in the intervention group and 105 women in the control group. One woman in the control group was restaged to a non-cancerous condition and was excluded, therefore leaving 104 women in the control group. The mean age was 55.7 years in the intervention group and 55.3 years in the control group. The mean size of the tumour was 2.0 cm in the intervention group and 2.1 cm in the
control group. The non-participants were generally comparable with participants in terms of race, marital status, histology, tumour size and other clinical factors. However, the participants were significantly younger than non-participants, and were more likely to have invasive disease.

**Study design**

This was a randomised clinical trial that was conducted in a large Midwestern metropolitan area in the USA. The method of randomisation was not reported. The length of follow-up was one year. This timeframe was selected so as to avoid the substantial loss to follow-up that would have occurred had a 2-year assessment period been used. Further, the authors noted that the intervention decreased in intensity during the second year. The loss to follow-up after one year was not reported. The outcomes were assessed at baseline and 1, 3, 6, 12, 18 and 24 months after enrolment, by means of pre-stamped return envelopes containing sets of questionnaires. Reminder letters and telephone calls were used to contact women who did not return the questionnaires within one week of receiving them.

**Analysis of effectiveness**

The analysis of effectiveness appears to have been conducted on the basis of treatment completers only. The primary health outcomes were measures of quality of life obtained with three self-administered questionnaires. More specifically, the Mishel Uncertainty in Illness Scale (MUIS), the Profile of Mood States (POMS) and the Functional Assessment of Cancer Therapy (FACT-B). The MUIS assessed the inability to determine the meaning of illness-related events (higher scores reflected greater uncertainty). The POMS evaluated six mood states (higher scores suggested greater mood disturbance). Finally, the FACT-B assessed quality of life on six dimensions (higher scores indicated greater well-being).

The study groups were comparable at baseline in terms of several factors. However, the intervention women were significantly more likely to have a lower histology and to receive adjuvant hormone therapy than the control patients. Potential confounding factors, which were identified from the differences observed in the baseline comparison, were considered in a multiple regression analysis.

**Effectiveness results**

The scores of each questionnaire were only presented in graphs. The results of the statistical tests of the adjusted analysis were reported.

The MUIS score was significantly better in the intervention group than in the control group at 1, 3, and 6 months, but not at 12 months.

The beneficial effect of the intervention was greater in unmarried women than in married ones.

The POMS score was not statistically different between the groups. However, mood disturbances decreased from baseline significantly more in unmarried women at 1 and 3 months, and in women with no family history of breast cancer at 1, 3 and 6 months.

Changes in FACT-B scales did not generally reach statistical significance between the groups. The exception was unmarried women at 1 month, when scores favoured the intervention group.

**Clinical conclusions**

The effectiveness study showed that at the end of follow-up, the two interventions had a comparable impact on quality of life. However, in some sub-groups of patients with breast cancer, namely unmarried women, improvements were reached faster with the APN than with usual medical care alone.

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

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

**Direct costs**
Discounting was not conducted since the costs were incurred during 2 years. The unit costs and the quantities of resources used were not presented separately for all cost items. The health services considered in the economic evaluation were grouped into five main categories. These were inpatient hospitalisation, outpatient or clinic visits, emergency room visits, urgent care visits, and home care visits. The cost of the APN service was also considered. This was derived from the average hourly salary plus benefits. A travel cost of $0.315 per mile was added for home care visits. The provider fees for anaesthesiologists, emergency room physicians and radiation oncologists were not considered because of the unavailability of data.

The cost/resource boundary of the study was unclear. The costs were estimated from actual hospital and clinic billing systems. Charges and reimbursement rates were used. The clinic reimbursements were calculated by multiplying clinic charges by a collection factor (net revenue received from a participant's insurance divided by the gross charges assessed in this insurance). Resource use was estimated using individualised data based on time logs in which APNs recorded the time spent with each patient for each category of cost. The costing was conducted on a sub-sample of patients that were involved in the effectiveness analysis after 58 patients (28 in the intervention group and 30 in the control group) with incomplete data had been excluded. An imputation procedure was used for some patients (11 participants) with partially incomplete data. The price year was not reported.

**Statistical analysis of costs**
A non-parametric Wilcoxon-Mann-Whitney test was used for univariate analyses of variables that were not normally distributed (i.e. charges, reimbursements and number of health care visits). Multivariate regression analyses on the natural logarithmic transformation of these variables were also conducted.

**Indirect Costs**
The indirect costs were not considered.

**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 mean total charges were $34,100 (median $29,506; range: 12,020 - 109,591; standard deviation, SD=19,245) in the intervention group and $32,399 (median $26,079; range: 9,149 - 141,734; SD=25,481) in the control group, (p=0.128).

The mean total reimbursement was $23,946 (median $18,713; range: 6,361 - 70,467; SD=14,510) in the intervention group and $23,476 (median $18,460; range: 4,071 - 114,998; SD=20,149) in the control group, (p=0.305).

No statistically significant differences were observed when the costs were broken down into sub-categories, or were presented at 6-month intervals.

Similarly, differences in the length of stay and the number of overall visits did not reach statistical significance.
The APN cost $629 per patient. This cost was incurred mainly in the first 6 months of the intervention.

**Synthesis of costs and benefits**
The costs and benefits were not combined because a cost-consequences analysis was conducted.

**Authors' conclusions**
Compared with standard medical care alone, the advance practice nurse (APN) service was effective in reducing uncertainty in the first 6 months for women newly diagnosed with breast cancer. Both moods and well-being were improved for unmarried women who were attended by the APNs. Well-being improved for those with no family history of breast cancer. Such improvements were obtained without increasing health care visits and hospitalisations. However, due to the extra costs of the nurse treatment, which were not offset by reductions in the costs of care, the APN service led to an overall increase in costs.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator (standard medical care) was appropriate, although it was not described clearly. 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 study, which was appropriate for the study question. The study groups were fairly comparable at baseline. The potential impact of confounding factors, which were derived from the observed differences in baseline characteristics between the groups, was addressed in statistical analyses. The method used to select the sample was reported, but the randomisation procedure was not. A substantial group of patients who were initially identified did not participate in the study. The authors noted appropriately the differences between the participants and non-participants.

Although the initial timeframe was 2 years, the authors noted that several follow-up data were missing after one year and the intervention reduced its efficacy in the long-term. Therefore, the length of follow-up was limited to one year after enrolment. No justification was provided for the size of the sample and the use of power calculations was not reported. Therefore, it is unclear whether a wider sample of patients would have led to statistically significant differences between the groups. The authors noted that the sample included primarily Caucasian, middle-income women with a high level of education, who might not be representative of the target population.

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

**Validity of estimate of costs**
The authors did not report explicitly which perspective was selected for the analysis. Charges and reimbursement rates were used for the analysis, but the true costs of the services were not analysed. The costs were broken down in terms of gross categories. The unit costs were reported only for a few items (APN services). The price year was not provided, which would have helped reflation exercises in other settings. The costs were treated stochastically since several statistical tests were conducted to deal with non-normally distributed data. However, the cost estimates were specific to the study setting and variability in the data was not explored in sensitivity analyses. The confidence intervals for charges and reimbursement rates were presented in graphs.

**Other issues**
The authors did not make extensive comparisons of their findings with those from other studies. They also did not address the issue of the generalisability of the study results to other settings. Sensitivity analyses were not conducted, which further limited the external validity of the analysis. The study referred to women newly diagnosed with breast cancer.
cancer and this was reflected in the authors' conclusions.

**Implications of the study**
The authors noted that future studies should be conducted to determine whether nurses could replace some visits carried out by physicians in the outpatient setting, in order to reduce the service costs without affecting the quality of the care.

**Source of funding**
None stated.

**Bibliographic details**

**PubMedID**
10920832

**Other publications of related interest**
Brooten D, Naylor MD. Early discharge and specialist transitional care. Image: Journal of Nursing Scholarship 1988;20:64-8

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adaptation, Psychological; Adult; Affect; Aged; Aged, 80 and over; Analysis of Variance; Breast Neoplasms /economics /nursing /psychology; Cost-Benefit Analysis; Female; Health Care Costs; Humans; Middle Aged; Midwestern United States; Nurse Clinicians /economics; Outcome Assessment (Health Care); Quality of Life; Regression Analysis

**AccessionNumber**
22000007618

**Date bibliographic record published**
30/09/2004

**Date abstract record published**
30/09/2004