Clinical and economic outcomes of pharmacist recommendations in a Veterans Affairs medical center


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
This study considered pharmacist recommendations to alter medication. A recommendation was defined as a suggestion made to a care provider that involved the application of the pharmacist’s knowledge to a specific patient or prescription.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised all patients prescribed medication in an inpatient, outpatient or nursing home setting at a Veteran's Hospital.

Setting
The setting was secondary care. The study was undertaken in San Francisco, USA.

Dates to which data relate
The effectiveness and resource use data related to April 1998 to April 1999. The price year was not reported.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The cost data were taken retrospectively from the same patient sample that provided the effectiveness evidence.

Study sample
The authors reported that to obtain a statistical power of 80% at the 95% significance level, they required a minimum of 100 recommendations for each of the three settings (inpatient, outpatient and nursing home). The cases were selected consecutively from the electronic system used to document recommendations. Overall, 600 recommendations were included in the study. Of these, 250 related to inpatients, 250 to outpatients and 100 to nursing home patients. Recommendations were excluded from the study if there were insufficient details recorded on the system. They were also excluded if they were duplicates, prescription clarifications, or automatic therapeutic interchanges.
Study design
The study was a case series of pharmacist treatment recommendations and, as such, determined the outcome from pharmacist recommendations. Two independent reviewers projected the outcome from no pharmacist recommendations. The independent reviewers who assessed the implications of the recommendations were blind to the pharmacist, physician and patient who were involved in the case. Due to the nature of the study design, there was no loss to follow up. However, only 487 (81%) of the medical records relating to recommendations contained sufficient detail.

Analysis of effectiveness
The medical records of each patient for whom a recommendation was made were included in the study. Clinical problems were classified as resolved, improved, no change, or worsened. The review also assessed whether any adverse outcomes could be attributed to the recommendation.

Effectiveness results
The problem associated with the recommendation was resolved in 17.9% of cases and improved in 21.3% of cases.

The problem remained unchanged in 49.3% of cases and worsened in 6.2% of cases.

No patients died as a result of the recommendation, although one patient (0.2% of cases) had an adverse effect.

Overall, the majority opinion of the assessors was that patient harm would have occurred if the pharmacist’s recommendation had not been implemented in 90% of the cases. In less than 1% of the cases, the assessors considered that harm could have been caused by the pharmacist’s recommendation.

Clinical conclusions
The authors concluded that the implementation of pharmacist recommendations was beneficial to clinical outcomes.

Measure of benefits used in the economic analysis
No summary measure of health benefit was used in the economic analysis. In effect, a cost-consequences analysis was undertaken.

Direct costs
The costs to the health service were included in the analysis. Medication, inpatient stay, diagnostic procedures, laboratory tests, clinic visits, pharmacist consultancy and emergency room visits were all costed. The costs relating to pharmacist recommendations were derived from the hospital records for the case series of recommendations. Otherwise, independent reviewers estimated resource use on the basis of the projected outcomes with no pharmacist recommendations. The paper did not provide a comprehensive breakdown of the resources used and the unit costs. No price year was reported. The costs were not discounted as they were incurred during less than one year.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
No indirect costs were included in the study.

Currency
US dollars ($).
Sensitivity analysis
A one-way sensitivity analysis was performed to consider the impact of variability in the resource use data. The pharmacist and physician's estimates of resource use provided the ranges in the analysis.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total cost of all 600 prescriptions, over all settings, was $67,540 before the pharmacist's recommendation (mean per recommendation $113) and $53,571 after the recommendation (mean per recommendation $89).

The mean cost-saving arising from the implementation of the recommendations varied between the three settings in the study. The mean cost-saving was $21 for inpatients, $19 for outpatients and $41 for nursing home patients.

The sensitivity analysis found that the implementation of pharmacist recommendations was cost-saving, irrespective of the estimates of resource data used.

Synthesis of costs and benefits
Costs and benefits were not synthesised.

Authors' conclusions
The implementation of pharmacist recommendations had a positive effect on clinical outcomes and was cost-saving.

CRD COMMENTARY - Selection of comparators
The authors did not provide an explicit justification for their choice of the comparator. You should consider how it relates to your setting prior to applying the results of this study.

Validity of estimate of measure of effectiveness
The outcomes for the pharmacist recommendations were derived from a case series, while experts projected the outcomes for no pharmacist recommendations. This is a weak source of evidence, very much open to bias. A randomised controlled trial would have been more appropriate. Further, the authors did not compare their study sample with the study population.

Validity of estimate of measure of benefit
There was no summary measure of benefit. In effect, a cost-consequences analysis was undertaken.

Validity of estimate of costs
The authors did not state the economic perspective adopted in the study, although a health care purchaser view appears to have been used. From this point of view, all the appropriate costs seem to have been included. Experts projected the costs that would have occurred had the pharmacists not made any recommendations. This is a weak form of a cost analysis, very much open to bias. However, the authors conducted a one-way sensitivity analysis, with appropriate ranges, to assess the variability in resource use arising from harm caused or avoided due to the implementation of the recommendations. No discounting was undertaken, which was appropriate as the longest time span used was one year.

Other issues
The authors concluded that the implementation of pharmacist recommendation has clinical benefits and is cost-saving across all Veterans Affairs settings. However, they did not comment on how their hospital might have differed from others and the impact this might have had on the results. They also did not compare their findings with other published studies, or consider how their findings could be generalised to other non Veterans Affairs settings.

**Implications of the study**
The authors did not make any specific recommendations for further research or changes in practice.

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