The cost of allied health assessments delivered by videoconference to a residential facility for elderly people

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Summary

We calculated the cost of providing allied health assessments to high-dependency residents of a rural facility for elderly people. The costs of conducting assessments via videoconferencing were compared with the costs of conducting assessments face to face. The observed costs in a three-month pilot trial were used to estimate the annual costs. Given an annual workload of 1000 occasions of service, each videoconference assessment would cost $84.93, compared with $90.25 for face-to-face assessments. Allied health assessments delivered by videoconferencing became cheaper at workloads of approximately 850 occasions of service annually. Additional increases in the workload further improved the financial viability of this approach to service delivery.

Introduction

The application of telemedicine to the delivery of community health is fairly recent, especially in Australia. Previous studies have identified the potential for home nursing in Queensland and have also developed a protocol for the use of telenursing in community health[1,2].

A pilot study was recently carried out to determine the feasibility of conducting allied health assessments, case conferences and staff education using videoconferencing at a rural facility for elderly people[3]. The technique appeared to be feasible[4]. Previous work of this type in allied health has found videoconferencing to be suitable for physical rehabilitation consultations and a range of physiotherapy interventions delivered to the home[5,6].

The aim of the present study was to compare the costs of conducting allied health assessments via videoconferencing and face to face for high-dependency residents at a facility for elderly people in rural Queensland. Assessments were conducted by five therapists at a metropolitan allied health centre who worked in dietetics, occupational therapy, physiotherapy, podiatry and speech pathology.

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Methods

Costs were first calculated for the three-month pilot study. These actual costs were then used to estimate the annual cost of providing a videoconference service. As in other economic evaluations, costs were divided into fixed and variable costs. Three delivery scenarios (typical, best case and worst case) were considered for the face-to-face assessments, because the method of delivery actually used during the pilot investigation would not be practical at higher case-loads. Costs are reported in Australian dollars (A$1 is US$0.6, €0.5). The five therapists each assessed 12 residents, giving a total of 60 assessments.

Fixed costs

Videoconference assessments

Equipment at both sites included a set-top videoconferencing unit (model 1500, Sony) connected via ISDN at 384 kbit/s. The annual cost of each unit and its maintenance costs were calculated. The equipment was assumed to have a lifetime of three years (a Blue Care policy) and the maintenance expenses were assumed to

be 10% of the annual equipment costs. ISDN line installation and rental charges were included as fixed costs. No training was undertaken for the pilot study. However, training expenses were factored into subsequent projected costs.

Face-to-face assessments

No fixed costs were associated with face-to-face assessments for the pilot investigation. The equipment necessary to perform each allied health assessment was either available at the residential facility or was taken with the allied health therapist from the metropolitan allied health centre.

Variable costs

Videoconference assessments

Variable costs for videoconference assessments included ISDN call charges and salaries for the nursing staff assisting with each assessment. Nursing staff do not normally assist clients during face-to-face assessments with allied health professionals. However, given the high support needs of the clients involved in this study, the assistance of nursing staff was considered to be necessary for the videoconference assessments. Salaries were costed at an hourly rate of $11.33 for assistants in nursing and additional associated costs were included at 23% of the salary costs.

Face-to-face assessments

Variable costs for face-to-face assessments included the costs associated with travelling to and from the residential facility, accommodation expenses and running costs for the vehicles used. During the pilot study, allied health staff drove to the residential facility only once. The facility was approximately 225 km from the metropolitan allied health centre, which represented a travelling time of approximately 2.5 hours. Allied health staff were subsidised for accommodation at the rate of $132.00 per night each, and for car use at $0.30/km. Three allied health staff stayed two nights, while two stayed one night only.

Sensitivity analysis

Three different scenarios were examined to determine the sensitivity of the costs to the assumptions made in their calculation. The costs were therefore recalculated on the basis of the following assumptions:

(1) the equipment charges (purchase and maintenance) decreased by 50%;
(2) the line charges (monthly rental and call charges) decreased by 50%;
(3) the equipment was used for videoconferencing 50% of the time and for some other purpose (e.g. education) for the other 50%.

Results

Actual costs in the three-month pilot study

Table 1 shows the actual costs for the duration of the pilot study. Client consultations are referred to as 'occasions of service' (OOS). Table 2 gives the details for the videoconference equipment costs, while Table 3 gives the details for the variable costs of the face-to-face assessments. The total cost of conducting 60 videoconference assessments during the pilot project

Table 1 Fixed and variable costs ($) incurred during the three-month pilot study

	Videoconference[a]	Face to face[b]
Fixed costs		
Equipment and maintenance	5949.49	–
ISDN installation	1298.55	–
ISDN rental	1025.82	–
Training	–	–
Variable costs		
Salaries (nursing staff)	836.15[c]	–
ISDN call charges	2475.00	–
Staff travel	–	671.25
Staff accommodation	–	1056.00
Car expenses	–	273.00
Total cost	11,585.01	2000.25
Number of occasions of service (OOS)	60	60
Cost per OOS	193.08	33.33

[a]Table 2 provides a breakdown of equipment and maintenance costs.
[b]Table 3 provides details of variable expenses for the face-to-face assessments.
[c]Salaries for the assistants in nursing who helped with the videoconference assessment were costed at an hourly rate of $11.33 and additional associated costs were included at 23% of the salary costs.

Table 2 Videoconference equipment and maintenance costs incurred during the pilot study

	Costs ($)
Total cost	
Equipment purchase costs (two videoconference units)	55,003.00
Annual cost[a]	18,334.33
Interest[b]	3300.18
Maintenance[c]	2163.45
Project cost	
Total cost in three-month pilot project	5949.49
Total annual cost	23,797.96

[a]Assumed equipment lifetime three years.
[b]Rate of interest 6%.
[c]Maintenance expenses were assumed to be 10% of the annual equipment costs.

Table 3 Variable costs for face-to-face assessments during the pilot study

	Costs ($)
Staff travel time	
Cost/hour ($21.83+23% additional costs associated with salary)	26.85/h
Cost/therapist (5 h travel time)	134.25
Total cost of travel time (five therapists)	*671.25*
Staff accommodation	
Accommodation subsidy	132.00/night
Three therapists for two nights each	792.00
Two therapists for one night each	264.00
Total cost of accommodation	*1056.00*
Car expenses	
Car subsidy ($)	0.30/km
No. of cars used	2
Total cost of car expenses for 455 km total distance travelled	*273.00*
Total variable costs	*2000.25*
Cost per OOS (n=60)	33.33

Table 4 Estimated costs ($) for an annual workload of 1000 occasions of service (OOS)[a]

	Videoconference	Face-to-face		
		Typical[b]	Worst[c]	Best[d]
Total annual cost	84,931	90,250	270,750	26,630
Cost per OOS	84.93	90.25	270.75	26.63

[a]At the time of the study the allied health team was undertaking approximately 1000 OOS annually.
[b]Assumptions for the typical scenario for the face-to-face assessment: one trip allows three resident assessments to be completed by each allied health therapist; no overnight stay is required (i.e. there are no accommodation expenses for delivering face-to-face assessments); approximately 250 trips annually.
[c]Assumptions for the worst-case scenario for the face-to-face assessment: one trip allows one resident assessment to be completed by each allied health therapist; no overnight stay is required (i.e. there are no accommodation expenses).
[d]Assumptions for the best-case scenario for the face-to-face assessment: one trip allows 30 resident assessments to be completed by each allied health therapist over a one-week period; accommodation expenses amount to five days and four nights per trip; approximately 33 trips annually.

was $11,585.01. Thus each OOS cost $193.08. Face-to-face assessments cost $2000.25. Thus the cost of each OOS was $33.33.

Estimated annual costs

The estimated annual costs were based on the actual costs of the three-month pilot study. Table 4 shows the cost comparisons for the two methods of delivery of allied health assessments. Estimated annual costs included twice-yearly training sessions. Assumptions were made for typical, worst-case and best-case scenarios for the face-to-face assessments, as shown in Table 4. By way of comparison, the total cost of providing a full-time allied health service to the residential facility would be $237,813.

Fig 1 shows the total cost of delivering assessments via videoconferencing and face to face. Fig 2 shows the costs per OOS for each form of assessment delivery. Allied health assessments delivered by videoconferencing became cheaper at approximately 850 OOS annually, when compared with the typical face-to-face assessment approach. Additional increases in the numbers of OOS further improved the viability of this approach to service delivery. At the time of the study, the team of allied health therapists undertook approximately 1000 OOS annually. However, this figure does not represent the maximum work capacity of the team and it was estimated that a total of 1800 OOS could be undertaken by a team of five allied health therapists. Any further increase in OOS would require additional allied health staff. The best-case scenario remained cost-effective irrespective of any changes in OOS.

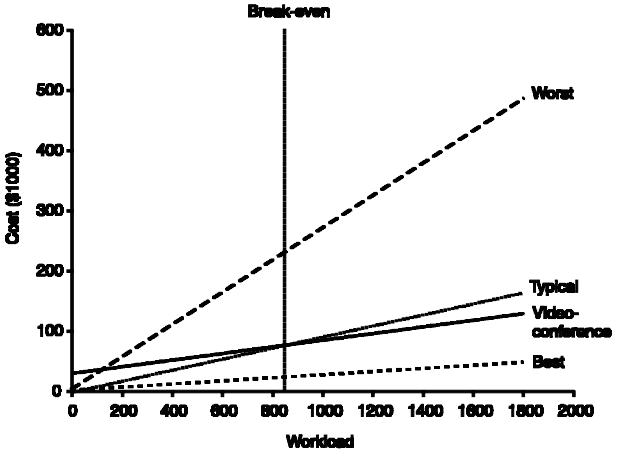

Fig 1 Annual cost of assessments delivered by videoconference and face to face (in typical, best-case and worst-case scenarios).

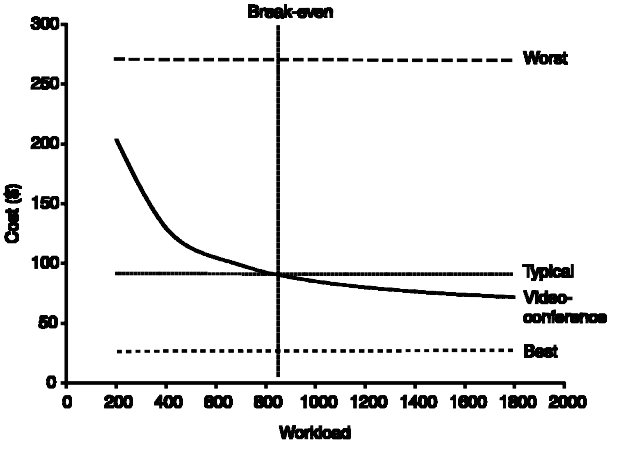

Fig 2 Cost per assessment delivered by videoconference and face to face (in typical, best-case and worst-case scenarios).

Table 5 Costs ($) at an annual workload of 1000 occasions of service (OOS)

	Typical face-to-face scenario	Videoconferencing		
		Cheaper equipment[a]	Lower line charges[b]	Additional utilization[c]
Total annual cost	90,250	73,028	62,251	70,057
Cost per OOS	90.25	73.03	62.25	70.05

[a]Assumption that equipment charges (i.e. purchase and maintenance) decrease by 50%.
[b]Assumption that line charges (monthly rental and call charges) decrease by 50%.
[c]Assumption that equipment is used for videoconferencing 50% of the time and that it is used for some other purpose (e.g. education) for the other 50%.

Sensitivity analysis

The costs of providing allied health assessments via videoconferencing were decreased by assuming cheaper equipment, or reduced line charges, or additional equipment utilization. The results are shown in Table 5.

Discussion

The present study showed that allied health assessments delivered via videoconferencing, when compared with the 'typical' face-to-face assessment approach, become cheaper at approximately 850 OOS annually. The best-case scenario for face-to-face assessment was cheaper than videoconferencing irrespective of any increase in the annual number of assessments undertaken.

At the actual annual workload at the time of the study (1000 OOS), face-to-face assessments delivered in the typical scenario were marginally more expensive than videoconference assessments. Face-to-face assessments require, on average, 250 trips by car each year to the rural facility. Assuming the best-case scenario still requires approximately 33 trips annually, or two or three trips every month. This represents a considerable amount of travelling and the safety of staff travelling by car needs to be considered in deciding whether, in practice, this is an efficient method of service delivery.

The intangible benefits of videoconferencing are also worth considering. For example, the costs calculated in the present analysis focused on using the videoconference equipment for the delivery of allied health assessments only. However, once the equipment is in place it can be used for other purposes, such as staff education and to facilitate team meetings and other administrative functions. The sensitivity analysis demonstrates how costs are reduced when the videoconferencing equipment is used half the time for other purposes.

Finally, it can reasonably be expected that the cost of purchasing videoconferencing equipment and the associated telecommunication costs will decrease over time. Thus the economics of providing services via videoconferencing are likely only to improve. The sensitivity analysis suggests that the financial viability of using videoconferencing will be further improved in future.

The present study has demonstrated that videoconferencing for allied health assessments is financially viable at about 850 OOS annually. Delivering allied health assessments in this way can also be considered a more efficient method of service delivery. Given these results, a long-term study focusing on the application of videoconferencing in service delivery in rural and remote areas appears to be justified.

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