The cost effectiveness of strategies to reduce barriers to cataract surgery

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Abstract

The cost and effectiveness of eight approaches to reducing barriers to cataract surgery were evaluated in a rural area of South India during 1987–1989. The approaches were based on four intervention alternatives – aphakic motivator (AM), basic eye health worker (BW), screening van (SV), and mass media (MM). Each intervention was offered at two levels of economic incentive: partial, which provides free surgery and hospital stay, and full, which also provides transport from the recipient’s village to the hospital and free food during the hospital stay. Evaluations took place in a probability selection of 90 villages, including ten control villages not subjected to either of the interventions. Only costs unique to patients from the intervention villages were considered: Health education and screening costs were included, surgery costs were not. Percentage reductions in the cataract blind backlog and increases in surgical coverage were used as effectiveness measures. Analyses suggest that the SV and AM interventions, both with full economic incentive, offer the greatest advantage. The AM intervention is the more effective of the two, but also the more costly.

Introduction

Cataract blindness is a significant world-wide problem, particularly in Third World countries. Globally there are an estimated 14 million cataract blind, and it is estimated that in India alone there are six million cases [1]. Eradication of the backlog is frustrated by difficulties in reaching the blind and providing curative services. The blind individual must be first identified (perhaps by self-identification), and then he must be examined to determine if blindness is due to cataract and, thus, curable by surgery. Further, the curable cataract blind must recognize the need for treatment, must acknowledge that surgery can cure the blindness, and must present themselves for treatment. Finally, the treatment must result in an acceptable level of sight restoration [2, 3].

Numerous barriers stand in the way as the cataract blind progress through this decision/treatment process. Some barriers have been addressed through technological or logistical innovations in surgery provision, such as by providing surgery on an outpatient basis [4]. However, many significant programmatic and resource barriers must be overcome if the surgical backlog is to be eliminated with resources presently available for primary eye care. In addition, behavioral factors related to the economic, psycho-social and educational characteristics of the cataract patient, have been identified as
substantial barriers to acceptance of cataract surgery [5].

The subject of this paper is an operations research project implemented by the Aravind Eye Hospital in rural Southern India to compare the costs and effectiveness of eight different barrier-reduction intervention strategies. The cost-effectiveness analysis follows traditional lines. Cost is expressed in monetary terms, and intervention effectiveness (benefit) is quantified in terms of backlog reduction and surgical coverage rates. This paper focuses on the determination of intervention costs and analysis of the relationship between cost and intervention effectiveness; a more detailed treatment of evaluation methods and effectiveness findings is found in reference 6.

Methods

The eight strategies consist of four interventions, each implemented at two levels of economic incentive. The four interventions are labeled aphakic motivator (AM), basic eye health worker (BW), screening van (SV), and mass media (MM). The partial economic incentive (P) provided free surgery and hospital care, while the full incentive (F) added transportation to the hospital and free food during the hospital stay. The full economic incentive was implemented with each intervention option to test the importance of reducing patient-borne costs to an absolute minimum compared to the partial incentive, which is routinely provided to Aravind charity patients. Each strategy was assigned to a probability sample of ten villages. Ten additional villages were selected as control villages. The entire study area contained 1,589 villages ranging in estimated population from approximately 250 to 10,000.

The AM and BW interventions used a door-to-door screening approach to find cataract cases. In the AM intervention, a trained aphakic (i.e., an individual previously operated for cataract) from the same or nearby village went door-to-door in the intervention village to identify the blind among those aged 40 or above. Those identified as cataract blind were implored to accept surgery. The BW intervention canvasser was not an aphakic, but a more extensively trained eye health worker from outside the village who had received a six-week training program regarding ophthalmic conditions and their treatment. In villages where transportation was provided, an Aravind vehicle transported patients on two pre-scheduled dates, immediately following the conclusion of screening activities and again approximately one week later when the first cases were returned after hospitalization.

The remaining two interventions utilized large-scale centralized screening operations to find cataract patients. The SV intervention used a mobile, ophthalmologist-led team to screen villagers appearing at a central village site in response to advance publicity within the community. The MM intervention took place during four consecutive weekly market days in a central marketplace generally serving eight to ten surrounding villages. Five marketplaces were used for each of the two MM strategies; within each market service area, two villages were randomly selected for evaluation. Audio-visual materials including music, a videotaped puppet show, and posters were used to educate those visiting the media booth about the curability of cataract blindness. In full-incentive villages or markets, Aravind vehicles provided transportation following the conclusion of screening activities.

Cost determination

Emphasis was on the differential cost of implementing the alternative interventions. Differential costs are the added ones associated with the various intervention options, beyond those customarily incurred in the treatment of cataract blindness. Similarly, the fact that transportation and food are provided in some villages and not in others is of no differential cost relevance. Since these costs are generally the same across intervention (and control) villages, except that in one-half of the villages the costs are borne by the program instead of the patient, this distinction is important only to the extent that it influences acceptance of cataract surgery. (An obvious disadvantage of differential cost