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Travel time to radiotherapy and uptake of breast-conserving surgery for early stage cancer in Northern England

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Abstract

Patients with early stage breast cancer can opt for either mastectomy or breast-conserving surgery (BCS), but BCS requires daily radiotherapy for some weeks. The hypothesis that ease of access to radiotherapy might affect choice of surgery was investigated using records of 6014 breast cancer patients in Northern England. Adjusting for the effects of age, deprivation and hospital type, the choice of BCS was not associated with the estimated car journey time to radiotherapy for most women but there was an association for patients living in places without a regular bus service, so transport problems might influence surgery choice for a minority of women.

Keywords: Health service accessibility; Radiotherapy; Breast cancer

Introduction

Equity in access to healthcare is one of the founding principles of the UK National Health Service (NHS) (Benzeval and Donald, 1999). Nevertheless, the provision of equal access to healthcare wherever people live is not generally possible. 'Accessibility' is the term geographers and planners use to describe the ease or difficulty of reaching services in another place. It is influenced by factors such as the degree of service centralisation (Campbell et al., 1999), travel times and distances (Lovett et al., 2002), and the availability of public or other forms of transport (Martin et al., 2002). For an overview of the development of theoretical and empirical work in the field see Haynes (2003). Previous research has suggested that geography may significantly affect use of health facilities in the UK. A distance-decay effect whereby those living furthest from treatment are least likely to use the service has been demonstrated for some primary and secondary health services (Carr-Hill et al., 1997; Jones et al., 1998; Haynes et al., 1999). There are also indications that the deterrent effect of travel effort is worst for those with no household car living in rural areas (Haynes, 1991).

Since the 1960s there has been a tendency to concentrate UK health services in larger, predominantly urban centres. Such units offer economies of scale and the advantages of specialist expertise.

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This process of centralisation has been particularly marked for the provision of cancer services (EACG, 1995). For treatments such as radiotherapy, where installation and operation is costly, it is inevitable that some patients will be faced with long journeys to receive therapy. Centralisation has led to concerns that those living at distance from healthcare will be deterred from using the service by the cost and inconvenience of the journey (Watt et al., 1993). However, Carr-Hill et al. (1997) considered that the distance decay effect would only occur where the patient considered the medical problem trivial. The cost in terms of time and effort to seek medical help would be perceived to be greater than the potential health benefits. They found that travel effort did not deter patients from using cancer clinics.

Breast cancer patients with disease localised to the breast may be offered two forms of surgical treatment. Both mastectomy and breast-conserving surgery (BCS) have been shown to produce equivalent five year survival rates (Fisher et al., 2002). Mastectomy involves a more extensive operation and may be psychologically unacceptable for some women (Hall et al., 2004). BCS may be more satisfactory cosmetically. However, unless BCS is followed by adjuvant radiotherapy administered daily for several consecutive weeks, there may be significant chance of local recurrence of disease leading to the requirement for subsequent mastectomy (EBCTCG, 2000). In the UK, standard guidance is that patients opting for BCS be advised to undergo post-operative radiotherapy (NICE, 2002).

In the UK radiotherapy units typically serve a population of around one million and treatment may require some patients to undertake long journeys. A review of radiotherapy provision in the UK undertaken in 2000 found that "demand has hugely exceeded capacity. Inadequate funding…has led to…significant inequity of access to radiotherapy within the UK" (RCR, 2000, p. 5). Even given sufficient radiotherapy provision to meet demand, previous studies have shown that the travel effort involved may deter some patients from accepting radiotherapy, especially where the health benefits are perceived to be uncertain (Greenberg et al., 1988). This raises the possibility that some women may opt for mastectomy and so avoid the commitment of time required for daily radiotherapy. Indeed the RCR (2000) study called for a review of the availability and funding of patient transport schemes.

BCS plus irradiation became an acceptable (and for some authorities the preferred) treatment option for early stage breast cancer in the early 1990s (Morrow et al., 2001). Initial uptake of this treatment regime was poor and varied geographically (Nattinger et al., 1992). Workers in a number of countries have examined factors associated with low utilisation of BCS (Molenaar et al., 2004; Nattinger et al., 2001; Meden et al., 2002; Morrow et al., 2001; Schroen et al., 2005; Hall et al., 2004; Martin et al., 2006). Most studies have shown that older patients and those with lower socioeconomic status are significantly more likely to opt for mastectomy. The reasons for choice are poorly understood and have come from small-scale qualitative studies (for example Molenaar et al., 2004).

The effect of distance to treatment has been examined in both Australia and the US. The Australian studies have examined travel effort by categorising patients by home location (for example using a crude *metropolitan*, *rural* or *remote* classification). The greater distances involved in accessing healthcare in Australia may make extrapolation to the UK situation unwise. Australian results with respect to distance to healthcare have been equivocal. Controlling for age and deprivation Hall et al. (2004) found that BCS uptake was not significantly associated with distance. Martin et al. (2006) found that rural, but not remote, patients were significantly less likely to receive BCS compared with metropolitan patients.

US studies examining the effect of travel to treatment have, with the exception of the work of Athas et al. (2000), used crow-flies estimates of distance to hospital as a proxy for travel effort (Athas et al., 2000; Nattinger et al., 2001; Meden et al., 2002; Schroen et al., 2005). Of the US work the Meden et al. (2002) study was small-scale (involving 81 patients) and did not control for confounders. They found that patients living over 45 miles from hospital were significantly less likely to receive BCS compared with those living closer than the 45 mile cut-off. Nattinger et al. (2001) used the SEER database and examined nearly 18,000 patient records. Controlling for age, race and education they found that patients living further than 15 miles straight-line distance from therapy were significantly less likely to choose BCS compared with those living closer than 5 miles from hospital. Schroen et al. (2005) used a population-based cancer registry database and controlled for age, race and tumour size. Women living over 10