Journal of Psychosomatic Research 79 (2015) 465–470

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

Cost-effectiveness of integrated collaborative care for comorbid major depression in patients with cancer☆

A. Duarte [a,*], J. Walker [b], S. Walker [a], G. Richardson [a], C. Holm Hansen [c], P. Martin [d], G. Murray [e], M. Sculpher [a], M. Sharpe [b]

[a] Centre for Health Economics, University of York, Heslington, York, UK
[b] Psychological Medicine Research, University of Oxford Department of Psychiatry, Warneford Hospital, Oxford, UK
[c] MRC Tropical Epidemiology Group, London School of Hygiene and Tropical Medicine, London, UK
[d] Robertson Centre for Biostatistics, University of Glasgow, Glasgow, UK
[e] University of Edinburgh, Centre for Population Health Sciences, Edinburgh, UK

ARTICLE INFO

Article history:
Received 29 July 2015
Received in revised form 26 October 2015
Accepted 30 October 2015

Keywords:
Collaborative care
Cost-effectiveness
Comorbidity
Depression

ABSTRACT

Objectives: Comorbid major depression is associated with reduced quality of life and greater use of healthcare resources. A recent randomised trial (SMaRT, Symptom Management Research Trials, Oncology-2) found that a collaborative care treatment programme (Depression Care for People with Cancer, DCPC) was highly effective in treating depression in patients with cancer. This study aims to estimate the cost-effectiveness of DCPC compared with usual care from a health service perspective.

Methods: Costs were estimated using UK national unit cost estimates and health outcomes measured using quality-adjusted life-years (QALYs). Incremental cost-effectiveness of DCPC compared with usual care was calculated and scenario analyses performed to test alternative assumptions on costs and missing data. Uncertainty was characterised using cost-effectiveness acceptability curves. The probability of DCPC being cost-effective was determined using the UK National Institute for Health and Care Excellence's (NICE) cost-effectiveness threshold range of £20,000 to £30,000 per QALY gained.

Results: DCPC cost on average £631 more than usual care per patient, and resulted in a mean gain of 0.066 QALYs, yielding an incremental cost-effectiveness ratio of £9549 per QALY. The probability of DCPC being cost-effective was 0.9 or greater at cost-effectiveness thresholds above £20,000 per QALY for the base case and scenario analyses.

Conclusions: Compared with usual care, DCPC is likely to be cost-effective at the current thresholds used by NICE. This study adds to the weight of evidence that collaborative care treatment models are cost-effective for depression, and provides new evidence regarding their use in specialist medical settings.

Introduction

Major depression is a leading cause of disability worldwide [1,2]. It is also an important cause of work place absenteeism and reduced productivity [3]. Major depression that is comorbid with a chronic disease has a particularly large effect: it is associated with substantial decrements in health and a significant increase in patients' use of health care resources [4–6]. Despite its importance, the treatment of major depression is often suboptimal [7].

The collaborative care model was developed with the aim of improving the management of depression in primary care [8]. The model emphasises systematic treatment delivery and efficient use of specialist skills to deliver evidence-based treatment to a large number of patients. Many trials have found the collaborative care model to be an effective and cost-effective way of treating depression in primary care, and the model is now being developed further to treat depression comorbid with chronic disease [9–13].

Cancer is becoming a chronic disease for a rapidly increasing number of people [14]. Major depression affects approximately 10% of patients with cancer but, despite the significant health care resources devoted to cancer care, few of these patients receive treatment for depression [15]. 'Depression Care for People with Cancer' (DCPC) is a development of the collaborative care model for patients with cancer and comorbid

☆ Funding: Cancer Research UK (Grant no. C5547/A7375).Registration: The trial is registered with Current Controlled Trials, number ISRCTN40568538.

* Corresponding author.
E-mail addresses: ana.duarte@york.ac.uk (A. Duarte), jane.walker@psych.ox.ac.uk (J. Walker), simon.walker@york.ac.uk (S. Walker), gerry.richardson@york.ac.uk (G. Richardson), christian.hansen@lshtm.ac.uk (C. Holm Hansen), Paul.Martin@glasgow.ac.uk (P. Martin), Gordon.Murray@ed.ac.uk (G. Murray), mark.sculpher@york.ac.uk (M. Sculpher), michael.sharpe@psych.ox.ac.uk (M. Sharpe).

http://dx.doi.org/10.1016/j.jpsychores.2015.10.012

major depression. It is a multicomponent, manualised treatment programme that integrates specialist depression management with both cancer treatment and primary care [16]. The findings of SMaRT (Symptom Management Research Trials) Oncology-2, a 500 patient multicentre randomised controlled trial which found that DCPC was highly effective when compared with usual care, have recently been published [17]. However, its implementation in clinical practice also requires evidence about its cost-effectiveness.

This paper reports on a cost-effectiveness analysis of DCPC compared with usual care from a health service perspective using data from SMaRT Oncology-2.

Methods

Study design and participants

SMaRT Oncology-2 was a two-arm, parallel group, multicentre randomised controlled trial in three cancer centres in Scotland, UK (Glasgow, Edinburgh and Dundee) and their associated clinics [17]. The trial included 500 adults (aged ≥ 18 years) with a diagnosis of cancer, a good cancer prognosis (predicted survival ≥ 12 months estimated by their cancer specialist) and major depression (Diagnostic and Statistical Manual of Mental Disorders, 4th Edition [DSM-IV] criteria using the inclusive approach to diagnosis) of at least four weeks' duration [18–20]. Patients were excluded if they were unable to participate in DCPC (those with substantial cognitive or communication difficulties, or who could not attend regular sessions), or if DCPC was inappropriate to their needs (those with continuous depression for ≥ 2 years, a psychiatric or medical condition requiring alternative treatment, known cerebral metastases, or those already regularly seeing a mental health specialist). Written consent was obtained from all participants. Ethical approval was given by the 'Scotland A' Research Ethics Committee (08/MRE00/23).

Interventions

DCPC

DCPC has been described in detail elsewhere [16]. In summary, it is an intensive, manualised, collaborative care-based multicomponent treatment programme specifically designed to be integrated with the patient's cancer treatment. DCPC is systematically delivered by a team that comprises specially trained cancer nurses and supervising psychiatrists working in collaboration with the patient's oncology team and primary care physician. The nurses establish a therapeutic relationship with the patients, provide information about depression and its treatment, deliver brief evidence-based psychological interventions (problem-solving therapy and behavioural activation) and monitor patients' progress. The psychiatrists supervise treatment, aiming to achieve and maintain treatment targets, advise primary care physicians about prescribing antidepressants, and provide direct consultations to patients who are not improving. The initial treatment phase comprises a maximum of ten sessions with the nurse (at the cancer or primary care clinic, or if necessary by telephone) over a four-month period. After this initial treatment period, patients' progress is monitored monthly by telephone (through an automated system supplemented by nurse calls) for a further eight months; additional sessions with the nurse are provided for patients not meeting treatment targets.

Usual care

The participant's primary care physician and oncologist were informed about the major depression diagnosis and asked to treat their patients as they normally would. The patient was encouraged to consult their primary care physician to obtain treatment.

Resource use and costs

The team delivering DCPC recorded: the duration, setting (hospital, home) and professionals (nurse, psychiatrist) present at each treatment session; the duration of all telephone calls to patients and primary care physicians; and related administrative time and average time per patient in supervision sessions. Data were collected on the following healthcare resource use by participant report (using questionnaires administered by post or read out to the patient by telephone interviewers) supplemented by case note review (by clinical researchers to determine the type of appointment, hospital stay or treatment received): inpatient hospital and hospice stays; accident and emergency (A&E) attendances; outpatient appointments for cancer treatment; outpatient appointments for psychological treatment; attendance at NHS-funded day hospices; primary care consultations; relevant prescribed medications (antidepressants, analgesics and anticancer medication). Researchers involved in data collection were blind to treatment allocation.

Total healthcare costs were estimated by multiplying the cost of each unit of resource, using UK national unit cost estimates (pounds sterling at 2010–11 prices), by the amount used [21]. The full cost of training the nurses who delivered DCPC in SMaRT Oncology-2 does not reflect the cost of this training in a real-world setting because nurses will retain the skills acquired for longer than the duration of the trial. Therefore, a more appropriate estimate of this capital cost (as training costs per patient treated with DCPC) was derived by assuming a five-year tenure for each DCPC nurse (with no requirement for re-training), an annual flow of 60 patients per nurse and an annual discount rate of 3.5%. Discounting was not applied to any other costs or outcomes because the time horizon of the study was less than one year.

Outcomes

Quality-adjusted life years (QALYs) were estimated based on patients' responses to the EQ-5D-3L health-related quality of life (HRQoL) questionnaire at baseline and at 12, 24, 36 and 48 weeks post-randomisation [22]. The EQ-5D-3L asks patients to rate the severity of their problems (no problem, moderate problems or severe problems) in the following domains: mobility, self-care, usual activity, pain/discomfort and anxiety/depression. These ratings define health states which have been assigned scores using preferences measured in a representative sample of the UK population [23,24]. The EQ-5D scores at each time-point were used to estimate QALYs using the area under the curve method, which multiplies HRQoL weights by time [25]. Mean differences in QALYs were estimated per treatment group using linear regression adjusting for baseline EQ-5D-3L score [26].

Analysis

A cost-effectiveness analysis was conducted from a healthcare perspective using the intention to treat principle with a time horizon of 48 weeks. The mean difference in healthcare costs incurred and QALYs accrued between treatment groups were estimated using ordinary least squares regression analyses, with robust standard errors to guard against heteroscedasticity [27]. The mean difference in QALYs was adjusted by baseline EQ-5D-3L score to address any baseline imbalance between groups. No other baseline covariate adjustment was performed in the QALY or cost regression analyses for the purpose of this paper. The adjustment of differences in costs and QALYs based on other baseline characteristics (gender, cancer centre, and, cancer type) did not affect the cost-effectiveness results, and regression coefficients were non-significant at a 95% confidence level. These results are, therefore, not shown, but are available on request.

Multiple imputation methods were used with chained equations and predictive mean matching over 10 imputations to estimate cost and EQ-5D-3L data items when these were missing. The following