Economic assessment of a workplace cognitive behaviour therapy service

David Hitt and colleagues assess the value of providing cognitive behaviour therapy for employees experiencing stress, anxiety and depression

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Abstract

This article presents a pragmatic economic assessment of an innovative service providing cognitive behaviour therapy (CBT) in the workplace to employees who are experiencing stress, anxiety and depression. The economic assessment tool used was designed to enable front line practitioners to demonstrate the value of their service innovations. Presenting the value of providing a CBT service in the workplace in this way is arguably compelling. This case study serves to illustrate the potential that can be realised by augmenting the skillset of front line practitioners who already have the clinical and service know-how with the skills to demonstrate economic value. These practitioners are equipped to lead service transformation that is not only clinically effective, but economically sound.

Keywords
cognitive behaviour therapy, occupational health, economic assessment, service innovation, anxiety, depression, mental health

WE BEGIN with a word of caution to the reader by dispelling any assumptions about what is to follow. This is a case study of a service innovation where a pragmatic approach to economic assessment has been applied by a front line healthcare practitioner. It demonstrates the value of the service innovation by drawing on and interpreting routinely collected local data where it is available and published data when it is not. Its purpose is, in times of unprecedented economic restraint, to inform local decision-making and share the learning with a wider audience. Conducted in the messy world of everyday practice where data sets are often incomplete and costs can vary significantly from one locality to another, this is not academic research. It is not a conventional economic assessment and should not be judged on those terms. It is, however, an innovative, pragmatic and useful approach that we argue is fit for purpose. This case study serves as an example of the use of a methodology that, if applied more widely, could support widespread service innovation in a financially constrained environment.

In 2008-09, 11.4 million working days were lost in Britain due to work-related stress, depression or anxiety (Knapp *et al* 2011). That is equivalent to 27.3 days per affected worker. In 2005-06, the average annual cost of lost employment in England attributable to an employee with depression was estimated to be £7,230; the figure for anxiety was £6,850 (McCrone *et al* 2008).

In its most basic form, cognitive behaviour therapy (CBT) involves the identification of negative automatic thoughts and behaviours that contribute to maintaining low mood and anxiety. CBT helps modify these variables and aids positive outcomes. CBT intervention is recognised as both clinically and cost effective for individuals with anxiety or depression who have been off work for four or more weeks (National Institute for Health and Care Excellence (NICE) 2009).

Despite this strong national evidence and policies recommending its use in practice, access to psychological therapies is by no means universal. In 2009, the City of Cardiff Council recognised this unmet need in its workforce and negotiated a partnership agreement with the department of liaison psychiatry, Cardiff and Vale University Health Board to provide psychological services, namely CBT. This enabled the council's occupational health (OH) department to refer employees who

presented with anxiety or depression for an expedited psychological assessment with the aim of promoting an earlier return to work, enhancing employee productivity while in work and more generally improving their quality of life.

A comprehensive evaluation of this partnership agreement is in progress. This case study focuses specifically on an economic assessment of the service, conducted by the lead author in 2013 under the auspices of a bespoke programme funded by the Burdett Trust for Nursing to build nursing leadership capability in economic assessment (McMahon and Sin 2013). It is a pragmatic economic assessment of a service that provides an evidence-based intervention in a novel context. The costs and benefits of the service are presented from the standpoint of the service funder, in this case the City of Cardiff Council.

The approach to economic assessment applied here was developed by the Office for Public Management (Ryrie and Anderson 2011). The method is in keeping with mandatory requirements (HM Treasury 2003) and is therefore robust, but also pragmatic and suitable for use in clinical practice. It can be tailored to any context and the needs of local decision-makers by drawing on routinely collected data and, where indicated, additional data collected and analysed, or evidence drawn from validated external sources.

The case study

The OH service of Cardiff Council identified a need for a partnership initiative with the NHS department of liaison psychiatry at the former Cardiff and Vale NHS Trust as it strived to maximise staff health, and improve attendance and performance at work. A number of complex sickness absence cases indicated the need for access to specialist services. The aims of the initiative were to:

- Address the lack of availability of services in some areas of the NHS for psychological treatment and support.
- Overcome the delays in NHS services in cases where early assessment and treatment is important for successful rehabilitation.
- Provide the benefits of an established service offering continuity and a focused source of specialist support to OH professionals and to council staff affected by psychological ill health.
- Assist the council to take a proactive approach to occupational and non-occupational mental health problems.
- Pursue an evidence-based approach to the prevention and management of complex mental health conditions through a credible and reputable NHS department.

The case study is summarised in Figure 1. In the first three years of the service (2009–12), 141 council employees were referred to the service by health professionals from the council's OH department.

All referrals to the department of liaison psychiatry were screened by a consultant psychiatrist and assessed by the CBT nurse specialist. Twelve of those referred did not attend their initial assessment appointment. More than half (77) of the remaining 129 were assessed as likely to benefit from CBT. Those not likely to benefit were, where indicated, directed to other more appropriate services on a case by case basis.

Within the timeline of the economic assessment, 51 had completed a course of CBT. A further ten had dropped out of treatment and two had received CBT through alternative means. Fourteen who were still receiving CBT were not included in the analysis. The average course of CBT was 12 sessions, with each session lasting approximately one hour. There was an endeavour to follow up any employees who dropped out of treatment, but this proved difficult and for the most part failed to provide any further information.

The occupational group was recorded for all referrals. Teaching staff and workers from social services accounted for a significant proportion of the cases referred to the service. This is in line with national data (Health and Safety Executive 2014), in which the incidence of stress and associated mental health problems was measured as higher in these occupations than other occupational groups.

Costs

All set-up costs were identified. It was assumed that the facilitators of the partnership, authors LD and TT, with other mental health directorate and City of Cardiff Council managers, undertook this work as part of their normal duties, not 'over and above'. While their significant contribution to the setting up of the initiative is acknowledged, their contribution for preliminary project planning is not listed or monetised in the economic assessment (Figure 1).

NHS premises and infrastructure were identified as indirect set-up costs as they were made available free of charge to this local authority-funded service. They were therefore noted, but not monetised. IT costs were not adjusted based on the assumption that the cost of IT in 2009 would not be significantly different from 2013 costs. Furniture was costed at £225 (in 2013).

Staff constituted the running costs for the service. At the outset, the service was provided by a 0.5 whole-time equivalent (WTE) CBT practitioner.

In response to increased demand, this establishment was increased in May 2011 when the CBT practitioner was appointed full time, and part-time (0.2 WTE) administrative support was secured. Salary costs were calculated based on mid-band costs using Agenda for Change band 7 for CBT therapist and band 4 for administrator as the point of reference. Full economic costs to include employer's costs were calculated by adding 22.5% to salary costs.

Over the three-year period, five clients were referred to a psychiatrist within the department of liaison psychiatry, either because of mental health problems or for medication advice. As well as these face-to-face contacts, these colleagues screened referrals and attended meetings where local authority service users were discussed. Their input was not charged to the council and therefore noted as indirect costs.

It was estimated that this equated to 2% of consultant time, and 1% registrar time. Here again employer's costs were added to salary costs. The total costs for psychiatrist intervention either in the form of treatment, screening or advisory roles over the three-year period was calculated as £9,077.

Benefits

City of Cardiff Council employees The service provided council employees with an expedited assessment and timely access to CBT, which it is likely they would not have been able to access through other means. Routine audit demonstrated high levels of client satisfaction with the service (see, for example, Box 1).

The referred employees who completed a course of CBT (n=51) were assessed using the PHQ9, a validated measure of mood developed

Figure 1 A nurse-led cognitive behaviour therapy service for local authority employees

Inputs

Investment (£110, 911)
Direct set-up costs:
Computer and printer: **£689**
Furniture: **£225**
Total: £914

Indirect set-up costs:
NHS premises and infrastructure, such as telephony

Direct running costs 2009-2012 (incurred by local authority):
1 x 0.5 WTE band 7 nurse therapist for 18 months; + 1 x WTE band 7 nurse therapist for 18 months: **£94,320**
1 x 0.2 WTE Band 4 administrator for 16 months: **£6,600**

Indirect running costs 2009-2012 (incurred by health service):
2% consultant psychiatrists' time + 1% registrar time: **£9,077**

Total running costs: 2009-2012: £109,997

The service

Service use
- Clients all local authority employees
- Assessed and referred by local authority occupational health (OH) staff
- 141 cases referred, 129 assessed, 77 eligible for cognitive behaviour therapy (CBT) intervention
- 51 completed a course of CBT between 2009 and 2012, 49 achieved health gains and 36 achieved significant health gains

Services
- Clients screened by a consultant psychiatrist
- All clients assessed and treated by a CBT therapist if indicated
- Intervention, on average, 12 hourly sessions
- Signposting to primary secondary or voluntary mental health services where indicated
- Liaison with GP
- Referral to Department of Liaison Psychiatry (consultant psychiatrists) when indicated

Summary of benefits

Benefits for local authority employees and service users (£99,000)
- Option to receive evidence-based psychotherapy through work scheme (assumed to be unavailable elsewhere)
- Reduction in mental health symptoms (assumed to be result of CBT)
- Improved quality of life (assumed to be the result of CBT) **Quality-adjusted life year gains: £118,800**
- Accelerated return to work, enhanced productivity in and outside of work
- Client satisfaction
- Prevention of future mental health problems

Benefits for local authority (£149,677)
- Improvement in high quality partnership arrangement with NHS
- Improvement in mental health knowledge and skills of local authority OH staff
- Improved return to work: **£39,936**
- Improved retention: **£81,361**
- Improved presenteeism: **£7,840**
- Reduced LA OH input required with referred staff: **£2,180**
- Avoidance of referrals to local authority Well-being service: **£18,360**
- Potential reduction in sickness absence post CBT intervention

Benefits for the wider health system (£24, 840)
- Clients receiving CBT through this service are not referred to other services in the health system
- Prevention of GP appointments: **£12,696**
- Avoidance of physical care costs: **£4,600**
- Reduction in costs to secondary mental health services: **£6,392**
- Reduced use of medications through avoidance or timely reduction in usage **£1,152**

Monetised benefits: £273,517 (health gained and costs avoided)
For every £1 spent, £2.47 gained
NB preventions costs based on 2011 accounting year and unadjusted.
Assumed benefits due to CBT intervention and not 'natural recovery'
Allowing for 'natural recovery': for every £1 spent, £1.92 gained

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Box 1 Testimonial

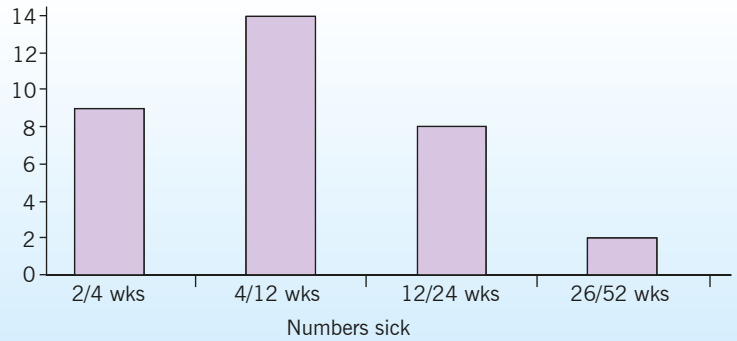
'I am writing to thank you for referring me to see [the cognitive behavioural therapist]. I have completed my course of therapy and cannot express my gratitude enough. As you are aware I have experienced many difficult life events during the last three years and have continued to do so during the time I have been seeing [the therapist] but with his help I have come through it a stronger person. I am no longer taking antidepressants and feel I have been taught the necessary skills to move forward. I cannot recommend CBT highly enough as it has changed my life for the better and I am so grateful that Cardiff Council has this service available. I know for a fact that if it wasn't for [the therapist] I would still be struggling on instead of looking forward. He is worth his weight in gold. Thank you so much.'

by Kroenke *et al* (2001) and validated for use in the general population (Martin *et al* 2006), and the Hospital Anxiety and Depression Scale (HADS), an internationally recognised measure of anxiety and low mood (Zigmond and Snaith 1983), which has been validated for use with employees (Bocéréan and Dupret 2014).

Measures were taken at initial assessment interview and at the point of discharge. Forty-six clients who presented with moderate to severe low mood and anxiety scores demonstrated statistically significant improvements at the point of discharge. Of these, 36 achieved scores at a sub-clinical level; that is they scored below the cut-off for 'caseness' using these measures.

The Quality-Adjusted Life Year (QALY) is a standard and internationally recognised measure of how many extra months or years of life of a reasonable quality a person might gain as a result of a treatment or intervention (NICE 2010). Improvements in mood and anxiety levels are factored into QALY calculations.

Figure 2 Length of time clients off sick at point of referral to the service



The monetary value placed on a QALY in 2010 was between £20,000 and £30,000 (NICE 2010). Layard *et al* (2007) estimated that the expected gain in healthy life for each person treated using CBT is 0.55 years in the subsequent two years – a gain of 0.11 QALYs. If we were to take an average value of a QALY of £25,000, the value of the benefits received from a course of CBT per person treated successfully is £2,750. These figures were used to monetise the clinical benefits. Forty six clients achieved significant health gain, according to their before and after PHQ9 and HADS scores; of these, 36 achieved subclinical scores. Basing the QALY calculation on the 36 alone, the most conservative estimate realises an economic benefit of £99,000.

Of the ten other employees who did not achieve subclinical scores, eight still made gains, moving them from one category in the PHQ9 (severe, for example) down to another (for example, moderate). Thus, many of these would also have made gains in mood that could have a cost benefit, but as the QALY mental health indicators operate in an all-or-nothing manner – evidence of a problem or not, as the case may be – we only included those individuals who made the leap from having a mental health problem to not having one by the end of treatment.

Local authority Productivity benefits for both employees and employer were monetised in three ways: an expedited return to work; improved retention in work; and enhanced presenteeism in the workplace.

Based on incomplete local authority data it was estimated that a minimum of 17 clients returned to work at least four weeks or 20 working days earlier than expected as a result of CBT. In the absence of local data, a productivity benefit was calculated using validated external evidence as a proxy.

The Office for National Statistics (ONS) (2009) calculated that a day of sickness/absence costs on average £117.46. Applying these 2009 figures to the whole group – that is, unadjusted to the year individuals returned to work – the service was estimated to have saved the council at least (17 x 20 x 117.46) £39,936 in sickness/absence costs.

Figure 2 shows the length of time clients had been off sick at the point of referral to the service. Arguably, any delay in referral and in commencing CBT, in turn, delays return to work; therefore, further cost savings may be realised if referral processes were expedited. The City of Cardiff Council has now developed more robust systems based on recommendations by OH staff that should improve this situation in the future.

Increased retention was measured using sickness/absence data at a point in time – on average, two years – after treatment completion. Complete data were only available for 29 of the service's clients. Using published projected number of sickness/absence days for specific mental health problems (Table 1) and the ONS 2009 calculation cited above – again unadjusted – the probable sickness/absence for each client had they not received CBT was estimated. These data were then compared with actual sickness/absence data.

The average 'healthy' employee is reported to be off sick/absent from work for five working days per annum and this was factored into the calculations. Table 2 illustrates a worked example. For all 29 employees, the total saving in projected sick time was calculated as £81,361.

Presenteeism is a contested concept (Johns 2010). In this context it is taken to mean the loss of workplace productivity as a result of employee mental health problems while 'present' in the workplace. It has been estimated that for each individual with a mental health problem, the cost of presenteeism is £560 per person (Scottish Association for Mental Health 2011).

It was assumed in this case study that clients who returned to work after a successful course of CBT were productive. Twenty nine clients who remained employed by the local authority returned follow-up measures at a set point in time to inform this study. These measures included the Work and Social Adjustment Scale (WSAS), developed by Mundt *et al* (2002) and later validated for use in phobic anxiety disorders (Mataix-Cols *et al* 2005). Fourteen clients self-reported a score of two or less, indicating mild or less disturbance at work. While acknowledging this may be an underestimate due to the limited data available, a cost saving of (14 x £560) £7,840 was calculated.

Thirty one of the 51 clients discharged from the service had no further involvement with OH. Based on approximate ratios of referrals from medical and nursing staff, we can assume that without CBT all 31 employees would have had at least one additional appointment.

On average, this would equate to ten appointments with medical staff and 21 appointments with nursing staff. Using Personal Social Services Research Unit (PSSRU 2011) figures for an hour's consultation for OH nursing staff, calculated as specialist nurses, and assuming associate specialist costs for medical input, potential savings were estimated at £2,180.

Anecdotal evidence suggests that OH appointments are also avoided while clients are receiving CBT, indicating additional costs were avoided.

If the service had not been present it was assumed that employees would have been directed to the employee wellbeing counselling service operated by the council, or advised to seek help from usual healthcare routes.

A full course of counselling (six sessions), based on PSSRU (2011) figures (Table 3), costs £360.

Table 1 Working days lost due to sickness absence – average per year per worker

No mental disorder: 5
Depression: 24
Phobia: 52
Obsessive-compulsive: 34
Panic disorder: 39
General anxiety: 14
Post-traumatic stress: 24
Weighted average: 25

(Based on Layard *et al* 2007)

Table 2 Worked example – calculation of sickness/absence costs avoided

Employee X had five days away from work on sick leave over the course of 104 weeks (two years) post-cognitive behaviour therapy treatment. She was previously away on sickness/absence with depression
Number of predicted days sick with depression (from Table 1): 24 per year
Therefore, number of days sick without CBT could have been: 24 x 2 = 48
Take into account five days off per annum for a 'healthy' employee: 10 for 2 years
48 minus 10 = number of days extra they may have been sick over this period: 38
Take off actual sickness over this time for mental health issues, 38 minus 5: 33
Cost of one day's sick leave: £117.46 (from ONS)
Therefore, the cost of the prospective sickness is 33 x £117.46: £3,876.18
Thus the cost potentially saved by moving a person from having a depressed mood to a sub-clinical population via reduced sickness/absence is £3,876 over the two-year period since discharge from CBT service

Table 3 Staff costs – based on PSSRU (2011) figures

Community nurse/OH nurse at band 6 (per consultation): £50 per hour
OH physician (calculated as associate specialists): £113 per hour
Counsellor: £60 per consultation
Consultant psychiatrist: £316 per patient hour
GP consultation: seven-minute consultation: £31; 17-minute consultation: £46

Assuming each client would have received a full course, the costs avoided by the counselling service equals (51 x 360) £18,360. The total value of these monetised benefits equals £149,677.

Wider health system

According to NICE (2004), on average a client with mild depression will visit their GP three times in a year (NICE 2004). Assuming clients treated successfully through this service avoided a minimum of three GP visits in the year in which they received CBT, and they remained well for at least 12 months after CBT, a minimum of a further three GP mental health sickness/absence-related appointments were avoided.

The average cost of a seven-minute GP consultation is £19.48 (Table 3). Clients with mental health problems regularly have longer appointments with their GP (Fitzpatrick and Sin 2013). The cost of an average longer consultation of 17 minutes is £46.

Forty-six clients significantly improved according to their PHQ9 and HADS scores. Arguably therefore (3 + 3) x 46 = 276 GP appointments were avoided, leading to a cost avoidance of (276 x 46) £12,696.

Links between physical and mental health are well documented, and it has been estimated that as many as half of all referrals to the acute sector that are not 'medically explicable' may be anxiety related and unnecessary (Nimnuan *et al* 2001). Drawing on data from the USA (Greenberg *et al* 2003), Layard *et al* (2007) estimated that a client treated with CBT could save the acute sector approximately £100 within the first two years. On this basis, cost avoidance within the acute sector for the 46 clients who demonstrated significant improvements was estimated to be (46 x 100) £4,600.

Twelve clients stopped taking antidepressant medication during their course of CBT. These were cases in which the therapist (a mental health nurse by training) was able, with GP consent, to actively assist a process of antidepressant medication withdrawal. This was achieved only when significant progress had been made. NICE calculated that the average unit cost of antidepressants was £13.62 per prescription (NICE 2005). Allowing for inflation, in 2011 (the midpoint of the case study audit) this cost was readjusted and calculated at £16. Assuming CBT avoided six months of prescriptions per client, cost avoidance was calculated as (6 x 12 x 16) £1,152.

A number of clients were already receiving secondary mental health care services from community mental health teams while accessing the CBT service. Specifically, four clients were supported by a community mental health nurse and four saw a psychiatrist for regular 30-minute appointments. The clients accessing community mental health nursing services were seen on average fortnightly (26 appointments per annum). Audit of client records indicated that the service led to a minimum 50% reduction in the numbers of community mental health nurse contacts over a 12-month period. Using PSSRU (2011) figures, 26 appointments cost (26 x 50) £1,300. Cost avoidance was calculated at (1,300 ÷ 2) x 4 = £2,600.

Assuming the CBT service also reduced monthly consultant appointments by 50%, cost savings using PSSRU (2011) figures were calculated at ((316 ÷ 2) x 6 x 4) £3,792. In addition, the service avoided one client referral to a clinical psychologist and two clients from being referred to a trauma-focused service. As it cannot necessarily be assumed these clients would have received these services, these potential savings were not monetised.

The total value of these monetised benefits (12,696 + 4,600 + 1,152 + 2,600 + 3,792) was £24,840.

Conclusion

A return on investment (ROI) for the City of Cardiff Council was calculated by dividing the overall value of the benefits monetised (99,000 + 149,677 + 24,840) = £273,517 – by the total investment (set-up and running costs) of £110,911. For every pound spent by the City of Cardiff Council, the total benefit was £2.47.

However, a degree of caution is required as Layard *et al* (2007) reported that a proportion of individuals will recover naturally from a mental health problem. For example, people with depression have a 50% chance of natural recovery within the first four months. For those with an anxiety disorder, the incidence of a natural recovery is generally far less. The average has been calculated as 22%.

Even allowing for the potential for natural recovery of 22% of clients in this case, the ROI for the council is that every pound spent resulted in a £1.92 return.

There is compelling evidence of the costs and benefits of CBT interventions, but access is not universal. Applying robust national evidence in the messy world of everyday practice is known to be challenging, for a whole range of complex reasons. In this article we have presented a case study of a workplace-based CBT service, underpinned by strong national evidence, provided through a partnership arrangement between a local authority and a health service.

A pragmatic approach by a healthcare practitioner, drawing on local data where it is available and national data where it is not, demonstrates the value of this service.

There are limitations to the approach, and data gaps and data-quality issues. The nurse's work demands made setting aside the time necessary to complete this economic assessment challenging. Also the support of other staff in accessing databases for the necessary information, alongside the quality of the information that can be gained in this way, can prove problematic.

This project was undertaken across public sector bodies, which made acquisition of information difficult. Nevertheless, we recommend the approach to other practitioners seeking to demonstrate the value of their innovations in practice by drawing on data they can access locally and combining it, when required, with evidence reported by others. This in turn enables commissioners and other local decision makers to draw on evidence developed in context. By applying these methods, nurses and other front line practitioners can, with training and support, undertake economic assessments to demonstrate the value of their innovations at a relatively low cost to the NHS.

We therefore recommend incorporating these methods into the training of nurses and other front line staff to empower them to work with commissioners to avoid waste and release much needed cash within the public-funded healthcare system. In times of austerity, this would appear to be important and necessary, and has the potential to generate a substantial return on investment.

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Conflict of interest
None declared

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