Economic Evaluations

A resource for occupational therapy

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Introduction to Economic Evaluation

An economic evaluation examines the impact of occupational therapy in relation to financial costs of providing a service. The analysis compares the costs of occupational therapy with an alternate (control) intervention to determine:

Is occupational therapy more beneficial than the control intervention to attain desired outcomes, such as increased independence or improved quality of life?

What is the difference in cost between occupational therapy and the control intervention?

How beneficial is occupational therapy in relation to costs, when compared with the control intervention?

As resources available to provide occupational therapy can be limited, economic evaluations are helpful to make choices regarding how financial investments are made.

Relevance to Occupational Therapy

Occupational therapists have developed tools and processes to evaluate their interventions in terms of benefits to users and other quality standards. Economic evaluations complement traditional processes that measure quality of health services in areas such as efficacy, user satisfaction, effectiveness and accessibility.

Many choices exist in how money is invested for the delivery of health services. An economic analysis adds value to the traditional measurement of quality performance by:

- Recognising the full impact of occupational therapy in terms of costs, as well as benefits; and
- Identifying how to allocate resources where the profession can add optimal value.

Economic evaluations may be undertaken to:

- Ensure occupational therapy is seen as necessary, particularly during service reconfigurations or expansions;
- Ensure occupational therapy remains relevant and is used appropriately;
- Promote accessibility of needed occupational therapy services to intended users;
- Review emerging areas of practice; and
- Evaluate service innovations.

As an example, an economic evaluation may be undertaken to determine the value of introducing 3D printers in an occupational therapy service to produce orthoses. Measures may be evaluated to determine:

- Could the orthoses be made by a less expensive practitioner?
- Does this process increase availability of orthoses at a lower cost?
- Would this process improve productivity to reduce waiting lists?
- Does this process save occupational therapy intervention time and therefore money?

In this situation, economic evaluations complement other quality measurement measures that answer questions such as:

- Is this process as effective to meet treatment goals as using off-the-shelf orthoses or manufacturing orthoses using traditional methods?
- Is the product satisfactory to the user?
- Is the fit of the product satisfactory to avoid risk of harm to the user?

Economic evaluations are most useful when interventions are known to result in beneficial outcomes (Drummond et al, 2015). The economic evaluation can then be used to demonstrate what return on an investment of resources can be expected. Such returns on investment may relate to immediate benefits of an intervention. For example, in the context of community-based rehabilitation, the benefits of occupational therapy could relate to immediate reductions in the involvement of volunteers, family and community members to provide carer assistance. Economic evaluations also examine longer term benefits such as the cost savings gained from reductions in medical or hospital care as result of the community-based rehabilitation (Toida & Takamura, 2002).

Evaluation of the cost effectiveness of occupational therapy interventions is identified as a global occupational therapy research priority by the World Federation of Occupational Therapists (WFOT) (2016). In some areas, occupational therapists have begun to evaluate their interventions in economic terms. Recent reviews of the economic literature in occupational therapy, however, indicate that more research is needed to demonstrate how the profession provides cost effective solutions to optimising occupational engagement and participation in society, thereby promoting health and well-being (Green & Lambert, 2017).

The Economic Evaluation Process

1. Identify the purpose

An economic evaluation begins by selecting a topic and defining the purpose or objective for the investigation. The purpose statement identifies the interventions that will studied. For example, Lambert et al (2009) stated the objective of their study was 'To assess the cost-effectiveness of an occupational therapy-led lifestyle approach to treating panic disorder in primary care compared with routine general practitioner's care'.

To demonstrate that an input has a desired effect in an economic evaluation, it is necessary to measure both inputs and benefits of the service to compare performance with a 'control' intervention. The control intervention usually involves the traditional or conventional approach used to provide a service, before a change was implemented or a new programme was introduced. This may involve comparing the service to a 'non-intervention' group. In study by Lambert et al (2009), occupational therapy intervention for people with a panic disorder was compared with conventional primary care treatment from a general practitioner.

Control interventions may also involve variations in how a new programme is delivered to determine the most cost-effective method. For example, to evaluate the cost-effectiveness of preventive occupational therapy intervention for well older adults, Hay et al (2002) compared occupational engagement after participants engaged in either an occupational therapy group, a social activity group or a passive activity group.

Consideration of the following questions is helpful when determining the purpose of an economic evaluation:

- What is the intervention?
- What are the goals of the intervention?
- Where and how is the intervention offered?
- What populations are served?
- Who provides the service?
- Why is this intervention used? How does it differ from previous interventions?
- What are the alternatives to the intervention? How do they compare?

2. Determine expectations for the intervention

To develop a design for an economic evaluation, it is necessary to fully understand an intervention for the populations that will be studied. This process involves developing an appreciation of expectations regarding the intervention. Such an understanding is necessary to determine relevant measures that should be evaluated. Information sources that are used to determine such expectations include critical reviews of research evidence, practice guidelines, policy documents, stakeholder consultations and other relevant information.

Questions that may be addressed in a review of expectations include:

- What research and evidence guide practice in relation to this intervention?
- Who are stakeholders and what are their needs? Among others, stakeholders may include service users, employers, local health authorities, professional bodies, governments and other funders such as insurers.
- What key policies at the local, national or international level influence services (e.g.: mission, vision, objectives)?
- What are the clinical and administrative aims of the intervention?
- What are economic drivers for the intervention? For example:
 - Is the intervention in short supply?
 - Is provision of the intervention difficult to access?
 - Is the intervention of shorter duration than conventional care?
- What are the issues which need to be solved? Examples include long waiting lists, frequent readmissions, frequent missed appointments or poor integration with other services.

3. Design the evaluation

Economic evaluations in occupational therapy vary in complexity. Simple evaluations may involve the collection of quality indicator data on costs and benefits to compare performance with established practice standards and benchmarks. Quality indicator data can also be used to measure costs and benefits before and after implementation of a quality improvement initiative within a particular occupational therapy service.

To generalise the findings of economic analyses to other environments or contexts, larger experimental studies are necessary, conducted by a team knowledgeable in research design and methodology. Such teams often include health economists to assist with economic reasoning and cost analyses.

The gold standard for conducting experimental studies for an economic evaluation is the randomised control trial. Such studies involve randomly assigning all participants that match study eligibility criteria into either an experimental group (to receive the intervention under investigation) or a control group (to receive a control intervention). As the participants in both

groups are matched, they are assumed to be the same with the exception of the type of intervention that is provided. Costs of the interventions and the benefits received are then measured and compared between the two groups.

4. Define measures

An economic analysis evaluates how well 'inputs' such as investment of finances and other resources for the provision of occupational therapy translate into desired 'outputs' or benefits. Inputs are described in terms of costs, for example, the average cost of interventions per user. Outputs are measured in terms of cost savings or other quality benefits such as goal attainment, improved safety or increased user satisfaction.

Economic evaluations therefore require:

- Knowing the cost of interventions (inputs) determination of average costs of
 invested resources, based on where and when it is provided, what is provided, and
 how much is provided; and
- Determining the benefits gained from the intervention (outputs) valuation of the outcome of the intervention in terms of costs or other relevant measures.

When defining measures to evaluate costs in economic evaluations, the financial value of all resources needed to provide an intervention must be considered. Calculations include direct expenses, as well the economic value of non-expenditure items, for example, time provided by a volunteer.

Occupational therapy intervention costs often include the following items:

- Staff costs, for example salary and extra expenses related to pensions, holidays, sick cover, education and continuing professional development, supervision and management;
- Overhead costs for space rental and utility expenses such as heating, light, cooling;
- Equipment costs, including information technology, transport; and
- Consumable costs, including materials, dressings.

In addition to evaluating expenses associated with service 'inputs', costs may also be measured to evaluate the consequences or benefits attained from the intervention. Many such 'outputs' can be translated into economic terms, for example, a reduction in loss of income resulting from a return to work. When calculating potential cost savings, it is necessary to consider both who will receive the benefit, as well as when the savings are expected to be realised. If the benefit does not accrue for many years, it may necessary to translate the savings to a present-day value.

For benefits that cannot easily be assigned a monetary value, other types of measures must be identified. Such measures must be explicitly described to indicate how data will be collected consistently in the evaluation.

Different types of evaluations are described in health economics that reflect various ways of measuring benefits (Macdonald, 2006; Chiatti & Iwarrson, 2014). While some methods evaluate the benefits directly in financial terms, others measure outputs in non-monetary terms such as improved quality of life. Economic analyses in occupational therapy most frequently involve direct health-related outcomes, which are non-monetary measures of

benefits. Given the challenges associated with assigning a financial value to a health benefit, for example, for determining benefit costs of a preventing a fall or injury, this type analysis is usually more feasible and acceptable (Macdonald, 2006).

- Cost-benefit evaluations compare costs of services to health and non-health related benefits expressed in monetary terms. As an example of a cost-benefit analysis, Shimada et al (2020) evaluated the cost benefit of adding individualized occupational therapy intervention to group therapy provision for people with schizophrenia by comparing the costs of hospital readmissions after receiving one or both of the interventions.
- Cost-minimization evaluations compare costs of services that provide the same outcome to determine the least expensive option. As an example, a study by Trahey (1991) compared the costs of individual versus group treatment for total hip replacement patients when the effectiveness of both modes of intervention were known to be equal.
- A cost effectiveness evaluation compares the relative costs and outcomes of two or more alternatives, where the benefits are expressed in natural units of outcome. Such units vary and relate to the type of issue investigated. For example, in a cost-effectiveness study evaluating community-based dementia care, Gitlan et al (2010) measured effectiveness of the intervention in terms of a reduction in hours of carer intervention when compared to a wait-list control group. The study determined the incremental cost-effectiveness ratios (ICER) for reducing time required for carers for 'doing things' and 'being on duty'. ICER is a statistic often used in cost-effectiveness analysis that is calculated by the difference in cost between two interventions, divided by the difference in their effect.
- A cost-utility evaluation estimates the ratio between the cost of an intervention and
 the benefit it produces in terms of general economic indices describing desired
 health outcomes, for example, Quality Adjusted Life Years (QALY). For example,
 Zingmark et al (2016) evaluated QALY benefits for occupation-focused health
 promotion for well older people involved in individual treatment, an activity group, a
 discussion group or no intervention control group to determine the most cost
 effective intervention.

In an economic evaluation, more than one type of measure may be used to assess benefits associated with an intervention. Given the multidimensional nature of quality, a number of measures may be required to understand the full impact of the intervention. For example, an evaluation of the use of exercise to improve safety for fall prevention requires examination of user satisfaction, in addition to other measures of effectiveness. A study by Hanley et al (2011) indicated low compliance rates with some forms of exercise compromise the cost-effectiveness of the intervention.

5. Collect and analyze data

As economic evaluations usually compare performance of occupational therapy with a control intervention in terms of costs and benefits, findings may fall into one of four categories (Black, 1990):

- Occupational therapy is less costly and more beneficial than the control group;
- Occupational therapy is less costly and less beneficial than the control group;
- Occupational therapy is more costly and less beneficial than the control group; or

• Occupational therapy is more costly and more beneficial than the control group.

It is obvious that occupational therapy interventions that are less costly and more beneficial present win-win opportunities that should be adopted. Conversely, interventions that are costlier and less beneficial should be avoided.

The adoption of interventions that are more beneficial, but also more expensive depends on the value placed on the increased benefits that are gained. Similarly, the adoption of interventions that are less beneficial but also less costly depends on how much the reduced benefit is perceived as a loss by decision-makers. Decisions often involve consideration of ethical and political, in addition to economic factors (Chiatti & Iwarrson, 2014; Macdonald, 2006).

To assist in decision-making, the incremental cost-effectiveness/utility ratio (ICER/ICUR) is often calculated for either cost effectiveness or cost-utility evaluations. Organisations such as the United Kingdom National Institute for Health and Clinical Excellence (NICE) have developed standards for ICER/ICUR to inform decision-making regarding the cost effectiveness of proposed new interventions (Chiatti & Iwarrson, 2014).

6. Share results

A number of stakeholders may be interested in the results of economic evaluations. For example, funders of health services must increasingly demonstrate not only that services are beneficial, but also that investments are cost effective to gain optimal desired results within the available resources. Given the evidence gained from economic evaluations, results are of high interest to policy-makers and other decision makers to determine what health services are funded.

In addition to funders, information gathered by economic evaluations may be valuable to other groups to promote access to needed and desired services. Such stakeholders include:

- Service users, families and carers;
- Members of the general public;
- Other professionals;
- Patient groups/charities/support groups; and
- Influencers/lobbyists.

Use of the Quality Evaluation Strategy Tool (QUEST)

Economic evaluations measure costs associated with an intervention in relation to the quality of the benefits that are received. Given the multidimensional nature of quality, a broad range of measures may be used.

WFOT developed the Quality Evaluation Strategy Tool (QUEST) (2020) to guide the evaluation of quality in occupational therapy. QUEST outlines a comprehensive process to develop indicators or measures that can evaluate both costs and benefits for an economic evaluation. A conceptual framework described by QUEST identifies seven core quality indicators that serve as a basis for defining the measures. The core indicators relate to seven dimensions of quality, as outlined in Table One.

Table One: QUEST Quality Dimensions

Quality dimension	Definition	Core indicator
Appropriateness	The right occupational therapy services are delivered by the right person, at the right time, to the right person in the right place	Availability of competent occupational therapists.
Sustainability	Occupational therapy services extend into the future, by using resources to deliver health care today without compromising the health of current or future generations.	Long term supply of resources.
Accessibility	The ease of obtaining occupational therapy services from a physical, financial or social perspective.	Ability to access service.
Efficiency	The optimal use of resources in occupational therapy to yield maximum benefits.	Optimal use of resources.
Effectiveness	The degree of achieving desired outcomes that is reliant on the provision of evidence-informed occupational therapy services to those who could benefit.	Success in attaining occupational therapy goals.
Person- centredness	The ability of occupational therapy to meet legitimate expectations of people receiving services.	Satisfaction with service delivery.
Safety	The degree to which reduction of risk and avoidance of harm is considered in the provision of occupational therapy services.	Incidents resulting in harm.

Potential uses of QUEST for economic evaluations follow the quality evaluation process described by the tool that include:

- Mapping expectations relating to interventions studied in an economic evaluation to
 each of the seven quality dimensions to provide a comprehensive understanding of
 issues that need to be considered when choosing evaluation measures for the
 investigation. This mapping process can determine different perspectives and options
 for measuring the costs and benefits of occupational therapy.
- Defining measures that are SMART (specific, measurable, agreed upon, relevant and timely) to evaluate quality expectations with respect to quality dimensions and core indicators. The SMART indicators can be used to objectively and systematically collect data relating to costs and benefits for a particular occupational therapy service. Using QUEST, data may be collected and reported on SMART indicators for all seven quality dimensions; usually, however, only a few priority measures are identified. More than one indicator may be monitored for a particular quality dimension for issues resulting in multiple quality concerns.

Case Study

The use of QUEST in the economic evaluation planning process will be illustrated using a case study. The case study involves the introduction of the use of videoconference technology for providing an occupational therapy counselling programme for the management of chronic pain. The objective of the programme was to increase participation of the service users in meaningful activities. The use of videoconferencing was proposed to improve access to occupational therapy counselling for community-dwelling adults living with chronic pain, when compared with services provided during in-home, in-person occupational therapy visits. Stakeholders interested in this intervention included service users, as well as the insurers who were the funders for the services provided by occupational therapy.

1. Purpose of the economic evaluation

The economic evaluation measured the costs and benefits of using videoconference technology for providing a chronic pain management counselling programme, when compared with delivery of the programme during in-home, in-person occupational therapy sessions.

2. Quality expectations

Expectations regarding the provision of the occupational therapy pain management counselling programme using videoconferencing technology were mapped in relation to QUEST quality dimensions, as outlined in Table Two.

Table Two: Quality Expectations for Introduction of Videoconference Pain Management Counselling

Quality dimension	Sample expectations
Appropriateness Availability of competent occupational therapists	Occupational therapists are competent in the use of videoconference technology; able to instruct others in use of videoconference technology; and able to adapt intervention tools and methods for use with videoconference technology.
Sustainability Long term supply of resources	Videoconference hardware and software and access to technical support are consistently available from the employer for occupational therapists, as needed for service delivery. Costs of videoconference hardware and software are reasonable and affordable for service users.
Accessibility Ability to access service	Technical issues do not interfere with access to counselling sessions online.
Efficiency Optimal use of resources	Reduced travel time for occupational therapists to visit service users will reduce costs of service.
Effectiveness	Occupational therapists are able to adapt to online service delivery to implement the pain management counselling programme using

Quality dimension	Sample expectations
Success in attaining occupational therapy goals	evidence-based guidelines. Rates of service user goal attainment are comparable for videoconference counselling to intervention provided during in-person sessions.
Person-centredness Satisfaction with service delivery	Rates of service user satisfaction are comparable to intervention provided during in-person sessions. Attrition rates due to service dissatisfaction do not increase with use of videoconference technology.
Safety Incidents resulting in harm	Incidents of harm resulting from greater risk-taking in functional activities do not rise when counselling is provided by videoconference.

3. Evaluation design

The design of the economic evaluation involved the measurement of SMART indicators relating to the costs and outcomes of a pain management counselling program offered by occupational therapists, both before and after the implementation of videoconference technology. The evaluation was conducted with service users that met eligibility criteria for involvement in the pain management counselling programme.

4. Evaluation measures

Potential SMART indicators were identified to evaluate the costs and benefits of videoconference pain management counselling by reviewing quality expectations in relation to each quality dimension (Table Three).

Table Three: Potential SMART Indicators to Measure the Introduction of Videoconference Pain Management Counselling in Occupational Therapy

Quality dimension	Sample SMART Indicators
Appropriateness Availability of competent occupational therapists	Training costs for occupational therapists to use the technology
Sustainability Long term supply of resources	Number of service users unable to use videoconference services due to a lack of availability of required resources and equipment (e.g. internet connectivity, computer hardware).
Accessibility	Average wait time to access service

Ability to access service	
Efficiency Optimal use of resources	Average cost of service per session. Average service cost per service user.
Effectiveness Success in attaining occupational therapy goals	Average changes reported by service users before and after intervention on a questionnaire assessing the targeted goals of the programme, including symptoms of pain and satisfaction with daily occupations.
Person-centredness Satisfaction with service delivery	Rates of service user satisfaction. Programme attrition rates.
Safety Incidents resulting in harm	Incidents of harm to programme participants with involvement in the programme.

The indicators were prioritized to select the following measures for the economic evaluation:

Service Inputs:

The costs of resources needed to provide the occupational therapy intervention using either videoconference technology or in-person visits were measured in the form of the **average cost of service per session**. Costs were calculated by considering total staff costs (salary and benefits, including reimbursement for travel time and expenses, continuing professional education costs) plus office overhead expenses (information technology capital and operational costs, heat, hydro, internet). The costs were divided by the number of sessions provided during the evaluation period to attain an average cost.

Service Outputs:

Three indicators were chosen to measure the outputs or consequences of the occupational therapy intervention using either videoconference technology or in-person visits. The indicators evaluated the effectiveness of the intervention, as well as reviewed impact for the accessibility of the service and the acceptability of the treatment methods.

 Rates of service user goal attainment – This indicator measured the average changes in service users scores on a questionnaire administered before and after the intervention sessions. To calculate result, the total change in scores was divided by the total number of service users.

- Average wait time to access service The measure was calculated by dividing the
 total number of days service users were required to wait for an initial occupational
 therapy session after a referral for service was received by the total number service
 users.
- Attrition rate This indicator measured the average number of service users who
 terminated their attendance of occupational therapy sessions prior to completion of
 the intervention programme. The calculation of the rate involved dividing the total
 number of service users that terminated their attendance prior to programme
 completion by the total number of service users.

5. Evaluation findings

Savings or losses in average costs per session for the pain management programme were compared between the videoconference and in-home, in-person intervention groups to determine any incremental gains or losses in respect to three potential benefits:

- Goal attainment for service users;
- Wait time for treatment; and
- Avoidance of programme attrition.

To make a judgement regarding the findings, each type of benefit was independently evaluated in respect to the average costs for each session. When favourable findings were determined for some, but not all of the measures, evaluation of the overall cost effectiveness of the use of videoconferencing for this pain management programme was dependent upon the value placed on the outcomes that were received. Input of stakeholders received during the evaluation of quality expectations was used to determine cost and benefit priorities for making decisions regarding the long-term adoption of the programme. Findings of the evaluation were then able to be used to provide the rationale for the decision regarding programme continuation that was shared with the programme funder and users.

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