Acceptor the Challenge of Outcome Research: Examining the Effectiveness of Occupational Therapy Practice

The theme of this special issue of the American Journal of Occupational Therapy (AJOT) is functional outcomes of occupational therapy practice. The focus on functional outcomes is critical because it targets attention appropriately on the patient. Patients who come to occupational therapy share several expectations about the services they receive. First, they expect that the choice of interventions will be based on science or, in the absence of science, on a consensus of experts, and that the intervention will be delivered by a competent therapist using state-of-the-art technology as applicable. Second, patients expect the services to be appropriate for their own unique health care needs. In applying science to individual patients, therapists make a clinical judgment about what should be done for a particular patient in a particular situation. Standards of the appropriateness of care are based on a consensual judgment of practicing therapists. In other words, given the same patient under the same conditions, to what extent would other therapists agree with the treatment regimen? Third, patients expect the services to be consistent with their own preferences. In formulating therapeutic decisions, the therapist is expected to inform the patient of alternative treatments and, subsequently, to take the patient's perspective into account in making decisions. Lastly, patients expect the occupational therapy interventions to be effective, that is, to lead to the designated outcomes. Because alternative treatments may lead to different outcomes, or achievement of the same outcomes at a different rate, patients need to be aware of the outcomes associated with each intervention to make informed choices. These expectations reflect the social contract between occupational therapy and the recipients of occupational therapy services.

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Historically, society entrusted the health professions with the responsibility for establishing standards of care and for monitoring the quality of care provided. Relman (1988), the former editor of The New England Journal of Medicine, suggested that the basic contract between medicine and society has been renegotiated because of widespread public concern about the quality and cost of American health care. We are now in an era of “assessment and accountability” (Relman, 1988, p. 1220), and occupational therapists, like other health professionals, must account for what they do, why they do it, what the outcomes are, and how much it costs to achieve the outcomes. Hence, the challenge confronting occupational therapists is to demonstrate the value of occupational therapy by providing objective, persuasive evidence of the effectiveness of occupational therapy interventions for the various patient populations served.

Impetus for Outcome Research

Outcome research received its impetus from studies that detected substantive variability in the patterns of medical care within small geographical areas (Subcommittee on Outcome Studies, 1991). These studies documented variability in factors like rates of hospital admissions, lengths of stay, and use of different medical procedures for the same medical diagnosis. Wennberg and Gittelsohn (1973), for example, found that in Vermont the rate of hysterectomies ranged from 20 to 60 per 10,000 persons and that of tonsillectomies ranged from 13 to 151 per 10,000 persons, depending on the community studied. Findings such as these are difficult to justify on the basis of medical need alone. Hence, the public began to question why the rates of procedures like hysterectomies and tonsillectomies were so much lower in one community.
A second initiative supports research to advance the knowledge base for clinical care guidelines and standards. The guidelines are based on a synthesis of research and clinical expertise and are designed to assess and assure quality of care. Occupational therapists have served as panelists or consultants for the following guidelines: poststroke rehabilitation, treatment of stage II and greater pressure ulcers, low back problems, acute pain management, urinary incontinence in adults, pressure ulcers in adults, and diagnosis and treatment of depressed outpatients in primary care settings.

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In some respects, outcome research reflects an intriguing departure from the gold standard for health services research, the randomized controlled clinical trial. Randomization, that is, the assignment of patients to alternative treatments by chance, eliminates bias in assigning treatments, equates the groups on any covariates that may influence outcomes, and ensures the validity of statistical inferences. An experimental situation is created wherein a cohort of patients with discrete clinical characteristics receives a predetermined intervention. These features make the randomized controlled clinical trial the research design of choice for demonstrating treatment efficacy. Unfortunately, randomization is not always possible. It may take decades to accrue a sufficient number of subjects meeting tightly defined criteria. It may be unethical to withhold a treatment recognized as having some degree of effectiveness. In the typical outcome study, subject criteria are more broadly defined than in clinical trials, and comparison groups may be constituted by convenience rather than randomization. Statistical tests (e.g., analysis of covariance) are used to reduce bias, but they cannot correct for the influence of unknown variables on the outcome. In effect, outcome research is a systematic study of usual clinical practice with the intent of ascertaining the extent of improvement and of linking alternative treatments to outcomes. Thus, although we may have more confidence in the findings generated by randomized controlled clinical trials, the outcome movement carries with it the message that practice-based effectiveness research also has a valid role in the formation of health care policy (Perketch & Verran, 1992; Nutting, 1991).

Definition of an Outcome

An occupational therapy outcome is the functional consequence for the patient of the therapeutic actions implemented by an occupational therapist. Lang and Marek (1992) identified four outcome components. The first component involves determining the outcome behavior and the means of measuring it. Potential outcomes of occupational therapy intervention are stronger muscles, increased independence in dressing, or return to work. Muscle strength may be measured through manual muscle testing, a dynamometer, or pounds of weight lifted. Dressing independence may be measured dichotomously, as able (independent) or unable (dependent); ordinal, as needing no, minimal, moderate, maximal, or total assistance; or, on a ratio scale, as the percentage of dressing tasks performed independently. Return to work may be measured as the number of days taken to return to usual household activities, an adapted job situation, or full employment. Careful consideration needs to be given to selecting an outcome behavior that can reasonably be expected to change (or at least stabilize) as a result of therapy. The same studied attention needs to be given to the selection of a measure that is sensitive to the changes caused by the intervention. Although measuring dressing behaviors as independent or dependent is valid, this method will not document change in dressing performance as sensitively as the percentage scale, because increases from 20% to 40% to 80% in dressing independence will continue to be rated as dependent on the dichotomous scale until 100% independence is reached.

The second outcome component involves a determination of when the outcome will be achieved. Some occupational therapy interventions yield almost immediate results. Prescription of a long-handle back sponge for a person with restricted upper extremity motion may enable that person to move from dependent to independent bathing status upon receipt of the device. Other interventions require more time for change to occur. Reducing a contracture or teaching one-handed home management techniques may take months. Thus, in the clinical situation, it is imp...
important to designate outcomes that can be expected to occur given the anticipated frequency and duration of therapy.

The third outcome component requires a detailed specification of the occupational therapy intervention that is administered to produce the outcome. A 1-hr occupational therapy session for a patient who has just experienced a stroke may consist of the following procedures:

- 50 min: Training in activities of daily living as follows: 10 min - bed to chair, chair to commode transfers; 20 min - one-handed dressing techniques; 10 min - one-handed oral hygiene techniques; 10 min - one-handed feeding techniques
- 10 min: Self-range of motion exercises for the upper extremity

If occupational therapy outcomes are to be matched with occupational therapy interventions, the time spent in occupational therapy must be described in terms of the discrete procedures experienced by the patient. Further, if practice setting is the unit of analysis, each setting needs to standardize its intervention protocols. This is the only way we can elucidate occupational therapy interventions responsible for the measured outcomes.

The last outcome component requires an identification of the specific population for which the occupational therapy intervention is to be given. Outcomes emerge from the interaction between characteristics of the patient and the discrete elements of the intervention. Even if occupational therapy intervention is held constant across several stroke rehabilitation sites, functional outcomes are likely to be less favorable for patients who are older, more severely ill, less educated, poor, and socially isolated than for those who are younger, less ill, rich, and have good social support. Hence, in occupational therapy outcome research, it is important to describe patients' medical and functional diagnoses as well as other factors that may markedly influence the outcomes.

Determining the outcome behavior and the measure that is to represent it, predicting when the outcome should be reached, describing and quantifying the intervention, and identifying the salient characteristics of various patient populations are difficult clinical and research decisions. As practice-based research accumulates, better information will be available to assist in making these decisions.

The Meaning of Function

Enhanced function is the desired outcome of occupational therapy intervention. Unfortunately, the term function has multiple connotations. It can refer to an organ or system of the body, as in muscle function; a body part, as in arm function; task function, as in dressing function; or, to the ability to enact a social role, as in homemaker function. In recent years, numerous efforts have been made to clarify the meaning of function. One widely accepted scheme is the model of disability put forth by the World Health Organization (WHO). In this scheme, disability applies to the spectrum of experiences associated with limitations in function (Wood, 1980). The functional sequelae of pathology are designated as impairment, disability, and handicap, and each term implies a different level of dysfunction.

Impairment refers to dysfunction at the level of an organ or system. Impairments may be biologic (e.g., restricted range of motion), cognitive (e.g., short-term memory loss), or affective (e.g., apathy). Reduction, alleviation, and prevention of impairments are beneficial outcomes of occupational therapy interventions, because when impairments become severe they may cause disability. Disability refers to dysfunction in task performance. When the joint restrictions make it difficult or impossible to perform the basic movements that underlie daily living tasks, disability results. Teaching patients how to compensate for impairments when performing daily living tasks so that disability is avoided or minimized is a beneficial outcome of occupational therapy intervention at the second level of disablement. When substantive disability persists and a person is unable to assume responsibility for a majority of the essential tasks associated with a social role, handicap emerges. Job modification, as well as assisting patients to supervise caregivers, access support services, and advocate for the development of support services are illustrative of occupational therapy interventions at the level of handicap.

As one moves up the hierarchy from impairment to disability to handicap, disability becomes increasingly complex. However, the hierarchy does not imply a simple cause-and-effect relationship between impairment and disability or disability and handicap. Dysfunction at one level does not automatically result in dysfunction at the next level; it merely sets the condition for the development of dysfunction.

The WHO model of disablement provides a common terminology for the health professions as well as a conceptual structure for ordering the concepts that define disablement. Elsewhere, we illustrated the relationship between the WHO terminology and occupational therapy terminology (Rogers & Holm, 1989). We also discussed a major limitation of applying WHO terminology to occupational therapy phenomena, because the former is more restrictive than the latter. For example, the WHO model only defines dysfunction, whereas occupational therapy takes into account the preservation and strengthening of abilities as well as the elimination, reduction, or prevention of dysfunction.

Tracing the Outcome Theme

The WHO model will be used as a framework for our discussion of research on functional outcomes of occupational therapy intervention. Functional outcomes of each study (i.e., elimination, reduction, or prevention of impairment, disability, or handicap) are described with the WHO model, because this model is used by the National Institutes of Health, the HICPR, and the National Center for Medical and Rehabilitation Research, among others. While many possible frameworks are workable, we chose to use the WHO model because it is familiar to those agencies that promote and fund studies on functional outcomes.

The articles presented in this issue were generated by several calls for papers published in OT Week. For the most part, they represent the beginning efforts of a profession struggling with burgeoning caseloads and limited personnel and fiscal resources for research to meet its professional responsibility to demonstrate the value of occupational therapy. Neistadt (1994) reports on an effectiveness study of two alternative...
treatments for reduction of impaired coordination in men with brain injury who are undergoing long-term rehabilitation. The difficulty encountered in obtaining an adequate sample size for occupational therapy research is illustrated by the need to recruit from 10 head injury programs to obtain 45 subjects who met the study's entry criteria. Assignment to treatment groups was random, and statistical tests indicated that the two groups were comparable on salient variables before treatment, except for age. One intervention, parquetry puzzle construction, is an impairment-level intervention; the other, meal preparation, is a disability-level intervention. The outcome behavior, speed of hand performance, is measured by two subtests of the Jebsen-Taylor Test of Hand Function. Hence, the study compares the effects of an impairment-level intervention and a disability-level intervention on the reduction of impaired coordination. The findings suggest that the disability-level intervention may be more beneficial, because this treatment group showed greater improvement on one of four outcome indicators. Detection of greater differences between the treatment groups may have been mitigated by the subjects' continued participation in their regular occupational therapy program. Thus, the findings actually represent outcomes achieved as a result of regular treatment plus the study treatments. In addition, the treatment duration of 3 weeks, with a frequency of three 30-min treatments per week, may not have been sufficient for differential treatment effects to be realized.

One advantage of single-subject research designs is that they can be more readily incorporated into practice than experimental designs. Casby and Holm (1994) used three single-subject designs to examine the effectiveness of music for reducing repetitive disruptive vocalizations of nursing home residents with dementia of the Alzheimer's type. A leisure occupation, listening to music, was chosen as the intervention. Because disruptive vocalization is not meaningful communication, the functional outcome of this study was a reduction in impairment (i.e., disruptive vocalizations). The occurrence or nonoccurrence of disruptive vocalization was measured during predetermined intervals. Selection of the most disruptive residents as subjects capitalizes on documenting treatment effects should they occur, because these subjects could show the most dramatic improvement. The study involves a well-delineated intervention in terms of frequency, duration, equipment, music content, and rationale for music selection. The findings support use of music with the target population and the target behavior.

A central question of outcome research is the extent of compliance with treatment programs. Furth, Holm, and James (1994) pursued this question in regard to injury prevention education for patients with cumulative trauma disorders. This study also underscores the problem of obtaining homogeneous samples for occupational therapy research, because the 15 subjects were gleaned from five area clinics over 3 months. The functional outcome is focused on the reduction of disability, associated with work task performance, and prevention of handicap, associated with work role retention. The outcome behavior, compliance with recommendations at the worksite, was rated on a 3-point scale. Interventions to change daily living habits are difficult to evaluate because observation of performance in the home or worksite is expensive and often not feasible. These researchers accepted a self-evaluation of compliance obtained via telephone interview; however, a concrete example of behavior change had to be given to substantiate compliance. A mix of impairment-oriented and disability-oriented interventions were used. The data reflect an interesting occupational therapy practice pattern, because ergonomic equipment and therapeutic maintenance techniques were stressed over body mechanics and work simplification. Hence, it was not surprising to find better outcomes regarding ergonomic equipment and therapeutic maintenance techniques, and the 80% to 92% compliance achieved for these recommendations may well be the maximum attainable. The implication for quality improvement would be to concentrate on body mechanics and work simplification or reevaluate their significance to injury prevention education. It would be informative to chart the frequency and duration of treatment needed to achieve the compliance documented.

The medical record often provides a rich source of information about function, despite notorious problems in incompleteness and inconsistencies. Current efforts to standardize the collection of minimum data sets for various populations such as the Minimum Data Set for Long Term Care (MDS) will increase the utility of the medical record for outcome research. Khader and Tomlin (1994) conducted a chart audit of stroke patients admitted to an inpatient rehabilitation unit to examine wheelchair transfer outcomes. By design, only men were included as subjects, hence the results are gender specific. Differences in impairment characteristics associated with left and right cerebral vascular accident (CVA) were hypothesized to lead to differences in disability regarding transfer skills. To examine this hypothesis, record review was continued until sufficient subjects accrued for each subgroup. Transfers skills were measured with the Functional Independence Measure. The results indicated that patients with left CVA and right CVA made equivalent progress during rehabilitation. The intervention of rehabilitation was not defined; however, to gain insight into the outcome behavior, the effects of several patient and rehabilitation variables on transfer performance were assessed. Better outcomes were related to younger age, earlier onset of rehabilitation, and longer rehabilitation. The study illustrates the importance of describing both patient and treatment characteristics.

Brodie, Holm, and Tomlin (1994) also conducted a chart review of patients with stroke admitted to a rehabilitation hospital. Their purpose was to predict discharge outcomes from demographic, diagnostic, and therapy variables known at admission. Their article demonstrates an interesting application of the WHO model as a classification device. Therapy variables involved assessment, intervention, and adaptive aids, and occupational therapy interventions were classified as either impairment or disability oriented. This classification scheme enabled them to identify some intriguing practice patterns: (a) most interventions were impairment oriented; (b) patients with the most severe disabilities received more disability-oriented interventions than those with the least severe disabilities; (c) regardless of the level of disablement, equivalent proportions of impairment-oriented interventions were administered.
Age, marital status, premorbid living situation, and disability level were the most significant predictors of discharge outcome.

Measurement of occupational therapy outcomes requires instruments that are valid, reliable, and sensitive to change. Rogers, Holm, Goldstein, McCue, and Nussbaum (1994) compare the yield from two interviewing procedures and performance testing. Although occupational therapy assessment is heavily performance-based, therapists often use a combination of subjective and objective assessment methods (Rogers & Masagatani, 1982). Using subjective and objective data interchangeably is valid only if the methods yield equivalent results. The Rogers et al. study cautions against using subjective and objective data interchangeably. If performance testing is accepted as the gold standard, the study suggests that real differences in personal and instrumental activities of daily living between discharge and follow-up may be obscured by factors attributable to assessment method rather than patient capability. The focus of the outcome measure in this study is on disability rather than impairment, and the findings pertain to older adults discharged from an acute psychiatric hospital.

Cohen’s (1994) article on vestibular rehabilitation differs from the preceding articles because it is an integrative review of literature rather than original research. Cohen uses available research and clinical expertise to summarize the state of the science regarding vestibular function and dysfunction, the assessment of vestibular function, the relationship between vestibular impairment and disability, and expected outcomes of vestibular rehabilitation. Interventions focusing on impairment and disability are discussed and outcome measures are identified for both reduction of impairment and disability.

In the education section, Best (1994) addresses the prediction of an occupational therapy education outcome; namely, the clinical performance achieved by entry-level students during Level II fieldwork with patients with physical impairments. The target population is from one academic setting but includes entry-level professional students at the baccalaureate and master’s degree levels. The outcome involves role performance and is measured by a nationally accepted tool, the Fieldwork Evaluation for the Occupational Therapist. The prediction interval is relatively short and spans from the completion of physical dysfunction course work to the completion of physical disabilities fieldwork. The significance of the study lies in the potential value of being able to distinguish unsuccessful students from successful ones before failure occurs. The inclusion of a physical disabilities clinic grade in the prediction model differentiates this study from its predecessors. The results of the study suggest using factors other than course grades as predictors of clinical performance.

The first case report shifts to the therapist’s perspective of clinical outcomes. Meredith (1994) addresses the quandary that occupational therapists face when prescribing upper extremity prosthetic devices. The performance of three male subjects with below-elbow amputations using four prosthetic prehensile devices is compared. The outcome behavior is prehension; outcome measurement incorporates both impairment-related measures and disability-related measures. Although speed of performance is an easily obtainable outcome measure, Meredith recognizes its shortcomings as the sole indicator of functional prehension. Hence, she creatively establishes additional clinical criteria. The complexity of the prosthetic prescription becomes readily apparent as subject factors of hand dominance and prior experience with a particular prosthetic device are related to treatment outcomes. The study findings present a variety of functional outcomes to consider when making recommendations about prehensors.

The second case report grapples with the problem of documenting the occupational therapy process and communicating it to other health care providers, legal officials, and payers. Rogers and Salta (1994) provide an example of an occupational therapy report and an analysis of its structure. Finally, in the “Issue Is” department, Velozo addresses whether occupational therapy should choose a single functional outcome measure.

Outcome Research Agenda

This AJOT issue draws attention to the importance of occupational therapy research focused on functional outcomes. In making therapeutic decisions, therapists exercise independent clinical judgment. Outcome research provides a vehicle for sharpening these judgments so that patients receive the quality of care they expect. The American Occupational Therapy Association and the American Occupational Therapy Foundation have supported outcome research through research consultation for investigators, mentoring for future grant recipients, and funding for effectiveness studies. A comprehensive agenda for outcome research in occupational therapy would encompass the following components:

- Identifying the most appropriate directions for a clinical research program focused on the effectiveness of occupational therapy practice.
- Examining the variability in occupational therapy practice emanating from patient characteristics, clinician choice of assessment content and tools, clinician choice of occupational therapy interventions, clinician competence (i.e., novice, expert), clinician advanced specialty training, type of practice setting, and source of reimbursement.
- Examining the linkages between medical and psychiatric pathology, impairment characteristics, disability characteristics, specific occupational therapy interventions, and patient functional outcomes. This would require developing diagnostic taxonomies classifying the types of functional problems (i.e., impairments, disabilities, and handicaps) treated in occupational therapy; developing intervention taxonomies classifying occupational therapy interventions; and relating patient outcomes to functional problems and specific occupational therapy interventions.
- Devising an occupational therapy minimum data set to facilitate outcome research across sites and settings.
- Developing functional outcome measures that are sensitive to occupational therapy interventions.
- Devising strategies to incorporate research examining the effectiveness of occupational ther-
apy interventions into existing programs examining the effectiveness and outcomes of medical treatments (e.g., PORTs).

- Publishing outcome studies in non-occupational therapy journals as well as occupational therapy journals.
- Developing practice-based research networks to investigate occupational therapy effectiveness in targeted populations.
- Fostering the development of occupational therapy scientists in the research methods and designs appropriate for studying the effectiveness of occupational therapy practice.
- Increasing the participation of occupational therapy scientists on federal research grant review panels.
- Advocating for the inclusion of essential occupational performance variables (e.g., the occupational therapy minimum data set) in national health databases.

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References


