Searches and Content of the OTseeker Database: Informing Research Priorities

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Jenny Strong, PhD, MOccThy, is Professor, Division of Occupational Therapy, School of Health and Rehabilitation Services, University of Queensland, Queensland, Australia. BACKGROUND. A strategic and prioritized approach to occupational therapy research is needed, particularly given the limited research funding available. Comparing occupational therapists' information needs with the research evidence available can potentially inform research debate within the profession. This study aimed to identify research topics most often sought by users of the OTseeker database and to compare these with the quantity of topics available in the database.

METHOD. A random sample of keyword search terms submitted to OTseeker (n = 4,500) was coded according to diagnostic and intervention categories, and compared with the amount of research contained in OTseeker in 2004.

RESULTS. Most frequently sought topics were relevant to the diagnostic categories of pediatric conditions (19%), neurology and neuromuscular disorders (17%), and mental health (17%). Most frequently sought intervention topics included modes of service delivery, sensory interventions, and physical modalities. Although many frequently sought topics had a correspondingly high volume of research in OTseeker, a few areas had very little content (e.g., fine motor skill acquisition, autistic spectrum disorder). This information is offered to inform discussions about research priorities and resource allocation for research within occupational therapy.

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Introduction

Although the volume of research increases annually, there is still concern about the limited body of research to inform occupational therapy practice. Because limited funds are available for its support, a strategic and prioritized approach to occupational therapy research is needed (Hayes, 2000; Ilott, 2004; Ilott & White, 2001).

Setting research priorities is influenced by many factors (de Francisco, 2004; Fuhrer, 2003). Numerous stakeholder groups (researchers, institutions, agencies, professions, and government) undertake research priority setting, with each approaching the process with different goals, values, and degree of specificity. For example, national health priorities are often expressed at the broad level of disease, whereas priorities set by researchers are often much more specific. Factors that need to be considered when setting research priorities include the magnitude and burden of a particular problem (e.g., disease), the determinants of the problem, what knowledge and research already exist in a particular area, the cost-effectiveness of potential interventions, current resources available, and demographic trends (de Francisco, 2004).

A number of research priority-setting activities have been undertaken at national levels by the occupational therapy profession. In 2001, the College of Occupational Therapists in the United Kingdom developed a Research and Development Strategic Vision and Action Plan (Ilott & White, 2001). This plan was informed in part by a nationwide consultation with 766 people (mostly occupational therapists) between 1997–1998, to identify priorities for research and development. As a result of this process, evaluating the effectiveness of specific interventions was identified as the top research priority for occupational therapy in

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the United Kingdom. In the United States, the American Occupational Therapy Association (AOTA) and the American Occupational Therapy Foundation (AOTF; 2003) recently reconfirmed a set of priorities ("Research Priorities and Parameters of Practice for Occupational Therapy") to guide research initiatives and funding. The process involved consultation with more than 200 occupational therapy clinicians, researchers, and educators, followed by a consensus process with 30 leaders across the profession. Consensus was reached on 10 broad research questions, a number of which focused on the effectiveness of interventions.

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Research on the effectiveness of occupational therapy interventions has been consistently identified as a high priority by the profession and its special interest groups. For example, 401 hand therapists in the United States identified an urgent need for randomized controlled trials (RCTs) to determine the effectiveness of hand therapy interventions (MacDermid et al., 2002). In the United Kingdom, a survey of research priorities in mental health confirmed that evidence of effectiveness of occupational therapy interventions (particularly the core areas using activity and occupation) remains an important theme (Fowler & Hyde, 2002).

Priorities for proposed research cannot be set without knowledge of existing research. To date there has been no systematic estimate of the overall quantity of research supporting the effectiveness of occupational therapy interventions, nor of those areas of occupational therapy practice with and without substantial research evidence. This type of estimate would require systematic searches across many sources and would be a complex and time-consuming process. The OTseeker (Occupational Therapy Systematic Evaluation of Evidence) evidence database, which is available at www.otseeker.com, was established in 2003 to address this need. Currently the database contains abstracts of RCTs and systematic reviews relevant to occupational therapy. Systematic reviews and RCTs have the capacity to provide strong evidence about the effectiveness or ineffectiveness of interventions (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000). An inclusive approach is taken when determining which RCTs and systematic reviews to include in OTseeker, in recognition of the breadth of occupational therapy practice worldwide. Systematic reviews and RCTs in OTseeker are identified through regular searches in the following electronic databases: MEDLINE, CINAHL, ERIC, EMBASE (Rehabilitation and Physical Medicine), AMED, PsychINFO, the Cochrane Library, CancerLit, and Ageline. To help maximize the comprehensiveness of each database and reduce duplication of effort, exchange of database contents occurs between the developers of OTseeker, PEDro (Physiotherapy Evidence Database, available at www.pedro.fhs.usyd.edu.au), and the Rehabilitation and Related Field of the Cochrane Collaboration. Each RCT in OTseeker is critically appraised for internal validity and statistical interpretability (Bennett et al., 2003) and coded in up to five intervention and five diagnostic categories.

OTseeker has the potential to inform the profession about research strengths and gaps. It is possible to broadly determine the amount of research evidence contained in the database on the effectiveness of different occupational therapy interventions across different diagnostic categories. It is also possible to identify common information needs by analyzing the terms or topics of searches conducted in OTseeker. This approach has been used to examine the match between users' searches and the content of other databases and Web sites (Bader & Theofanos, 2003; Shuyler & Knight, 2003). For example, Shuyler and Knight (2003) analyzed the content and intent of 793 search queries submitted to an orthopedic, sports medicine, and arthritis education Web site. Mismatches between the searches submitted and the database content were identified. This information was then used to increase content on topics frequently sought and to optimize the Web site interface for users' needs. In another study, analysis of the content of the PEDro database identified the quantity of research on physiotherapy interventions (Moseley, Herbert, Sherrington, & Maher, 2002) and was suggested as a method to identify research needs.

Comparing search terms entered by users of OTseeker with the contents of the database may broadly inform discussions of research activities and priorities relevant to occupational therapy interventions. The aims of this study were to (a) identify research topics most often sought by occupational therapists when using OTseeker; and (b) compare these topics with research available in OTseeker.

Method

This study involved the analysis of searches submitted to OTseeker and the content of the database.

OTseeker Search Options

OTseeker can be searched using different options, including text boxes or drop-down menus (refer to www.otseeker.com for details). Options include: (a) entering keywords into the keyword textbox, with or without truncation (for example, "stroke" and "splint*"); (b) selecting diagnostic and intervention categories from drop-down menus (for example, "pediatrics" and "consumer education"); or (c) entering specific information such as title, author name, journal title,

year published, method (RCT, SR [systematic review]), and internal validity and statistical reporting scores. Studies retrieved using the keyword search option contain the keyword or keywords specified in their title, abstract, or both.

The intervention and diagnostic drop-down menus currently contain 34 major intervention categories and 28 diagnostic categories. The selection of these categories for OTseeker were informed by Medical Subject Headings (MeSH), major databases relevant to occupational therapy, the Wilma L. West Library, seminal textbooks, and consultation with academics and clinicians. When entered in the database, articles can be coded in up to five intervention and five diagnostic categories. For example, an article about the effectiveness of a respiratory rehabilitation program could be coded under the diagnostic category "pulmonary/respiratory conditions" as well as the intervention categories "consumer education," "exercise/strength training," and "relaxation/stress management."

Data Collection

Random sample of keyword searches submitted to OTseeker. The details of all OTseeker searches are automatically logged. Searches conducted between March 17, 2003 (when OTseeker was launched), and July 17, 2004, were downloaded into a Microsoft Excel spreadsheet. Because the keyword text box was the most frequently used search strategy—with 92% of searchers using this option compared to 12% using diagnosis and intervention drop-down menus for searching—further analysis of the keyword searches was undertaken.

Because of the large number of keywords captured by OTseeker since its development (N = 130,667), a random sample of keywords logged during a 4-month period was collected for analysis. The period March 17, 2004, to July 17, 2004, was selected because the database had been available online for 1 year. By this time, it was anticipated that users would be searching in a more routine manner and there would be fewer test searches being conducted by the OTseeker team.

Of 46,350 searches logged in this period, 4,500 keywords (approximately 10%) were randomly selected using a random number generator. Where possible, each keyword was coded in Excel according to the OTseeker "intervention" or "diagnoses" categories. Other categories were created for keywords that could not be categorized according to intervention or diagnosis, for example, "assessments" and "management." Keywords could be categorized into more than one intervention, diagnostic, or other category. For example, "music AND elderly" was categorized into both "creative therapies" (intervention) and "gerontology" (diagnosis) categories. Categories with more than 100 searches

were further broken down into the top two or three subcategories on the basis of consistent terminology. For example, the subcategory "sensory integration" included searches using the phrase "sensory integration" or close synonyms. One member of the OTseeker team who had previously coded more than 2,000 articles for OTseeker categorized all keywords. The accuracy of this coding was verified by a cross-check of frequencies between the final data set of 4,500 searches and the sampling frame of 46,350 searches for 5 individual categories. The results were equivalent.

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Matches and discrepancies between searches and content. To determine the match or discrepancy between users' search terms and database content, the number of RCTs or systematic reviews in OTseeker contained in OTseeker at October 2004 was determined for each intervention and diagnostic category and frequently searched subcategories.

Data Analysis

Descriptive statistics were used to analyze the data. Two counts were performed: (a) the number of searches allocated to each category and subcategory; and (b) the number of RCTs and systematic reviews contained in OTseeker broadly corresponding to these search categories and subcategories. Both sets of data were presented in quintiles to enable identification of matches or discrepancies between frequency of searches and database content. A quintile is one fifth of a ranked list. It separates data into five groups (in ascending order) so that an equal number of categories is included within each group. These quintiles were determined by ranking searches submitted to OTseeker from the most frequently searched topics to the least frequently searched. This ranking was then compared with the ranking of topics that had the most content in OTseeker to those with the least content. A decision was made that corresponding "search" and "content" categories that were separated by more than 1 quintile would indicate discrepancy between the level of interest in a topic (indicated by number of searches) and the amount of corresponding research content available in OTseeker (number of RCTs and systematic reviews).

Results

Search categories. Of the 4,500 keywords analyzed, 3,069 (68.2%) related to diagnoses [conditions], 2,279 (50.6%) related to interventions, and 975 (21.7%) related to general categories (with category totals not equaling 100% because some keywords were allocated to more than one category). The number and percentage of keyword categories and subcategories used are presented in Tables 1 to 3.

Information sought by diagnostic categories. More than 40% of searches using diagnostic terms were for studies

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Table 1. Number of Searches and OTseeker Content According to Diagnostic Categories

		lumber of Searches of OTseeker by Quintile (Total = 3,069)		Number of RCTs and SRs in OTseeker by Quintile	
Diagnostic Topic	Number	Quintile	Number	Quintile	
All pediatrics	576	1	265	2	
All neurology	536	1	414	1	
All mental health	516	1	399	1	
Stroke	249	1	305	1	
All gerontology	157	1	413	1	
All musculoskeletal disorders	157	1	285	1	
All pain	149	1	478	1	
All hand injury/condition	125	1	72	3	
Orthopedics	104	2	304	1	
Rheumatology	84	2	170	2	
Congenital disorders	65	2	15	4	
Autism	60	2	6	5	
Cardiovascular disorders	58	2	240	2	
Dementia	57	2	70	3	
Depression	55	2	258	2	
Schizophrenia	53	2	80	3	
Tendon/muscle complaints or injuries	50	3	13	5	
Health promotion/education	49	3	316	1	
Oncology/palliative care	47	3	87	2	
Spinal cord injury	44	3	15	4	
Cerebral palsy	38	3	41	3	
Acquired/traumatic brain injury	37	3	31	3	
Pulmonary/respiratory conditions	28	3	100	2	
Hip replacement	28	3	5	5	
Attention deficit hyperactivity disorder	27	4	14	5	
Developmental delay	25	4	30	3	
Musculoskeletal surgical	25	4	20	4	
Pain—back/neck	25	4	277	2	
Burns	23	4 ·	15	4	
Intellectual disability	22	4	22	4	
Learning disability	20	4	21	4	
Visual impairment	18	4	4	5	
Amputation	14	5	7	5	
Public health	13	5	139	2	
Immune system dysfunction	12	5	32	3	
Gerontology—mental health	11	5	33	3	
Edema	10	5	16	4	
Hearing impairment	3	5	1	5	
Endocrinology	2	5	27	4	
Renal conditions	0	5	6	5	

Note. RCTs = randomized controlled trials; SRs = systematic reviews. Other = 28 searches

involving general medical and surgical disorders, with most interest being shown in neurology and neuromuscular disorders (particularly stroke; 17%). Searches in the pediatric and mental health categories accounted for approximately 19% and 17% respectively, of all searches using diagnostic terms. Other frequently sought diagnostic categories as indicated in the 1st quintile included gerontology, musculoskeletal disorders, and pain (see Table 1).

Information sought by occupational therapy interventions. The most frequent searches in the intervention categories were in the areas of service delivery (e.g., community or hospital based therapy), treatments for sensory problems [sensation] (e.g., sensory integration), physical modalities

Table 2. Number of Searches and OTseeker Content According To Intervention Categories

	Number of Searches of OTseeker by Quintile (Total = 2,279)		Number of RCTs and SRs in OTseeker by Quintile	
Intervention Topic	Number	Quintile	Number	Quintile
Service delivery	195	1	422	1
Sensation	151	1	66	3
Physical modalities/orthotics/splinting	150	1	387	1
Assistive technology/adaptive equipmer	ıt 131	1	76	3
Developmental therapy	126	1	80	3
Psychosocial techniques	115	1	546	1
Skill acquisition/training	104	1	151	2
Movement training	103	1	182	2
Health promotion	100	1	405	1
Basic activities of daily living	98	1	66	2
Vocational retraining/work	94	2	109	2
Consumer education	90	2	875	1
Cognition	86	2	83	3
Sensory integration	77	2	32	4
Fine motor skills	76	2	10	5
Relaxation/stress management	75	2	317	1
Creative therapies	70	2	44	4
Splints/braces+	65	2	52	1
Home modification/access	63	2	48	4
Hand therapy	62	2	77	3
Leisure/recreation	57	3	20	5
Exercise/strength training	50	3	828	1
Behavioral interventions	44	3	554	1
Complementary therapies	43	3	59	3
Assistive technology*	40	3	32	4
Perception	39	3	32	4
Neurodevelopmental therapy	38	3	25	4
Service delivery—community^	37	3	117	2
Positioning	35	3	50	4
Falls prevention	34	3	90	2
Wheelchair/mobility*	33	4	10	5
Service delivery—groups^	32	4	120	2
Community living skills	29	4	13	5
Service delivery—home^	28	4	160	2
Skill acquisition (not fine motor)	28	4	69	3
Caregivers	27	4	141	2
Instrumental activities of daily living	23	4	20	4
Taping/slings+	22	4	6	5
Soft tissue therapy	20	4	83	2
Mattress/cushions*	19	4	7	5
Technology	18	5	210	1
Specific sensory techniques#	17	5	55	3
Ergonomics	15	5	60	3
Purposeful activity	15	5	20	5
Social skills	15	5	43	4
Counseling	14	5	344	1
Constraint-induced movement	14	5	9	5
Play	12	5	10	5
Multisensory environments#	12	5	9	5
Case management	8	5	41	4

Note. RCTs = randomized controlled trials; SRs = systematic reviews.

- + Subcategory of physical modalities/orthotics/splinting
- Subcategory of assistive technology/adaptive equipment
- ^ Subcategory of service delivery
- # Subcategory of sensation

(including splinting and orthotics), assistive technology, developmental therapy, psychosocial techniques, skill acquisition/training, movement training, health promotion, and basic activities of daily living. The most frequently sought

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Table 3. Number and Type of General Keywords Used During Searches of OTseeker

General Category	Number of Searches Submitted			
Assessments	244			
Ambiguous/other	174			
Theoretical approaches	67			
Occupational therapy	65			
Professional issues	54			
Research/EBP	48			
Occupational therapy process	48			
Management	45			
Occupation	40			
Training	34			
Activity	25			
Disability	21			
Rehabilitation/function	17			
Culture/social groups	16			
Author/name	16			

Note. EBP = evidence-based practice.

intervention categories are presented in Table 2 (indicated in the 1st quintile).

Other. Table 3 lists search topics that were neither interventions nor diagnostic in nature. The most frequently searched topic in the other categories was "assessments" and consisted of searches that entered the name of a specific measure or general terms relevant to assessment.

Comparison of search topics or categories with research contained in OTseeker. The number and nature of searches conducted by users was compared to the number of studies contained in OTseeker for specific intervention and diagnostic topics. Table 1 and Table 2 present the number of searches and number of RCTs and systematic reviews in addition to the quintile to which they belong to enable identification of matches and discrepancies between searches and content.

The most frequently sought topics by diagnosis (those in the 1st quintile) generally matched the diagnostic topics for which there was the most content (also indicated by content in the 1st quintile). Five topics—autism, congenital disorders, all hand/tendon injuries, hip replacement, and tendon/muscle complaints—had a higher number of searches compared to the amount of corresponding content in OTseeker (separated by more than 1 quintile). The most obvious discrepancy was for research related to autism spectrum disorder. Five diagnostic topics—public health, health promotion, back/neck pain, immune system dysfunction, and gerontology—mental health—had more research content available than there were searches submitted (separated by more than 1 quintile), with the greatest discrepancy for public health.

Intervention topics most frequently sought (those in the 1st quintile) mostly matched the intervention topics for which there was the most content (indicated by content in the 1st or 2nd quintile). Seven intervention topics—fine motor skills, sensation, leisure/recreation, assistive technology, developmental therapy, creative therapies, and home modifications/access—had a higher number of searches than relevant content in OTseeker (separated by more than 1 quintile) with the greatest search or content discrepancy being for fine motor skill acquisition. Ten intervention topics—counseling, ergonomics, technology, soft tissue therapy, caregivers, service delivery (home and groups), behavioral interventions, and exercise/strength training—had more research content available than searches submitted (separated by more than 1 quintile). Of these, counseling and technology (e.g., functional electrical stimulation, TENS [transcutaneous electrical nerve stimulation], biofeedback) were separated by 2 quintiles.

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Discussion

The OTseeker database contains RCTs and systematic reviews that can provide occupational therapists with information about the effectiveness of interventions. This study compared OTseeker users' search terms with database content to inform the profession about research needs.

The topics of highest interest to database users indicate common research information needs that could be considered in research priority-setting discussions. Many topics of high interest also have a large body of corresponding research evidence in OTseeker with some specific areas having potentially enough RCTs to conduct systematic reviews. However, within these topics it is important to determine whether there is sufficient specific research for the purposes of clinical decision making. For example, "effectiveness of stroke rehabilitation" was the most frequently sought single diagnostic topic. OTseeker contains a high number of RCTs and systematic reviews relevant to stroke rehabilitation, particularly in the areas of activities of daily living, motor training, skill acquisition, cognitive and perceptual rehabilitation, splinting, and consumer education. There are, however, gaps in research relevant to occupational therapists working in the area of stroke rehabilitation. For example, there are no RCTs or systematic reviews in the database about the effectiveness of driving rehabilitation for persons who are recovering from a stroke.

There were a few popular topics for which little research existed in OTseeker. For example, there were 10 entries or fewer in the database relevant to fine motor skill acquisition and autistic spectrum disorder, despite relatively frequent searches for information in these areas.

For those interventions for which there is little research in OTseeker, but which are of high interest to users, a concerted effort is needed to locate existing research in these areas. The lack of RCTs and systematic reviews in OTseeker

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in some areas may be due in part to pragmatic difficulties locating and obtaining all published research. Although OTseeker contains the majority of published RCTs and systematic reviews relevant to occupational therapy, there are still many more citations to be located and added. In many areas, however, there is simply a limited number of RCTs or systematic reviews. Factors contributing to these gaps include difficulty investigating the effect of some interventions using an RCT design (Nelson & Mathiowetz, 2004; Ottenbacher, 1990; Rogers & Holm, 1994); research that has not been published; and limited availability of resources, such as time and funding, to conduct research. These gaps indicate a greater need to consider both methodological issues and research resource allocation.

Categories that attracted few searches, indicating an apparent low level of current interest by users, require further attention. The lack of interest in some areas, such as case management and play, may be influenced by who uses the database and for what reasons. These issues are currently being investigated.

This study has demonstrated that the quantity of RCTs and systematic reviews in OTseeker can be used to indicate the status of research on the effectiveness of interventions relevant to occupational therapy. Similarly, if users' search terms are considered a marker of research information needs, the match between these terms and research available in OTseeker can highlight topics to address in future research priority discussions.

However, research priorities need to be informed by a complex mix of factors, including demographic trends and public health needs that consider the incidence, severity, and cost of specific disorders. For example, the world's population is aging, with significant projected increases in the number of people older than age 60 and older than age 80 in the next 40 to 50 years (World Health Organization, 2005). Research into aging is required to respond constructively, at both an individual and population level, to this worldwide demographic trend. Furthermore, the emergence of new diseases and the increase in or resurgence of others can direct where research funding is allocated. Although research priorities can be informed by the evidence-seeking behavior of occupational therapists, they also need to reflect this broader context and to consider pragmatic factors such as the feasibility of research, availability of research resources, and the potential cost-effectiveness of an intervention (de Francisco, 2004).

Consultation with experts in specific areas and consideration of frameworks such as the World Health Organization's (2001) International Classification of Functioning, Disability and Health (ICF) will further influence priority setting (AOTA/AOTF, 2003).

I imitations

This study had a number of limitations that meant the analysis and results were somewhat coarse in nature and should be considered accordingly. First, OTseeker is a relatively new database and does not yet contain all RCTs and systematic reviews relevant to occupational therapy. It is important to note that the analysis was based on data from 2004. Re-analysis of the database content is warranted in the future, when a more complete collection of RCTs and systematic reviews is available. Further content analysis could consider terms related to the ICF framework, and analysis of searches by country of origin.

Second, OTseeker contains only RCTs and systematic reviews. This study did not include other types of research, such as single-system design, which can also provide information about intervention effectiveness, albeit with less methodological rigor. Currently OTseeker does not contain qualitative research that is also important for informing practice.

Third, some interpretation was required by the authors when allocating keyword search terms to categories. Categorization may not have always captured the users' intentions when conducting their searches. Many terms entered were general in nature, with terms such as occupational therapy being difficult to categorize. Additionally, the terms chosen for the categorization system may not optimally represent all topics of interest to the profession.

And finally, who the database users were, and what their purpose was for searching the database, are not known. Students, as well as people other than occupational therapists, may have done searches in this study. Searches may have been conducted for nonclinical reasons including research, teaching, or general interest. Generalization of the results may be limited because users of OTseeker may be a specific group within the profession that is aware of the database and has a desire to use evidence to guide practice. Further research is underway to identify the characteristics and trends of OTseeker users.

Conclusion

Given the limited funding available for health care research, a strategic and prioritized approach to occupational therapy research is needed. Evaluating the effectiveness of occupational therapy interventions has been identified as a major research priority for the profession. Until now, little was known about the quantity of research by topic area, nor has there been an overall view of areas of most interest to occupational therapists. The process of matching searches with the content of OTseeker has the potential to inform the profession about areas that require further research and about the need for resources, and also serves as feedback for further database development and refinement.

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