A characterization of clinical questions asked by rehabilitation therapists*†

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Objective: This study explored the information needs of rehabilitation therapists (occupational therapists, physical therapists, and speech-language pathologists) working with patients who have had strokes in order to characterize their clinical questions, defined as their formalized information needs arising in the context of everyday clinical practice.

Methods: The researchers took a constructivist, interpretive approach, in which fifteen rehabilitation therapists working in various settings were recruited. Data were gathered using diaries, followed by diary-guided interviews, and thematically analyzed using template analysis.

Results: Rehabilitation therapists' clinical questions were characterized as having one or more of twelve foci and containing one or more of eight possible structural elements.

Conclusions: Findings demonstrate that the evidence-based practice framework currently applied for questions relating to rehabilitation is inadequate for representing rehabilitation therapists' clinical questions. A new framework that is more comprehensive and descriptive is proposed.

Implications: Librarians working with students and clinicians in rehabilitation can employ knowledge of the twelve foci and the question structure for rehabilitation to guide the reference interview. Instruction on question formulation in evidence-based practice can employ the revised structure for rehabilitation, offering students and clinicians an alternative to the traditional patient, intervention, comparison, outcome (PICO) structure. Information products, including bibliographic databases and synopsis services, can tailor their interfaces according to question foci and prompt users to enter search terms corresponding to any of the eight possible elements found in rehabilitation therapists' clinical questions.

INTRODUCTION

In the present era, health information is abundant and the challenge for health professionals is to locate credible information to inform decision making and deliver the best possible care. Evidence-based practice (EBP), which promotes the use of research to inform health care practice, has emerged as an influential social movement, not only in the field of medicine, but also in nursing and allied health professions, including rehabilitation therapy [1].

Information behavior research—the "study of how people need, seek, give, and use information in different contexts, including the workplace and everyday living" [2]—provides insight into what information health professionals need, how that information is sought, and how information is used to inform practice. Yet, the information behavior of rehabilitation therapists, who play an essential role in health care, has not been well addressed in the research literature, in particular, with respect to their information needs in the context of everyday practice.

Studies on the information needs, information-seeking behavior, and information use of health professionals such as physicians and, to a lesser extent, nurses and pharmacists number in the thousands [3] and have been synthesized in several literature reviews (e.g., Coumou and Meijman [4], Davies and Harrison [5], Dawes and Sampson [6], Gorman [7], Haug [8], and Hersh and Hickam [9]). In contrast, research on rehabilitation therapists' information needs, seeking, and use is less well represented in the literature. The lack of research on health professionals other than physicians has been previously noted by experts in information studies [3, 10] and persists to date. A small body of research on occupational therapists (OTs), physical therapists (PTs), and speech-language pathologists (SLPs) is available, primarily on database usage and preferences or obstacles to information seeking. Since a review of the information behavior of this population that was published five years ago [11], only two new studies have emerged, both of which investigate the selection of information sources used by PTs and OTs [12, 13].

Two research questions guided this investigation. First, what types of clinical questions do rehabilitation therapists ask? And second, how do rehabilitation therapists formulate their clinical questions?

Categorization of clinical questions

Clinical questions can be categorized for descriptive purposes as well as assistance in matching the question with material that can provide an answer. In evidence-based medicine (EBM), four categories or

types of questions were initially emphasized to guide physicians and educators in searching for and critically appraising potentially relevant, high-quality studies: therapy [14], diagnosis [15], harm [16], and prognosis [17]. Over time, proponents of EBM and EBP have suggested a more exhaustive set of categories for the types of questions that may arise in clinical practice. In medicine, for instance, Straus and colleagues list ten areas in which clinical questions may arise [18]. In rehabilitation, the categories used to describe clinical questions have been adapted from medicine [19] and not based on research specific to rehabilitation therapists.

In 1995, Richardson and colleagues first suggested a question-formulation structure to assist physicians in creating answerable questions from uncertainties arising during patient encounters [20]. That brief article argued that formulating questions using the proposed structure would help physicians devise a literature search and ensure that all relevant, high-quality research be retrieved. The now widely used structure—known by its initialism: problem, intervention, comparison, and outcome (PICO)—is employed not only in medicine by EBM proponents, but also in rehabilitation, for example, in physical therapy [19] and occupational therapy [21].

Champions of EBM frequently refer to questions formulated using the PICO structure as ''well built'' [20], ''answerable'' [22], and ''searchable'' [23]. The contention is that the PICO question-formulation structure assists the health professional (in this case, the physician) in formalizing an information need for immediate or later searching, typically of published literature, in order to locate a precise answer. Studies, however, have failed to demonstrate that this is the case [24, 25].

Structure of clinical questions

Since the PICO question-formulation structure was suggested in 1995, several alternative structures have been proposed in the health sciences literature, such as PESICO for speech-language pathology [26], ECLIPSE for health management [27], and PIPOH for development of clinical practice guidelines [28]. In many cases, these alternatives built on PICO, supplementing the four original structural elements with additional and sometimes optional elements for constructing questions in various fields of health care practice. The different question-formulation structures emerged from the realization by researchers, educators, and librarians that not all clinical questions match the medical intervention focus of the PICO structure. Instead, the alternative structures included concepts pertinent to fields such as rehabilitation and health care management in order to better represent information needs that arise in those contexts [29, 30]. The usefulness of these alternative question-formulation structures for articulating information needs has yet to be investigated. To address this, the present study was designed to describe rehabilitation professionals' clinical questions.

METHODS

The current study employed a constructivist approach, also known as naturalistic inquiry. The research was conducted in the context of the everyday practice in which rehabilitation therapists work. The area of stroke rehabilitation was selected for this study as it includes OTs, PTs, and SLPs and is a domain in which EBP has been strongly promoted.

This research used purposive sampling of rehabilitation therapists. Data were gathered using a diary followed by a diary-guided interview, a process known as the ''diary: diary-interview'' method. Therapists first recorded their clinical questions in a diary over several weeks. Following this, one of the authors (Kloda) conducted interviews to elicit further details regarding the clinical questions. Data were analyzed thematically to uncover: first, a typology of question foci asked by rehabilitation therapists and, second, structural elements present in their clinical questions. The authors obtained ethics approval from the McGill University Institutional Review Board and individual hospital ethics review boards, as required.

Sampling and recruitment

The goal of the sampling strategy was to reach ''a point of saturation or redundancy,'' that is, to sample enough informants until no new information was obtained [31]. Though impossible to predict, an estimate was made based on prior research of comparable populations. Previous qualitative studies on the information behavior of health professionals have included as few as five [32] to as many as forty-six informants [33]. More generally, fifteen to twenty informants are recommended for qualitative research studies of this nature [34].

Rehabilitation therapists working in neurology or stroke departments at a variety of regional hospitals were contacted through a site coordinator or manager and invited to participate in the study. As data gathering progressed, the authors invited participants with specific characteristics such as type of practitioner (OT, PT, SLP), years of experience, and practice type (in-patient, out-patient) to maximize the variety of clinical questions gathered.

Data gathering

Once informants were identified and recruited through the sampling technique, the authors supplied them with a diary along with a consent form and a self-addressed stamped envelope for returning the diaries and signed consent forms at the end of a two-to-three-week period. Informants were asked to record clinical questions in their diaries every time they became aware of an information need. The diary included separate pages to record each clinical question, along with questions about whether or not the informants intended to answer the question and how important the question was for their practice. These clinical questions were to be linked to a real

patient, and informants were encouraged to record the questions throughout the day as they became of aware of them, for example, after a patient consultation, and to be as detailed as possible.

The narrative interviews for this study were designed to complement the data gathering from the diary as the second component of the diary: diary-interview method [35] to obtain more data on therapists' behavior and to understand the context surrounding their information needs. One of the authors (Kloda) conducted all of the interviews in-person at either the workplace of the informants or a nearby location of their choice, such as a coffee shop. Interviews lasted between forty-five minutes to one hour, were audio-recorded, and were later transcribed. The primary purpose of the interview was to gather data related to a separate research question. Findings related to those portions of the interview will be presented in a separate publication.

Data analysis

Each of the clinical questions was analyzed as a separate incident, or unit of analysis, with the assistance of the qualitative data analysis software, Atlas.ti <http://www.atlasti.com>, for information on the question's topic, focus, and structural elements, and whether the question was pursued and answered. The authors employed template analysis, a primarily deductive method that uses a concept-driven coding scheme (i.e., a list of codes) as a starting point [36, 37]. As the objective of this study was divided into two questions, the authors performed template analysis to address each of the research questions separately.

For the first research question, ''What types of clinical questions do therapists ask?,'' the authors assembled a list of question types or foci drawn from the literature on EBP [18, 19, 38–41]. These question foci and their definitions served as the preliminary coding template for the first round of coding for all clinical questions gathered in the informants' diaries. Each clinical question was categorized as having at least 1 *focus* and in some cases as having several *foci.* As the analysis progressed, new categories of questions in addition to those identified from the literature emerged. Definitions and foci names were revised, and a final typology of question foci was constructed to convey the breadth of gathered clinical questions. Examples of foci in the initial template used as a starting point for coding included: therapy, etiology, prognosis, and diagnosis. Some of these foci were retained (e.g., epidemiology); some foci names and definitions evolved (e.g., therapy became treatment selection); and some new foci emerged (e.g., terminology).

For the second research question, ''How do therapists formulate their clinical questions?,'' the authors derived the initial template from a review of the literature on question-formulation structures. A list of the unique elements previously proposed in the literature on EBP, reviewed above, was the starting point for this portion of the analysis. Each clinical question was scrutinized for the presence of each of the initial ten structural elements. For each clinical question, the word or phrase corresponding to an element was coded, resulting in a list of terms. Once they completed the analysis, the authors revised names and definitions for each element to accurately reflect their meanings. Examples of elements in the initial template include: problem, intervention, outcome, environment, and stakeholder. These elements used at the starting point represented fuzzy concepts and were continuously refined during the coding process. As a result, some of the initial elements were retained (e.g., intervention); some evolved to have new names and definitions (e.g., outcome became outcome measure); and some merged or split (e.g., problem and population).

Interview transcripts were analyzed for contextual information about several of the clinical questions provided by each informant, including whether or not the informants had attempted to answer a clinical question and whether or not they were successful.

RESULTS

Informants

Informants were drawn from five institutions, including out-patient and in-patient clientele from the greater Montreal, Quebec, Canada, area. As a result of the purposive sampling method, the authors were able to recruit informants who had a wide range of years of experience working in rehabilitation and who worked specifically with patients who had had strokes. Table 1 presents the number of OTs, PTs, and SLPs who were informants in the study, their demographic characteristics, and the number of clinical questions recorded by each.

Number and topic of clinical questions

Informants recorded 129 clinical questions in total during the study. Each informant recorded between 1 and 17 clinical questions, with an average of approximately 8 per informant. The number of questions recorded did not appear to be associated with informant characteristics such as academic degree, number of years of work experience, or professional field.

The vast majority of the clinical questions (75%) related to the topic of stroke, with a smaller proportion (15%) addressing other or more general neurological issues or disorders. An even smaller proportion (10%) of the clinical questions concerned topics other than stroke or neurology. All of the 129 clinical questions were analyzed for foci and structural elements.

Pursued and answered clinical questions

Clinical questions were considered *pursued* and *answered* if the informants indicated in the affirmative that they had done so in response to the interview question, ''Did you try to answer this clinical question? Why?'' In some cases, the informants volunteered this information spontaneously while discussing the clinical question. In other cases, the

Table 1
Characteristics of informants and clinical questions gathered

Informant	Highest degree	Years of experience (with stroke)		Setting	Patient population		Clinical questions documented
OT1	BSc	1		Rehab	Neuro	Inpatient	7
OT2	BSc	6	(3)	Acute	Neuro	Inpatient	10
OT3	MSc	<1		Acute	Neuro	Inpatient	3
OT4	BSc	4		Acute	Mixed	Inpatient	6
OT total							26
PT1	BSc	18	(14)	Rehab	Neuro	Outpatient	15
PT2	MSc	10	(<1)	Acute	Stroke	Inpatient	9
PT3	MSc	3		Acute	Neuro	Inpatient	4
PT4	BSc	6	(4)	Acute	Mixed	Inpatient	16
PT total							44
SLP1	MSc	1		Rehab	Mixed	Inpatient	10
SLP2	MSc	35	(32)	Rehab	Mixed	Outpatient	1
SLP3	MSc	3		Acute	Neuro	Inpatient	5
SLP4	MSc	1		Acute	Neuro	Inpatient	7
SLP5	MSc	4	(1)	Acute	Stroke	Inpatient	17
SLP6	MSc	22	(20)	Acute	Mixed	Outpatient	8
SLP7	MSc	33		Acute	Mixed	Inpatient	11
SLP total							59
Total							129

Note: Acute=acute medical setting, Rehab=rehabilitation hospital, Neuro= neurological, Mixed=patients from a combination of neurology and other medical floors, Stroke=stroke patients exclusively.
OT=occupational therapist, PT=physical therapists, SLP=speech-language pathologist.

researcher asked the informants directly during the interviews whether they had tried to answer a specific clinical question and whether they had succeeded in doing so. The researcher did not ask this question for every individual clinical question recorded, because this was not the primary objective of the research, nor was there time to discuss every clinical question during each interview. As a result, data were gathered as to whether or not a clinical question was pursued for 92 of the 129 (71%), leaving 37 clinical questions (29%) for which no data were obtained. Almost half of those 92 clinical questions (47%) were pursued. Of these, approximately two-thirds (65%) were reported as answered. These proportions were similar to those found in prior research on physicians [4, 5].

Focus of clinical questions

Twelve different foci were identified as a result of the analysis of clinical questions (Table 2). Treatment and clinical manifestations of disease accounted for over half the question foci.

Clinical question formulation

Eight structural elements for question formulation were identified (Table 3). Sixty clinical questions (47%) included 2 structural elements, and 39 (30%) included a single element. The most common single element was the *problem*. When 2 or more elements were present in a clinical question, these tended to be a combination of *problem* and *intervention*, or *problem* and *population*.

DISCUSSION

Clinical question foci

Previous research categorizing clinical questions has been limited to questions generated by physicians and

medical residents. As a result, the categories or foci of clinical questions that have been previously identified are not necessarily comparable to those asked by other health professionals, including the rehabilitation therapists in this study. Moreover, prior studies tended to employ a more restrictive definition of a clinical question than the one used for the present study. For instance, Ely and colleagues defined a clinical question as something conceivably answerable using the published literature [42]. Consequently, clinical questions asked by rehabilitation therapists in the present study, which were not limited to those answerable using published literature, likely represented a broader range of foci than those identified in prior research. Nevertheless, the foci identified in rehabilitation therapists' questions were similar to the question foci proposed in the EBP literature.

The treatment-selection focus is described in many EBP-related publications, as these questions reflect one of the primary roles of all health care professionals, including rehabilitation therapists. This role is to heal or at the very least to improve the patient's condition and to prevent future harm. In EBM, the therapy focus encompasses physicians' clinical questions that are concerned with ''how to select treatments to offer our patients, that do more good than harm and that are worth the efforts and costs of using them'' [18]. In this study, the treatment-selection focus has the same meaning.

In one of the pioneering texts describing EBM and its tenets, Sackett and colleagues proposed many categories similar to the foci identified in this study. They were the first to describe clinical manifestations of disease, defining it as ''knowing how often and when a disease causes its clinical manifestations and how to use this knowledge in classifying our patients' illnesses'' [43]. They also proposed the foci of prognosis and etiology. Clinical questions focusing on diagnostic test selection are comparable to those

Table 2
Foci of clinical questions identified in diaries of rehabilitation therapists

Focus	Number of clinical questions (n=129)*	Percentage	Definition	Example
Treatment selection	42	33%	Identifies 1 or more treatments and inquires as to their effectiveness, sometimes in comparison to one another, or identifies a condition, disorder, or disease, and inquires as to possible treatments or the most effective treatment.	"Which is more effective for improving gait speed: body weight support, gait training, or treadmill training?" (PT1)
Clinical manifestations of disease	22	17%	Questions to improve one's understanding of diseases and disorders, including signs, symptoms, and clinical course.	"What are the cognitive changes/deficits seen post-ictal?" (OT4)
Prognosis	17	13%	Concerns patient improvement, sometimes specified within a time period (e.g., short term, long term). A specific outcome may or may not be identified.	"Improvement/outcome for moderate to severe ataxic-spastic dysarthria?" (SLP6)
Assessment tool selection	11	9%	Identifies an assessment tool and questions its effectiveness, validity, or reliability, occasionally within a particular population, or inquires as to what tool is available for a particular population, condition, or disease.	"Will a modified barium swallow for a patient with severely fluctuating level of alertness be an effective measure?" (OT3)
Terminology	11	9%	Concerns the definitions or meanings of terms, phrases, acronyms, and abbreviations.	"Is segmental ejection fraction (SEF) the same thing as ventricular ejection fraction?" (PT2)
Treatment procedures	11	9%	Concerns the implementation or process of conducting a specified intervention. Questions about procedures can be characterized as "how to…" questions, though they can also characterized by the concept of timing or "when to…?"	"Is speech therapy really best when they are so impaired or is it better to wait until rehabilitation to improve?" (SLP5)
Etiology	7	5%	Questions about the medical background to a particular disease or syndrome.	"Can a craniectomy cause depression?" (OT2)
Practice-related self-improvement	5	4%	Addresses an area of weakness or gap in skills related to a therapist's professional role and in which they want to learn more.	"What role do SLPs have in helping people with traumatic brain injury?" (SLP5)
Assessment tool procedures	4	3%	Concerns the implementation or process of conducting assessment, typically with a known assessment tool.	"What is the normal score (range of scores) for a 59 year old on the Community Balance Mobility Scale and on the Timed Up & Go?" (PT1)
Patient or family's experiences and concerns	3	2%	Questions about the concerns, feelings, or experiences of the patient, family members, or any potential stakeholder, such as a caregiver.	"What are the expectations of patients/family of rehabilitation team while in acute care?" (SLP5)
Anatomy, physiology, and pathophysiology	2	2%	Concerns understanding the functions of specific anatomical structures and mechanisms of action as well as normal and abnormal functioning of the human body.	"What is the prevalence of left hand dominance associated with right dominant hemisphere (brain)?" (OT4)
Epidemiology	1	1%	Concerns the incidence of a disorder in a specified population.	"What is the incidence/risk factors of/for acute cervical stenosis in adult population?" (OT4)

* Questions could have more than a single foci, so numbers do not sum to 100%.

asked by therapists concerning assessment tool selection, a question focus similarly proposed in the field of occupational therapy [19].

The practice-related self-improvement focus is similar to the focus "improvement" proposed originally for EBM, defined as "how to keep up-to-date, improve our clinical and other skills, and run a better, more efficient clinical care system" [18] and Florance's empirically derived category of learning, described as "questions aris[ing] during clinical practice that are not related to the care of a particular patient" [41]. Both improvement and learning could be considered equivalent to the practice-related self-improvement focus identified from the therapists' questions in the present study, though the prior foci are less precise.

It is also instructive to compare the results of the current research with prior studies of physicians' and medical residents' clinical questions. Four such studies [39, 44–46] found that questions regarding disease management, including therapy and prevention, were common, with 1 study reporting that almost half of physicians' and residents' clinical questions belonged to this category [47]. Disease

management questions might be similar to therapists' treatment selection questions, which were the most common in the present study. Between 1% and 12% of physicians' and medical residents' questions have been reported to focus on prognosis and an even smaller proportion on etiology [39, 46, 47]. In this study, the number of clinical questions with these foci was also relatively low. Questions with an epidemiology focus have previously been identified in only 2 studies of physicians' and medical residents' clinical questions [39, 40], and only a single clinical question was identified with an epidemiology focus in the present study, suggesting that questions of this nature are less common among health professionals in general.

Clinical question formulation

As noted earlier, several alternative structures have been proposed in the health sciences literature, such as PESICO for speech-language pathology [26], ECLIPSE for health management [27], and PIPOH for clinical practice guideline development [28]. None of the question-formulation structures previously proposed in the literature perfectly match the eight

Table 3
Structural elements identified in clinical questions reported by rehabilitation therapists

Element	Number of clinical questions including element (n=129)	Percentage	Definition	Examples
Problem	89	69%	Describes the condition or situation of interest to the therapist that required an intervention, assessment, or more information of any kind.	"deficits of executive functions" (OT1), "spasticity" (OT2), "shoulder instability" (PT1), "pain" (PT4), "silent aspiration" (SLP3), "neurogenic stuttering" (SLP6)
Intervention	53	41%	Describes a treatment, whether for preventative or therapeutic reasons, an assessment or diagnostic tool, or some other type of service or condition to which a patient might be exposed.	"craniectomy" (OT2), "modified barium swallow" (OT3), "electrical stimulation" (PT2), "word repetition" (SLP1)
Population	50	39%	Describes the patient population or client group. May be demographic in nature or specify a health condition.	"adult" (OT4), "59-year-old" (PT1), "Italian speaker" (SLP4), "multiple sclerosis" (OT2), "locked-in syndrome" (SLP4), "brainstem stroke" (SLP4), "acute stroke" (SLP5)
Outcome measure	14	11%	Specifies a measurable result, whether for impact of treatment or normal values for an assessment tool.	"distance walked" (PT2), "survival rate" (PT3)
Temporality	9	7%	Specifies a time period or sequence relating to any other element, such as the duration of an intervention, disease stage, or points in time at which an outcome is measured.	"after having been discharged" (OT3), "long term" (PT1), "10 days post-admission" (SLP5)
Context	6	5%	Describes the setting or location of the patient or intervention. May include a health care or a community setting.	"home [in] rural Ontario" (OT3), "bedside" (OT4), "acute care" (SLP5)
Professional stakeholder	4	3%	Describes the point of view of 1 or more types of health care professionals.	"SLPs" (SLP), "rehabilitation team" (SLP5), "nurse" (SLP5)
Patient or family stakeholder	1	1%	Identifies the patient and family members as individuals with a vested interest in the answer or the outcome of that answer.	What are the expectations of *patients/family* of rehabilitation team while in acute care? (SLP5)

structural elements identified in this study; however, all of the identified elements have either previously been proposed or are similar to previously proposed elements. Of the different elements proposed in the literature, all, with one exception (the *results* element), were either identified in the clinical questions gathered for this study or were similar to those identified. Table 4 provides a comparison between the elements identified in the present study and those previously proposed in the literature. These comparisons are discussed in more detail below.

In the original PICO question-formulation structure that Richardson and colleagues proposed, the letter P represented the element of *problem* [20]. Since then, EBM advocates have used the letter P in PICO or PECODR to represent *patient*, *population*, or *problem* [48], and more recently, the additional concept of *predicament* [18]. Other question-formulation structures employ more general terms such as *client type*,

problem, or *client group* [27]. In the clinical questions in this study, the structural elements labeled *problem* and *population* were distinguishable from each other, suggesting that the terms *client type* or *client group* and the term *problem* may in fact represent different theoretical constructs. Further investigation into whether clinical questions asked by other health professionals contain distinguishable elements of *population* and *problem* is indicated.

The intervention element is present in all structures, including the PICO question formulation and the elements identified in the present study. The intervention element has also been more broadly described as exposure.

A novel element emerged in the analysis of informants' clinical questions, that of *temporality* or being bounded by time. *Temporality* differs from that of *duration*, proposed in the PECODR question formulation structure, defined as the "duration of

Table 4
Comparison of clinical question structures found in the current study with others reported in the literature

Elements from clinical questions in this study	PESICO [26]	PICO+ [21]	ECLIPSE [27]	PIPOH [28]	PICO [22]	PECODR [23]
Population Problem	Person/Problem	Problem	Client group	Population	Problem	Patient/population/problem
Intervention	Intervention	Intervention	Service	Interventions	Intervention	Exposure
Context	Environments	Context	Location	Health care setting		
Temporality						(Duration)
Professional stakeholders			Expectation Professionals	Professionals		
Patient or family stakeholders	Stakeholders	Patient values and preferences		Patients		
Outcome measure	Outcome	Outcome	Impact	Outcome	Outcome	Outcome Results

exposure/follow-up'' [48] and limited to an intervention or outcome measure following an intervention and thus is a narrower concept. The broader element of *temporality* is similar to that noted by Chase and colleagues in their study of physicians' and medical residents' clinical questions, in which they found a small proportion (4%) included a temporal concept [40].

The element of *context*, present in the questions of study participants, has been previously proposed in evidence-based occupational therapy [19] and speech-language pathology, where it is referred to as *environments* [49]. Similar concepts of *location* in the area of health care management [27] and *health care setting* in creating practice guidelines [28] have also been proposed.

Both the ECLIPSE and PIPOH question-formulation structures include an element similar to the element described in the current study as *professional stakeholders*. In the PESICO structure in the field of speech-language pathology, the authors propose that the *professional stakeholder* could include any type of professional, including someone from outside the health care sphere, such as a school teacher in the case of a child with dyslexia [49]. In the clinical questions in this study, the authors limited *professional stakeholders* to those in health care.

Several question-formulation structures have also proposed elements similar to that of the current study's *patient or family as stakeholder*, but to date, no prior research has documented the clinical questions of health professionals that include this element. The PIPOH structure includes the element *professionals/patients* to represent the perspectives of interested parties [28]. Similarly, the PESICO structure includes the more general element, *stakeholder*. In their discussion of an EBP framework for OTs, Bennett and Bennett express the importance of including the client's values and preferences in the clinical questions, although they do not go so far as to propose a separate element in the question-formulation structure [19]. The present study is the first to identify the element of *patient or family stakeholder* as an element in clinical questions.

Although all previously proposed clinical question-formulation structures included *outcome* as an element, only one research study investigated its inclusion in physicians' clinical questions and found it present in approximately half of these [46]. The *outcome* element in PICO is described as ''outcomes of clinical importance, including time when relevant'' [18] and is broader than the element *outcome measure* identified in the present study, which may explain why this element was identified in only a minority of clinical questions.

With regard to the complexity of clinical questions, that is, the number of elements in each question, rehabilitation therapists' questions that included 2 or more elements most commonly consisted of the combinations of *problem* and *intervention* or *problem* and *population*. Although analysis of this nature was not the goal of the present study, it is noteworthy that these findings contrasted with prior research on physicians' clinical questions in which researchers found that 37% of questions included both an *intervention* and an *outcome* [46]. One possible explanation for this discrepancy is the narrower definition that the authors applied in this study to the *outcome measure* element, as well as the distinction between the elements *population* and *problem*.

The elements present in the clinical questions in this study point to the deficiency of the PICO structure for representing rehabilitation therapists' clinical questions. Additional structural elements similar to those proposed in adaptations of PICO (e.g., PECODR, ECLIPSE, and PESICO)—such as *context*, *stakeholder*, and, to some extent, *duration*—were identified. As the PICO structure is a prescriptive model for question asking and rehabilitation therapists were not instructed to employ PICO, it was not surprising that their questions did not contain these elements. Interestingly, their questions did contain elements proposed in other question-formulation structures. Due to the absence of strict guidelines for question formulation, it was possible that informants included only those details that they perceived to be important to the question and not elements specified in other guidelines. Questions that included the elements *context*, *professional stakeholder*, or *temporality*, for instance, might reflect the importance of these elements in obtaining a relevant answer. In a study comparing a structured PICO form to an unstructured form for conducting reference interviews, researchers found that the unstructured form elicited additional details regarding the information need, such as context, which in turn enabled more precise literature search results [24]. Further research investigating the importance of each of these elements in rehabilitation therapists' clinical questions would be useful to better understand how the structure of their questions may impact information retrieval.

Limitations

For this study, the authors employed purposive sampling to gather data from a variety of rehabilitation therapists working in diverse settings. In this method, the authors attempted to provide sufficient description of the sample to allow the reader to decide as to the transferability [50] or theoretical generalizability of the findings to particular settings or circumstances. In addition, data gathering methods might have influenced findings. Nevertheless, the activity of recording their clinical questions provided instances of rehabilitation therapists' constructions of their own information needs, and therefore, this data-gathering instrument proved useful in exploring these needs in the context of their everyday practice [51]. The authors consider that the consistency of the findings across this study's informants indicates the trustworthiness of the research.

CONCLUSIONS

Findings from this study demonstrate that rehabilitation therapists' clinical questions, that is, their formalized information needs arising in everyday practice, can be

characterized according to twelve foci. While this list may not be exhaustive, it demonstrates a much broader range of questions than the rehabilitation literature and the medical literature have suggested. Furthermore, the eight elements in the clinical question structure for rehabilitation demonstrate that the PICO question-formulation structure is inadequate for representing rehabilitation therapists' clinical questions. The alternative structure proposed in the field of speech-language pathology, PESICO [49], is only somewhat more appropriate, as it includes more of the elements. In fact, none of the existing question-formulation structures accurately represents therapists' everyday clinical questions. The findings of this research, therefore, point to the need for a more complete question-formulation structure, with more elements to better reflect this population's questions. Such a question-formulation structure should recommend the most common elements (problem, intervention, population) and suggest optional elements (outcome measure, temporality, context, professional stakeholder, and patient or family stakeholder).

Prior studies have been conducted to determine the effectiveness of interventions in teaching health professionals how to formulate questions [52], as well as the effectiveness of search systems using PICO for structuring database searches [24, 53]. Results of research in these areas have yielded mixed findings, suggesting that teaching health professionals to use the PICO structure to formulate their questions and to structure their searches may be ineffective at improving the success of their information seeking.

Combined with findings from the present study that demonstrates the mismatch between PICO and rehabilitation therapists' questions, these findings have several implications for librarians. First, librarians working with students and clinicians in rehabilitation therapy can employ knowledge of the twelve foci and the question structure for rehabilitation to guide reference interviews. Second, library instruction on question formulation in EBP can employ the revised structure for rehabilitation, including all eight elements and offering students and clinicians an alternative to the traditional PICO question-formulation structure. Finally, information products, including bibliographic databases and synopsis services, can tailor their interfaces according to the twelve foci for rehabilitation therapists' question and prompt users to enter search terms corresponding to any of the eight possible elements found in their clinical questions.

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