

# Methods

## The Implementation of Patient-Reported Outcome Measures in Yoga Therapy

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### Abstract

Yoga therapists are interested in knowing whether their therapeutic interventions are helpful in improving health and wellbeing in their yoga therapy clients. However, few yoga therapists use standardized, reliable, and valid questionnaires to determine the therapeutic effectiveness of their treatments. Patient-reported outcome (PRO) measures are paper or web-based questionnaires used to assess an individual's perceptions of their symptoms and/or quality of life. In 2004, the National Institutes of Health (NIH) launched the PROMIS<sup>®</sup> initiative to standardize and simplify the collection of PROs in research and in clinical practice. The PROMIS<sup>®</sup> initiative launched a multicenter cooperative group that collected and reviewed thousands of PROs, then extensively tested them in over 20,000 research participants. The result was a web-based collection of item banks of the best questions or “items” within three domains of interest: physical, mental, and social health. These item banks are housed in the Assessment Center, a free online resource for collecting PROs.<sup>1</sup>

Incorporating PROMIS<sup>®</sup> outcomes into yoga therapy streamlines and optimizes the collection of PROs by enabling access to reliable and valid questionnaires that are easy to read, simple to complete, and are available in multiple languages as well as in both adult and pediatric versions. The use of standardized PROs may improve yoga therapy implementation in healthcare and accelerate translation of clinical research by allowing yoga therapists to conduct in-depth symptom assessments using tools that allow for comparisons to other therapeutic clinical and research interventions.

The purpose of this paper is to summarize the development of the NIH PROMIS<sup>®</sup> initiative and to provide suggestions for incorporating PRO collection into yoga therapy.

Important considerations to consider when implementing PROs into yoga therapy are discussed, including the choice of questionnaires and method of delivery (paper or web-based), frequency of PRO administration, interpretation and management of PRO results, and the management of problematic issues that arise.

### Introduction

Yoga therapy is defined as “the process of empowering individuals to progress toward improved health and wellbeing through the application of the philosophy and practice of yoga” (IAYT, 2012). Yoga therapists are interested in knowing whether their therapeutic interventions are helpful in improving health and wellbeing in their yoga therapy clients. A national survey of yoga instructors published in this journal revealed that nearly all instructors ask their clients whether their therapeutic interventions are effective (Ross, 2016). Yet fewer than half of these instructors maintain any type of records other than attendance, and less than 2% use a valid, standardized questionnaire to assess the effectiveness of yoga therapy (Ross, 2016).

Patient-reported outcome (PRO) measures are questionnaires used to collect information about an individual's perceptions about symptoms such as anxiety, sleep problems, and pain; function such as physical or cognitive function; and concepts such as quality of life and social support. While widely used in yoga research to determine whether yoga interventions improve symptoms and quality of life in intervention studies, PROs may also serve as useful tools for yoga therapists. Widespread use of standardized PROs may improve yoga implementation in healthcare and accelerate translation of clinical research by allowing yoga therapists to conduct in-depth symptom assessments using tools that

1. <https://www.assessmentcenter.net>

allow for comparisons to other therapeutic research interventions.

Using PROs to assess the effectiveness of treatments such as yoga therapy provides quantifiable, actionable information regarding whether the individual's symptoms and function are improving, deteriorating, or remaining unchanged (Basch et al., 2009). This clearly is important in a yoga research intervention, but following an individual's symptoms and quality of life over time in a reliable, quantifiable manner is also important when providing therapeutic care to individuals outside of research studies. PROs can be used not only for determining an individual's response to yoga therapy but also for evaluating the overall effectiveness of a yoga therapy program. Quality improvement is an important concept today in healthcare, both for hospitals and for individual healthcare practices. Quality improvement is defined as systematic and ongoing actions taken to measure improvements in patient health outcomes and healthcare delivery.<sup>2</sup> In conventional biomedicine, PROs are widely used as a quality improvement strategy to monitor the progress of patient care (Valderas et al., 2008), and collecting PROs in routine care indeed does improve the quality of care (Snyder et al., 2012). Tracking quality of care is particularly important as “pay for performance” becomes increasingly popular among third party payers (Mullen, Frank, & Rosenthal, 2010). PROs provide an efficient way to track care.

Exploring the individual's perceptions regarding the effectiveness of therapeutic interventions is important. When healthcare providers assess effectiveness without including patient/client self-assessment, they frequently overestimate the benefits of treatments on function and underestimate the symptoms experienced by the individual (Basch et al., 2009; Hendriks & Schouten, 2002; Laugsand et al., 2010). In a review of the literature examining 27 research studies, routinely including PROs in cancer treatment improved patient satisfaction and patient-provider communication and clinicians were better able to monitor treatment response and detect unidentified problems (Chen, Ou, & Hollis, 2013). Additionally, information obtained through PROs can be used to help individuals who are considering initiating a specific treatment option to understand how others may have or may not have benefited from that treatment (Ayers, Zheng, & Franklin, 2013).

PROs can be collected using traditional paper or web-based versions of questionnaires. They have been used extensively in research, with investigators typically collecting PRO information before and after therapeutic interventions using a classical pretest-posttest design to assess the

efficacy of interventions. When researchers use PROs, they ideally seek to use PRO measures that have been rigorously researched and shown to be reliable and valid. A PRO measure is reliable if it consistently captures the various aspects of a concept. That is, the measure reports stable and consistent results. There is an entire field of science called psychometrics that focuses on the theory and technique of PRO measurement, with specific methodological and statistical strategies used to determine the validity and reliability of PRO measures (Nunnally & Bernstein, 1994). There are hundreds of questionnaires available to measure symptoms and quality of life, and most of these have “gold standard” or “legacy” PRO measures that have been psychometrically tested and found to be reliable and valid in both healthy and diseased populations. A PRO measure is valid if it accurately measures what it intends to measure. For example, grief is a complex psychosocial experience involving a normal reaction to a loss that is pervasive and may involve a number of emotional symptoms including sadness, guilt, loneliness, and depression (Jacob, 1993). A valid measure of grief would accurately capture all aspects of grief and not just depression or sadness.

While collecting PROs is important and reliable and valid measures exist, there are obstacles to collecting them (Bevans, Ross, & Cella, 2014). First, there are multiple questionnaires available for almost any concept of interest, and many are specific to a narrow patient or disease population. For example, 14 questionnaires exist for measuring fatigue exclusively in cancer patients (Stone & Minton, 2008). This limits how data may be compared across studies or among different populations. The quality of PRO measures also varies widely. In addition, many measures are lengthy and require a lot of time to complete, increasing patient burden and potentially producing response fatigue. The scoring and interpretation of some questionnaires can be complicated. Many require permission of the author in order to use them, with some requiring fees for use. Thus, the challenges of collecting PROs in clinical practices such as yoga therapy may be prohibitive. In 2003, the National Institutes of Health (NIH), as part of the “NIH Roadmap” for transforming how research is conducted through the development of transformative research tools, launched the Patient-Reported Outcomes Measurement Information System (PROMIS<sup>®</sup>) initiative in response to the challenges surrounding the collection of PROs.<sup>3</sup> The purpose of this article is to summarize the development of the NIH PROMIS<sup>®</sup> initiative and to discuss the use of PROMIS<sup>®</sup> for collecting PROs in yoga therapy and research.

2. <http://www.hrsa.gov/quality/toolbox/methodology/qualityimprovement>

3. <http://www.nihpromis.gov>

### NIH PROMIS® Initiative

In 2004, the PROMIS® initiative was launched in an effort to address many of the obstacles associated with collecting PROs in research and clinical practice. Facts about the NIH PROMIS® initiative are shown in Figure 1. The initiative was led by a multicenter cooperative group that included a steering committee, an expert scientific advisory board, and a 22-member advisory committee of experts in health outcomes (Cella et al., 2007). Using the World Health Organization’s framework of health (WHO, 1946), the cooperative group identified domains of interest under the categories of physical, mental, and social health that included such concepts as pain, depression, and social support. They collected thousands of individual questions (items) for each of these domains, many coming from the gold standard or legacy measures of those concepts. These items then were qualitatively reviewed by concept experts and by healthy and diseased individuals in the general public to ensure that the items were understandable to individuals at all literacy levels and that no gaps existed in previous measures of the concepts (DeWalt, Rothrock, Yount, & Stone, 2007). Following this extensive qualitative review, the items were categorized and rewritten to produce a set of relevant item pools that were extensively tested, using a modern statistical technique called item response theory (IRT), in over 20,000 research participants to confirm that only the most reliable and valid questions were included in the item banks to measure each of the domains (Cella et al., 2010).

After developing the extensive set of item banks for measuring a large number of PROs, including but not limited to anxiety, depression, sleep disturbances, pain, and fatigue, the cooperative group launched the Assessment Center,<sup>4</sup> a web-based resource for administering PROs that is the central repository for the PROMIS® item banks. The Assessment Center is currently available free of charge to the public. Individuals in research and clinical practice,

including yoga therapists, can register as users and access the instrument library that contains a variety of instruments for collecting PROs, including short- and long-form questionnaires of the different domains, as well as collections of short forms called “profiles” that can be used to collect a combination of PROs. For example, the PROMIS® Global Health profile collects information on general health using ten questions and includes assessments of five PROMIS® domains including physical function, pain, fatigue, emotional distress, and social health. Registered users can also use the Assessment Center for Computer Adaptive Testing (CAT), a method of data collection in which the number and order of questions asked is based upon the respondent's previous answers. CAT is particularly reliable, efficient, and accurate as it calculates a score within a specific domain of interest with an average of only four to eight questions (Broderick, DeWitt, Rothrock, Crane, & Forrest, 2013). In addition to PROMIS® measures that capture common symptoms and perceptions, individuals can also access instruments from two similar NIH initiatives, the NIH Toolbox and the Quality of Life in Neurological Disorders (Neuro-QOL), which provide measures of cognitive, emotional, motor, and sensory function, as well as quality of life (Gershon et al., 2010, 2012). Through the Assessment Center, users can design their own custom questionnaires that use a combination of measures from PROMIS®, NIH Toolbox, and Neuro-QOL. They have the option of adding their own questions to assess information not covered by these measures, such as medication and/or complementary and integrative medicine (CIM) use.

There are a number of benefits to using PROMIS® measures for data collection. First, individuals who complete PROMIS® questionnaires receive a “t score,” which is a standardized score that has been normalized to the general population, wherein the mean or average score is 50 and the standard deviation is 10. This means that, when a respondent completes a PROMIS® measure in any domain,

Launched in 2004 to address obstacles associated with collecting PROs.
Domains of interest within physical, mental, and social health* were identified.
Thousands of individual questions (items) specific to each domain were collected.
Items rigorously reviewed and tested to find best questions to assess domain.
Item banks of the best questions and instruments** were created.
Assessment Center*** was launched in 2008 as the central resource for PROMIS® item banks and to be a web-based resource for collecting PROs.
Yoga therapists can register in the Assessment Center and access the instrument library and/or create their own custom questionnaires for collecting outcomes in yoga therapy.

**Figure 1. Facts about the National Institutes of Health PROMIS® initiative.**

\* Domains available in PROMIS® include but are not limited to pain, fatigue, sleep disturbance, anxiety, depression, cognitive function, and social participation.

\*\* Instruments are questionnaires, combinations of questions designed to capture a specific domain.

\*\*\* The Assessment Center can be accessed through [www.assessmentcenter.net](http://www.assessmentcenter.net).

4. <http://www.assessmentcenter.net>

their scores can be compared to the general public, as well as to any disease or treatment population in which PROMIS® was used and the results were published. PROMIS® is also responsive, meaning that it is able to detect changes or improvements over time (Hays, Spritzer, Fries, & Krishnan, 2015). This allows users to collect information about symptoms or function at the start of a treatment or intervention and again at the conclusion in order to see if improvement occurred.

The individual PROMIS® items are simple and easy to read, allowing for a number of domains to be measured in a very short time. For example, one PROMIS® question assessing the domain of depression asks, “In the past seven days I felt worthless...” and includes five answer options including “never,” “rarely,” “sometimes,” “often,” and “always.” Because a domain can be assessed in under two minutes (Broderick et al., 2013), the time and effort associated with collecting PROs in research and clinical practice is reduced, allowing for the collection of multiple domains without adding excessive response burden. All PROMIS® items are available in English and in Spanish, and many are available in other languages. Pediatric self-report versions are available for children age 8 and up, and proxy versions are available to age 5. The Assessment Center offers a number of tutorials explaining how to navigate the system and the Assessment Center team is available as a resource to help registered users. With the Assessment Center, users can complete questionnaires online, with the results available immediately.

## Incorporating Patient-Reported Outcomes

### Patient-Reported Outcomes in Yoga Research

Yoga researchers have been incorporating PROs into their studies for decades. However, only a handful of yoga researchers have incorporated PROMIS® measures into their studies (Harris, Jennings, Katz, Abenavoli, & Greenberg, 2016; Hoffart, Anderson, & Wallace, 2014; King et al., 2014; Middleton et al., 2013; Saper et al., 2016; Siddarth, Siddarth, & Lavretsky, 2014; Sohl et al., 2016). The initial PROMIS® item banks were only made available in 2008, which may partly explain their lack of use to date. This likely will change, as the NIH supports the use of PROMIS® measures and several funding announcements by the National Center of Complementary and Integrative Health (NCCIH) explicitly encourage their use. However, yoga researchers who have used reliable and valid legacy measures in their research may be reluctant to part with those measures. For this reason, the NIH-funded PROsetta Stone®<sup>5</sup>, a system that links PROMIS® scores to numerous legacy measures of concepts such as sleep, fatigue, pain,

depression, and physical function, as well as composite health measures such as the SF-36 (Ware, Kosinski, & Gandek, 2002). Because direct comparisons can be made between PROMIS® and legacy measure scores, researchers who have used legacy measures in the past can utilize PROMIS® measures in future studies, as well as compare past legacy scores to the general population through PROMIS® t-scores.

PROMIS® measures allow researchers to collect reliable and valid PROs quickly and efficiently, but they are not perfect. A number of concepts that are important to yoga researchers, such as mindfulness, proprioception, and spirituality, are not currently available through PROMIS®. Additionally, the brevity of the measures may be a drawback to some researchers who may desire the more detailed, nuanced description of a concept that only can be provided through a legacy measure. For example, a researcher wanting to distinguish between emotional, physical, and mental fatigue might opt for a legacy measure that has subscales differentiating those types of fatigue. However, the brevity of PROMIS® measures is perhaps one of the biggest benefits of PROMIS®. Using PROMIS®, researchers can collect not only primary outcomes but can include multiple secondary measures in their studies without creating an excessive response burden for research participants.

### Patient-Reported Outcomes in Yoga Therapy

In addition to its use in yoga research, PROMIS® can be useful to yoga therapists. However, there are practical issues that should be considered when incorporating PROs into yoga therapy. These considerations have been outlined in detail by the International Society of Quality of Life Research (ISOQOL) in their *User's Guide for Implementing Patient-Reported Outcomes Assessment in Clinical Practice* (Aaronson et al., 2015) and are highlighted in Figure 2. We will briefly review key components to consider as they relate to yoga therapy, including (1) what outcomes to measure, (2) timing and setting for PRO assessment, (3) method for administering and scoring PROs, (4) interpreting and managing the results, (5) developing strategies for handling problematic issues identified through PROs, and (6) evaluating the impact of PROs on practice (Snyder et al., 2012).

**Outcome selection.** The yoga therapist should first consider the purpose of the data collection. Typically, PROs are used when some type of question exists that needs to be answered. PRO users then should determine what information is needed to answer this question. PROs may be used to evaluate a yoga program or intervention, improve the quality of a yoga intervention, or provide feedback to the yoga therapist and/or the yoga student. Next, a yoga thera-

5. <http://www.prosetastone.org>

<p><b>1. Outcome and population selection:</b> consider the symptoms and population of interest.</p> <ul style="list-style-type: none"> <li>• Which symptoms are important to assess?</li> <li>• Will all clients be assessed or just a subset?</li> </ul>
<p><b>2. Timing and frequency:</b> consider when and how often to collect PROs.</p> <ul style="list-style-type: none"> <li>• Will clients be assessed only prior to first yoga therapy session?</li> <li>• Will clients be assessed repeatedly over time to follow the effectiveness of yoga therapy? If so, how frequently will these assessments occur?</li> </ul>
<p><b>3. Assessment methods and scoring:</b> PROMIS® measures can be administered and scored electronically or by using paper and pencil questionnaires.</p> <ul style="list-style-type: none"> <li>• Is access to a computer or tablet available? Electronic administration using the Internet is efficient, accurate, and convenient, enabling automatic scoring.</li> <li>• Is using a paper questionnaire more comfortable and convenient? Paper questionnaire can be downloaded and printed from the Assessment Center, then scored manually.</li> </ul>
<p><b>4. Data interpretation, management, and incorporation into practice:</b></p> <ul style="list-style-type: none"> <li>• PROMIS® scores have been normed to the general population, allowing yoga therapists to compare their clients' scores to the general public, as well as to individuals with similar health conditions.</li> <li>• Yoga therapists should protect their clients' anonymity and maintain confidential records by creating a system for managing the information collected through PROs in a secure manner (storing paper questionnaires in locked filing cabinets and electronic files in password-protected computers).</li> </ul>
<p><b>5. Problematic cases:</b> Yoga therapists should have a plan in place should PRO measures reveal symptoms that require immediate treatment beyond the scope of yoga therapy.</p>

**Figure 2. Considerations for collecting Patient Reported Outcomes (PROs) in yoga therapy.**

pist needs to identify which clients will be included in PRO collection. A therapist may want to capture all therapy clients in his/her practice or focus only on a specific sub-population, such as those with depression or pain-related conditions.

Based on the purpose of the data collection and the targeted sample for data collection, the yoga therapist can then decide which measures to administer. Some PROs are designed to collect data on general wellbeing and a broad range of symptoms. The 10-item PROMIS® Global Health is a reliable and valid general measure that assesses physical function, pain, fatigue, anxiety, depression, and social satisfaction. Because it is a composite measure that captures several common symptoms, the yoga therapist might choose this as a measure to use with all of their therapy clients. This would provide valuable data regarding the general effectiveness of yoga therapy in clinical practice on the health and wellbeing of clients

Alternatively, the yoga therapist may want to focus more intensely on one or two symptoms. This may be more appropriate for a yoga therapy program geared towards a specific condition, such as chronic pain, depression, sleep disturbance, or low physical function. To achieve this, in the Assessment Center the yoga therapist can choose the specific profile measure or design their own by picking and choosing those items or measures within a domain that are pertinent to their own yoga therapy practice. It is also possible to choose a general measure, such as the PROMIS®

global measure, and then incorporate additional specific PROMIS® measures or even questionnaires that are outside of PROMIS®. For example, the yoga therapist might want to incorporate measures of such concepts as mindfulness or emotional intelligence, two concepts that are not currently available in PROMIS®.

**Timing and setting for PRO assessment.** Yoga therapists may decide to collect PROs before initiating yoga therapy, using them as part of their standardized clinical intake. By incorporating PROs into their initial assessment, they may uncover symptoms or issues that clients fail to mention on their own. Also, the severity of symptoms as compared to the general population may be assessed prior to therapy. This may help guide treatment goals, planning, and follow-up. In addition to a baseline assessment, the yoga therapist may conduct periodic assessments to monitor response to yoga therapy or to uncover new symptoms and issues as they arise. PRO collection could be performed at each visit or at specific intervals, such as monthly, or at the start and conclusion of a set course of treatment. More frequent administration, such as at each yoga therapy visit, might provide a more comprehensive picture for clients who are very symptomatic, while healthier clients might be assessed at longer intervals, such as every one to three months (Snyder et al., 2012). The frequency of PRO administration should be based upon a balance between the value of the information collected and the effort and time burden of collecting that information.

PRO collection may occur during or outside of a visit with the yoga therapist. During a visit, a yoga therapist may provide the PRO measures immediately prior to a session or as part of a session. Since scoring is immediate if collected electronically in the Assessment Center, the therapist will be able to use data to guide clinical decisions. Yoga therapy clients can complete questionnaires outside of visits, which may be more convenient and would allow the yoga therapist more time to preview and incorporate the assessment into the next session. Therapists may consider administering PROs at regular intervals to capture data consistently and uniformly from their therapy clients.

**Method for administering and scoring PROs.** PROMIS<sup>®</sup> measures can be collected electronically using the Assessment Center. The benefits of this method of electronic PRO (ePRO) collection include the option of using the more efficient and accurate CAT, real-time scoring that allows access to results immediately and the convenience of allowing clients with Internet access to complete the measures at a time of their choosing. Portable tablets such as iPads may make the collection of ePROs particularly easy. It should be noted that data that are uploaded into the Assessment Center are also stored there. While only the individual who created the account can access and view the data, any time data are collected and stored electronically, a breach in privacy is possible, potentially endangering data confidentiality.

Not all yoga therapists and clients may be comfortable using the Internet and/or electronic devices such as tablets or computers. For these individuals, paper versions of short and long forms of PROMIS<sup>®</sup> measures, as well as information on how to score and interpret them, are available through the Assessment Center. The yoga therapist can download the forms and then print paper questionnaires to administer to their clients.

**Interpreting and managing results.** All PROMIS<sup>®</sup> measures have been normalized to the general population of the US, providing a benchmark from which to interpret yoga therapy clients' scores. Should the yoga therapist be interested in a specific symptom, such as pain or depression, a substantial number of research studies have been published using PROMIS<sup>®</sup> measures in a variety of patient populations. These include but are not limited to cardiovascular disease (Flynn et al., 2015), cancer (Wagner et al., 2015), and arthritis (Broderick, Schneider, Junghaenel, Schwartz, & Stone, 2013). Because PROMIS<sup>®</sup> scores have been published in these patient populations, this allows yoga therapists to compare the PROMIS<sup>®</sup> scores of their clients that have undergone yoga therapy treatments to the scores of patients that have undergone conventional treatments for those conditions. The yoga therapist should

decide which results will be shared with the clients and how that information will be best presented.

If collecting PROs at multiple time points and/or using paper questionnaires, the yoga therapist will need a system of organizing the information. This will entail some sort of electronic or paper recordkeeping. At present, the Health Insurance Portability and Accountability Act (HIPAA) protecting patient privacy does not apply to all yoga therapists. However, the yoga therapist should consider the information collected through PROs as confidential (Choi, Capitan, Krause, & Streeper, 2006). Those records should be kept in a locked file cabinet or in a secure, password-protected computer, to be accessed only by the yoga therapist and appropriate staff members. If data collection is to be used for research and/or publication, then yoga therapists will need to ensure patient safety and confidentiality by following guidelines for the protection of human participants in research, which includes obtaining informed consent and receiving approval from a local institutional research board (The Belmont Report, 2014).

**Handling problematic symptoms identified through PROs.** During the course of collecting PROs, it is possible that a client's scores for certain symptoms, such as depression or anxiety, might raise concerns for the yoga therapist. At present, there are no clear guidelines regarding cut scores—scores that are indicative of a severe problem—with PROMIS<sup>®</sup> measures. However, t-scores above 70 or 20 points worse than the mean of 50 have been found to be severely symptomatic and may serve as a good reference point (Cella et al., 2014). The yoga therapist should develop a plan for making appropriate clinical referrals should a student present with troubling scores as well as symptoms such as suicidal ideation or other medical emergencies that require immediate treatment beyond the scope of yoga therapy.

**Evaluating the impact of PROs on treatment.** According to the national yoga therapy survey published in this edition (Ross et al., 2016), nearly all of the yoga instructors surveyed reported that pain was the most common symptom that motivated individuals to seek yoga therapy. This may mean that pain should be included routinely in PRO measurement in yoga therapy. Measuring pain is complex and multidimensional as pain can be measured by its intensity or magnitude as well as the interference that pain causes in one's functioning (Cook et al., 2013). Additionally, pain rarely occurs in isolation but rather presents as a cluster of co-occurring symptoms including sleep disturbance, pain, anxiety, depression, and low energy/fatigue, a combination referred to as SPADE (Davis, Kroenke, Monahan, Kean, & Stump in press). This cluster of symptoms may represent a good core of PRO symptoms

**PROMIS® measures\* of:**

- Sleep disturbance
- Anxiety
- Depression
- Fatigue
- Physical function
- Pain behavior
- Pain intensity
- Pain interference

**Other outcomes:**

- Frequency/dosage of prescription and over-the-counter pain medications
- Use of traditional medical treatments for pain
- Use of Complementary and Integrative Medicine (CIM) treatments for pain, other than yoga therapy

**Figure 3. Outcomes that should be included when treating pain conditions with yoga therapy.**

\* PROMIS® measures are available through the Assessment Center in short forms (4, 6, and 8 questions), long forms, and through computer adaptive testing (CAT).

that should be assessed routinely in yoga therapy clients with pain-related conditions. In addition, as pain increases, physical function often decreases (Lin et al., 2011). Therefore, physical function should also be included in pain assessments. Outcomes that should be collected when treating individuals for pain conditions with yoga therapy are shown in Figure 3. PROMIS® short forms or CAT measures of sleep disturbance, anxiety, depression, and fatigue could be collected in addition to PROMIS® pain measures of physical function, pain behavior, pain intensity, and pain interference. Yoga therapists also may want to collect information about the frequency and amount of prescription and over-the-counter pain medication, as well as other traditional medicine and CIM treatments that the client may be using for pain. This information will help determine whether the use of such medications and/or treatments changes throughout the course of yoga therapy. Additionally, the yoga therapist should keep records regarding what combination of yoga techniques (asana, breath work, meditation, philosophy) were taught to the client. By collecting this information in addition to PROs, the yoga therapist over time may confirm or reveal those yoga techniques that are associated with improvement in PROs.

**Conclusion**

In conclusion, incorporating PRO collection into yoga therapy using PROMIS® and the Assessment Center can be very useful for the field of yoga therapy. PROs may be used for clinical practice, program development, quality improvement, research, and to validate the effectiveness of yoga therapy. Collecting PROs prior to initiating yoga therapy can provide useful information about clients' symptoms

and quality of life that can improve and enhance yoga therapy. Following PROs over time can provide the yoga therapist with important information about which yogic techniques (asana, breath work, meditation, and/or philosophy study) appear to be most helpful in treating specific symptoms in their clients. If a large number of yoga therapists from various styles and lineages of yoga collect PROs using a reliable and valid system such as PROMIS® in a large-scale longitudinal research study, the data collected could be used to assess comparable effectiveness. This study would have the potential to distinguish which styles of yoga or which yogic techniques are most helpful in treating specific symptoms or health conditions. Because PROMIS® has been widely used in a variety of populations, both healthy and diseased, PRO collection using PROMIS® may enable yoga therapists to compare yoga therapy to traditional western medicine, as well as other CIM modalities. Using PROMIS®, yoga therapists can evaluate their treatments using the same metric as traditional medicine, an important step in yoga therapy being recognized as a valid treatment modality.

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