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Tools for Assessing Therapeutic Progress in Patients with Rett Syndrome

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INTRODUCTION

- Rett syndrome (RTT) is a rare genetic neurological and developmental disorder that occurs predominantly in females.[1] Patients with RTT have an almost normal early development and experience a developmental regression beginning around 12–18 months of age.[2]
- The symptoms of RTT are debilitating and affect multiple organ systems, ranging from loss of mobility to epilepsy and abnormal breathing.[1,3] Patients with RTT usually require round-the-clock care.[2]
- There is currently no cure for RTT, and treatment focuses on symptom management, in which therapeutic professionals (TPs) play a key role.[4,5].

OBJECTIVES

- This study aimed to identify the tools that TPs in the United States (US) use for assessment of therapeutic progress in patients with RTT, and to characterize the strengths and limitations of these tools as perceived by TPs.

METHODS

- TPs (physical therapists [PT], occupational therapists [OT], and speech and language therapists [ST]) and physicians who provide medical management and coordinate the care of patients with RTT were interviewed in a semi-structured manner. All interviews were double-blinded to maintain impartiality of the collected evidence.
- The target sample aimed to include 20–25 TPs and 8–10 physicians representing diverse care settings (RTT Centers of Excellence [COEs], non-COE outpatient and home health, and school-based care). Participants were required to practice in the US and have >3 and <25 years experience in their role.
- TPs provided information on the therapeutic assessment tools used, the patterns of their use, the influence of the assessment results on treatment plan and goals, and the benefits and limitations of the assessment tools. Clinicians provided information on the assessments they review, and the benefits and limitations of these tools.
- A framework to evaluate the therapeutic assessment tools was constructed based on interview responses and published literature. Interviews informed the sensitivity and specificity and practical utility of the assessment tools, as reported by the participants. Information on the empirical validity of the assessment tools was collected through a targeted review of the relevant literature.

RESULTS

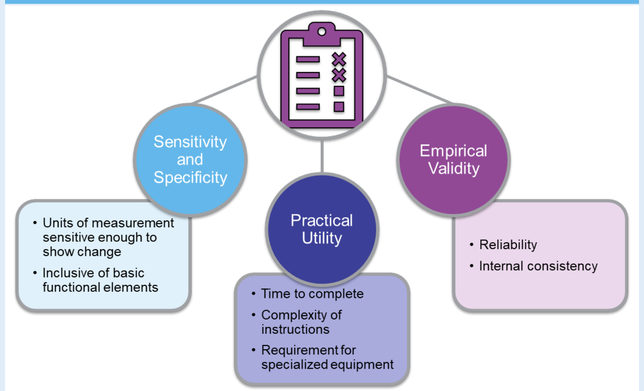
Participant characteristics

- A total of 17 TPs (6 PT, 6 OT, 5 ST), working in community-based (n=10), school-based (n=5),and other (n=2) settings were interviewed, alongside 9 physicians (3 pediatricians and 6 pediatric neurologists).

Framework to evaluate therapeutic assessment tools

- Optimal therapeutic progress assessment tools were considered to have good clinical validity, practical utility, and sufficient sensitivity to show progress or response to treatment:
  - Assessment tools that are too time intensive or require specialized equipment to complete may have limited adoption.
  - Assessment tools that are too high level (e.g., only assess ambulation status) and do not include more basic functional elements may have limited clinical utility.
  - Assessment tools may benefit from incorporating qualitative feedback, especially for measures with insufficient sensitivity for small changes common in RTT.
- Based on the aforementioned characteristics of an optimal assessment tool, a framework comprising three elements, empirical validity, practical utility, and sensitivity and specificity was constructed (**Figure 1**).

Figure 1. Framework for Evaluating Therapeutic Progress Assessment Tools



Therapeutic assessment tools used by TPs in patients with RTT

- Assessment tools were commonly used across the therapy continuum to inform treatment goals, treatment modalities, and discharge planning. Generally, assessments were completed at initial evaluation and every 3 months thereafter, followed by a reassessment at discharge.
- TPs tended to use assessment tools that are most relevant to their discipline, although some tools appeared to lend themselves to multiple disciplines.
- Overall, TPs reported the use of 22 assessment tools (**Table 1**) including 6 RTT-specific tools (3 assessing global function and 3 focused on PT/OT competencies, i.e., mobility and motor function). Tools unspecific to RTT (n=16) were used to measure global function (n=4), activities of daily living (n=6), and cognition, communication, and psychosocial functioning (n=6).
- Both TPs and physicians reported generally low awareness of RTT-specific assessment tools, and some respondents expressed an opinion that such tools are only appropriate for clinical trials and not everyday clinical practice.
- Access to some tools was limited due to permission and/or licensing requirements creating administrative barriers, and due to the prohibitive costs of using some of the tools.
- Integration into the workflow and embedding the assessment tools into electronic medical records were identified as possible barriers to adoption of assessment tools in clinical practice.

Evaluation of the therapeutic assessment tools

- Although published evidence reported that RTT-specific assessment tools had moderate–high to high empirical validity, the practical utility and sensitivity and specificity of these tools, as assessed by TPs and physicians treating patients with RTT, was low to moderate (**Table 1**).

Table 1. Evaluation of therapeutic assessment tools used in patients with RTT

Assessment Tool	Empirical Validity	Practical Utility	Sensitivity and Specificity
RTT-specific global function assessment tools			
Global Assessment and Intervention for Rett Syndrome (GAIRS)	Moderate-High	Low	Low
Rett Syndrome Behavior Questionnaire (RSBQ)	High	Moderate-Low	Moderate
Rett Assessment Rating Scale (RARS)	High	Low	Low
RTT-specific PT/OT-focused assessment tools			
Rett Syndrome Gross Motor Scale (RSGMS)	High	Moderate-Low	Moderate-Low
Rett Syndrome Motor Evaluation Scale (RESMES)	High	Moderate-Low	Moderate
Rett Syndrome Specific Mobility Scale (FMS-RS)	Moderate-High	Moderate-Low	Moderate
Non-RTT specific global function assessment tools			
Clinical Global Impression Improvement (CGH-I)	Moderate	High	Moderate-High
Autism Screening Questionnaire (ASQ)	Moderate-High	Moderate-High	Moderate
Motor-Behavioral Assessment Scale (MBA)	Moderate	Moderate	Moderate
Quality of Life Inventory – Disability (QI Disability)	Moderate	Moderate-High	Moderate
Non-RTT specific assessment tools focused on activities of daily living			
Vineland Adaptive Behavior Scales (VABS)	Moderate	Moderate	Moderate
Quality of Upper Extremity Skills Test (QUEST)	Moderate-High	Moderate	Moderate
Pediatric Functional Independence Measure (WeeFIM)	Moderate-High	Moderate-High	Moderate
Modified 2-Minute Walk Test (2MWT)	Moderate-High	Moderate-High	Moderate
Modified Bouchard Activity Record (BAR)	Moderate	Moderate	Moderate
Hand Apraxia Scale	Moderate	Moderate	Moderate
Non-RTT specific cognition, communication and psychosocial assessment tools			
Developmental Test of Visual Perception (DTVP)	Moderate	Moderate-Low	Moderate-Low
Beery-Buktenica Development Test of Visual-Motor Integration (Beery VMI)	Moderate-High	Moderate-Low	Moderate-Low
Aberrant Behavior Checklist – Community (ABC-C)	Moderate-High	Moderate	Moderate
Adapted Mullen Scales of Early Learning (MSEL-A)	Moderate-High	Moderate	Moderate
Anxiety, Depression, & Mood Scale (ADAMS)	Moderate-High	Moderate	Moderate-Low
Assessment of Visual Attention in Interaction (AVAI)	Moderate	Moderate	Moderate-Low

High — Low

OT, occupational therapy; PT, physical therapy.

- A range of non-RTT specific tools, often specific to the TPs' discipline or general pediatric disability, were used in clinical practice, although none of these combined high empirical validity available through published reports with high practical utility and sensitivity and specificity reported by the participants. Nonetheless, several measures rated at least "moderate" on all of the criteria were identified.

CONCLUSIONS

- TPs utilize a wide range of tools for assessing therapeutic progress in patients with RTT. These are often not RTT specific measures, but rather measures specific to the TPs' discipline or general pediatric disability.
- Although RTT-specific tools are perceived as having insufficient practical utility and sensitivity/specificity to be used in clinical practice, alternative non-RTT specific assessment tools exist, and are already widely used among TPs and clinicians treating patients with RTT.
- RTT is a rare disease and few clinical practice guidelines are available to guide real-world decision making. This represents a considerable evidence gap. More standardized and consistent assessment by TPs, and its regular review by clinicians, may allow for greater understanding of patient's therapeutic progress or response to treatment and facilitate therapeutic goal setting.

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DISCLOSURES

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