A Measure of Attitudes toward Interdisciplinary Healthcare Teams Around Pediatric Autism Care

ORIGINAL RESEARCH

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ABSTRACT

Introduction: Autism is a common neurodevelopmental condition often diagnosed in childhood that requires cross-system and -sector collaboration (e.g., educational, healthcare, community and family systems). Having a psychometrically strong tool to consistently and reliably measure clinicians' attitudes toward healthcare teams is necessary in both research and clinical contexts. Prior researchers have developed such tools, but many lack psychometric support or are not focused on interdisciplinary healthcare teams. In the present study, we revised the Attitudes Toward Health Care Teams (ATHCT) scale to explicitly address interdisciplinary healthcare teams and use inclusive language appropriate for a range of disciplines. In this study, we evaluate this revised measure—the Attitudes Toward Interdisciplinary Healthcare Teams (ATIHCT)—to determine its psychometric support.

Method: Two hundred and sixteen healthcare clinicians from two samples were included in the current study to validate the ATIHCT. An exploratory factor analysis with parallel analysis using maximum likelihood was conducted to determine factor structure. Promax (orthogonal) rotation method was used as factors are assumed to be correlated. Due to the ordinal nature of response options a polychoric correlation matrix was used.

Results: The ATIHCT evidenced good reliability and resulted in two distinct factors measuring healthcare providers' perceived efficiency of interdisciplinary team-based care and perceived service quality associated with interdisciplinary team-based care.

Discussion: The findings from the current study indicate that the ATIHCT is a psychometrically strong measure of healthcare provider perceptions of interdisciplinary team-based care. We discuss implications and potential uses for the ATIHCT in both clinical and research contexts.

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IMPLICATIONS FOR EDUCATION AND PRACTICE

- There is an increasing need for interdisciplinary healthcare teams in the United States, particularly in the service provision for autistic individuals.
- Having a psychometrically strong tool to consistently and reliably measure clinicians' attitudes toward healthcare teams is necessary in both research and clinical contexts.
- The findings from the current study indicate that the ATIHCT is a psychometrically strong measure of healthcare clinicians' perceptions of interdisciplinary team-based care.

THE ROLE OF INTERDISCIPLINARY TEAM-BASED HEALTHCARE

The concept of team-based healthcare was thrust into the national spotlight in 1999, when the Institute of Medicine (now The National Academies) issued a report highlighting the staggering prevalence of medical errors in the United States (U.S.) healthcare system (Kohn et al., 2000). Recognizing the fragmented workflows, as well as poor communication and information sharing, the report called for more effective communication, collaboration, goal sharing, and interdependent functioning among healthcare teams. In the roughly 20 years since, there is now near universal recognition that interdisciplinary team-based healthcare is a clinical and ethical imperative in providing safe and high-quality care. In healthcare teams, clinicians from distinct backgrounds, disciplines, and practice settings (e.g., hospitals, subspecialty clinics, primary care, community mental health, schools) unify relevant expertise that cannot be represented in one professional discipline alone (Bell et al., 2018).

The importance of healthcare teams is increasing as the U.S. grapples with steeply rising healthcare costs coupled with outcome quality metrics ranking well below other developed nations (Kruk et al., 2018). Several systemic factors have contributed to the highly inefficient nature of healthcare delivery. These factors include a fragmented approach that lacks a framework for interdisciplinary clinicians to function within a team structure (i.e., unified leadership, communication and mutual support, task-shifting, and situation and accountability monitoring; Porter & Teisberg, 2006). Functioning within the current delivery system, rates of burnout and moral injury are rising among healthcare clinicians, leading to a workforce crisis in the U.S (Shanafelt et al., 2012).

Over a decade ago, team-based healthcare was endorsed as a necessary mechanism for the U.S. to achieve the "Triple Aims" of healthcare reform: (1) improving the patient experience of care (including quality and satisfaction), (2) improving the health of populations, and (3) reducing the per capita cost of care (Berwick et al., 2008). These aims were expanded to the "Quadruple Aims" in 2014 when Bodenheimer and Sinksy (2014) added the fourth aim of improving healthcare provider satisfaction and reducing burnout. Several healthcare redesign initiatives such as new delivery systems and reimbursement structures (value-based incentives and shared savings programs for Accountable Care Organizations) have been implemented at the federal level (Berwick, 2011; Chernew et al., 2007; Mechanic & Altman, 2010). These initiatives emphasize improving value and efficiency and are uniquely dependent on clinicians from various healthcare disciplines operating as interdependent and collaborative teams in pursuit of the Quadruple Aims.

MEASURING ATTITUDES TOWARD HEALTHCARE TEAMS

Measuring clinicians' attitudes toward healthcare teams is necessary in both research and clinical contexts. Having a standardized, reliable, and valid measure allows researchers to expand on and strengthen the research on team-based healthcare in a systematic and consistent manner. In a clinical context, such a measure allows for effective program evaluation designed to improve and train healthcare clinicians in team-based care. Measurement of attitudes toward healthcare teams is critical in attaining the Quadruple Aims of healthcare reform. Furthermore, attitudes predict intentions, which are directly linked to behavior (Ajzen, 1991). Measuring clinicians' attitudes to interdisciplinary healthcare teams may provide insight into their engagement likelihood, which has direct clinical and research implications.

There are several available tools that measure attitudes or similar constructs (e.g., perceptions) of healthcare teams and interdisciplinary collaboration (Heinemann & Zeiss, 2002; Heinemann et al., 2002; Hollar et al., 2012; Norris et

al., 2015). Most of these measures are validated and have strong psychometric properties and focus on collaborations across disciplines (Thanhauser et al., 2010). The Attitudes Toward Health Care Teams scale (ATHCT) is one measure that has been developed, modified, and validated over the years. The ATHCT, originally developed by Heinemann and colleagues (1988), was designed for use with clinical teams in both research and program evaluation contexts (Heinemann et al., 1999). Heinemann and colleagues (1999) tested their 31-item measure covering perspectives of quality and cost of care and physician centrality on a 4-point Likert scale among physicians, social workers, nurses, and other interdisciplinary professionals. The original ATHCT had strong reliability and validity and was used in research as a valid method of measuring attitudes toward healthcare teams (Brown & Chamberlin, 1996). Since its inception, a few researchers have published studies that have provided modifications and/or updates to create revised or new versions of the ATHCT.

In a 3-stage study testing psychometric properties through factor analyses with varimax rotation, Heinemann and colleagues (1999) adapted the ATHCT. Their first iteration contained 31-items on a 4-point Likert scale and was narrowed to 21-items. The second phase included 38-items on a 4-point Likert scale and was dropped to 28-items, and the final phase included 21-items on a 6-point Likert scale which was narrowed to 19-items. Phases one and two consisted of three-factors: (1) *quality of care,* (2) *cost of team care,* and (3) *physician centrality,* while phase three was condensed into a two-factor solution of the following: (1) *quality of care/process* and (2) *physician centrality*. Ultimately, the authors suggested the use of a 20-item measure comprised of 14-items from the factor *quality of care/process* in phase three and 6-items from the factor *physician centrality* in phase two. Heinemann and colleagues (2002) later examined the psychometric properties of the suggested two-factor 20-item, 6-point Likert scale ATHTC through factor analysis with varimax rotation. The authors found this measure to be both a valid and reliable tool.

In 2000, Heinemann and colleagues' (1999) 21-item measure on a 6-point Likert scale was revised by Hyer and colleagues (2000) and was used as a method of evaluating the effectiveness of an interdisciplinary team training program. Results from an exploratory factor analysis (EFA) in a sample of multidisciplinary healthcare (e.g., medicine, pharmacy, social work) graduate students yielded a 3-factor model with the following subscales: (1) *value of team*, (2) *team efficiency*, and (3) *shared leadership*. This model has since been used in multiple research studies evaluating interdisciplinary team trainings in multidisciplinary healthcare fields such as medicine, nursing, social work, dentistry, psychiatry, psychology, occupational therapy, and physical therapy (Leipzig et al., 2002; Fulmer et al., 2005; Forchuk & Vingilis, 2008).

Additional modifications to the ATHCT were made by Curran and colleagues. Curran and colleagues (2007; 2008) adapted Heinemann and colleagues' (Brown & Chamberlin, 1996; Hyer et al., 2000; Leipzig et al., 2002) 2-factor 20-item tool on a 6-point Likert scale to be a 14-item measure on a 5-point Likert scale. This version was examined using a factor analysis (type unspecified) among medicine, nursing, pharmacy, and social work undergraduate students (Curran et al., 2007; Curran et al., 2008). This 2-factor version of the ATHCT tool was used again by Curran and colleagues (2010) among a similar interdisciplinary population to examine the effectiveness of interdisciplinary training workshops. The measure was also used with different populations (e.g., undergraduate students in nursing, laboratory science, and physical and occupational therapy). Hayashi and colleagues (2012) conducted an EFA in their examination of the adapted ATHCT, which resulted in a 3-factor model with the following subscales: (1) *quality of care delivery,* (2) *patient-centered care,* and (3) *team efficiency*. Most recently, the modified ATHCT tools by Curran and colleagues (2008) and Hayashi and colleagues (2012) were compared and evaluated by Kim and Ko (2014) in a sample of graduate law, nursing, medicine, pharmacy, social work, and dental students. Through a confirmatory factor analysis (CFA) Kim and Ko (2014) concluded that the 3-factor model by Hayashi and colleagues (2012) was appropriate and slightly stronger in psychometric quality. Despite modifications and adaptions over time, the ATHCT scale has shown to be a valid and a reliable measure of multidisciplinary professionals' attitudes towards healthcare teams.

STUDY PURPOSE

Measuring attitudes of interdisciplinary team-based care is a critical component to determining outcomes associated with interdisciplinary collaboration and ensuring progress towards the Quadruple Aims of healthcare reform. Various versions of the ATHCT have been frequently used for this specific purpose (Kim & Ko, 2014). Although prior versions of the ATHCT have been validated and evidence strong psychometric support, a more recent version is warranted. Given the increasing commitment to interdisciplinary collaboration across a wide range of healthcare clinicians and training programs, the purpose of this study is to develop and validate an updated version of the ATCHT, the Attitudes toward Interdisciplinary Healthcare Teams (ATIHCT), with items that use more inclusive language applicable to healthcare clinicians across a broad range of disciplines. Moreover, we use the terminology

"interdisciplinary" when referring to team-based care to ensure items are explicitly measuring perceptions of teams comprised of clinicians from multiple disciplines.

METHOD

PARTICIPANTS AND PROCEDURES

A total of 216 healthcare clinicians participated in the current study. We combined the two datasets (see below) from larger studies investigating professionals' attitudes toward working in healthcare teams. All procedures were approved by the Utah State University Institutional Review Board. All participants provided consent prior to completing any study tasks. Participants were included in this study if they met the inclusion criteria for their associated study (see descriptions below) and if they completed all items on the ATIHCT.

Dataset 1 Participants and Procedures

The original study purpose associated with dataset 1 was to determine the relation between community medical and mental/behavior health professionals' attitudes toward interdisciplinary team-based care and how often they engage in interagency collaboration with school-based professionals when serving autistic youth and their families. Participants were required to be engaged in clinical services at least 20 hours weekly and provide services to children with autism and their families. Participants were ineligible for participation if their primary place of employment was in a school or if they practiced predominately in a community setting but contracted services with schools for more than 20 hours weekly. Researchers used a two-phase recruitment method. They first sent an email with study information and the survey link to all Leadership Education in Neurodevelopmental and related Disabilities (LEND) and University Centers for Excellence in Developmental Disabilities (UCEDD) directors and requested they share with any practitioners they think would be interested and a good fit. Researchers then e-mailed directors of major autism centers across the U.S. study information and the survey link and requested that they share this information with their providers.

There were 116 participants in the original study. Most participants identified as White (n = 72, 85.7%), female (n = 76, 90.5%), psychologists (n = 41, 35.3%), and living in the South (n = 55, 47.4%). Most participants were practicing in urban settings (n = 57, 67.9%) with approximately 51–75% of their patient population receiving insurance through Medicaid (n = 32, 38.1%). Participants noted that they had been practicing on average 10.6 years (SD = 9.13). Table 1 includes complete participant demographic

	***DATASET 1* (n = 84)**	***DATASET 2* (n = 124)**
		M(*SD*)
Age, years	NA *n*(%)	42.5(11.1) *n*(%)
Gender		
Female	98(84.5)	—
Male	13(11.2)	—
Prefer Not to Respond	2(1.7)	—
Race/Ethnicity		
Aboriginal/First Nation/Native American	0(0)	1(7.7)
Asian	6(5.2)	4(3.1)
Black or African American	2(1.7)	3(32.3)
Latinx	9(7.8)	3(2.3)
Multiracial	3(2.6)	0(0)
White	96(82.8)	107(82.3)
Other	1(0.9)	12(9.2)
Practice Setting		
Hospital/Outpatient Clinics	43(37.1)	27(20.7)
Community Clinic	15(12.9)	8(6.2)
Private Practice	20(17.2)	17(13.1)
University/University-Based Clinic	31(26.7)	38(29.2)
Home-Based Care	3(2.6)	—
School	—	14(10.8)
Other	4(3.4)	0(0)
Profession		
Audiology	0(0)	15(11.5)
Behavior Therapy	11(9.5)	—
Education/Special Education	—	15(11.5)
Genetics	—	5(3.8)
Health Administration	—	3(2.3)
Medicine	—	3(2.3)
Mental Health Counseling or Therapy	4(3.4)	—
Nutrition/Dietetics	—	5(3.8)
Occupational Therapy	7(6.0)	8(6.2)
Pediatrician	8(6.91)	2(1.5)
Pediatric Dentistry	—	6(4.6)

(Contd.)

	DATASET 1 (*n* = 84)	*DATASET 2* (*n* = 124)
		M(*SD*)
Physical Therapy	2(1.7)	7(5.4)
Psychiatry	4(3.4)	—
Psychologist	41(35.3)	24(18.5)
Psychometrician	2(1.7)	—
Social Work	10(8.6)	12(9.2)
Speech Language Pathology	19(16.4)	8(6.2)
Other	1(0.9)	13(10.0)

Table 1 Participant Demographics.

Note: Due to inconsistent demographic data across datasets and sparse cell sizes, statistical tests comparing demographics across samples was not pursued.

information. Once removing participants with incomplete ATIHCT responses, the current study included 84 medical and mental/behavioral health professionals working in community settings (e.g., private practice, hospital, university clinic) in the U.S from dataset 1.

Dataset 2 Participants and Procedures

The study purpose associated with dataset 2 was to examine the attitudes toward interdisciplinary team-based care in graduates of a Western region Leadership Education in Neurodevelopmental and Related Disabilities (LEND) interdisciplinary training program. Researchers recruited participants for dataset 2 by having the URLEND training coordinator send an email with study information and the survey link to past trainees. All data were collected online via Qualtrics. Inclusion criteria included being a graduate of the URLEND training program between the years 2001 and 2019. Following consent, participants completed a brief survey that included demographic questions and the ATIHCT. There were 131 participants in the original study. Participants were predominately female (n = 102, 82.3%), White (n = 101, 81.5%), in the psychology discipline (n = 22, 17.7%), and currently living in urban areas (n = 83, 66.9%). The average age of participants was 42.42 years (SD = 11.08) and they had been working in their profession an average of 12.96 years (SD = 9.76). Following the removal of participants with incomplete responses to the ATIHCT there were 124 participants from dataset 2 in the current study. See Table 1 for complete participant demographic information.

MEASURE DEVELOPMENT

We revised the original 20 items from the ATHCT (Heinemann et al., 1988; Brown & Chamberlin, 1996) to create the Attitudes Toward Interdisciplinary Healthcare Teams (ATIHCT) by: (a) referring to teams throughout the measure as being explicitly interdisciplinary and (b) adding inclusive language to ensure relevance to all healthcare disciplines. The initial ATIHCT (prior to analyses) was comprised of 16 items with response options on a 6-point Likert scale ranging from 1 (Strongly Disagree) to 6 (Strongly Agree).

DATA ANALYSES

An EFA with parallel analysis using maximum likelihood was conducted to determine factor structure. Varimax rotation method was used as factors are not correlated. Due to the ordinal nature of response options a polychoric correlation matrix was used. Both scree plots and factor loadings were used to determine the most appropriate factor structure (.4 was determined coefficient cutoff). Cronbach's alpha was used to estimate internal consistency. Analyses were conducted using SPSS (Version 27).

RESULTS

Analysis of the scree plot and factor loadings indicated that a 2-factor (explaining 45.62% of the cumulative variance), 3-factor (explaining 54.66 of the cumulative variance) or 4-factor model (explaining 61.35 of the cumulative variance) may be appropriate for the ATIHCT. After considering statistical loadings and conceptual connections among items, we initially concluded the 3-factor model with 9 items was optimal. Of the original 16 items, 7 were omitted due to poor statistical (items 2, 3, 4, 10) or conceptual (items 6, 7, 15) fit. Factor 1 (4 items) measures perceived efficiency of interdisciplinary team-based care, Factor 2 (2 items) measures perceived service quality associated with interdisciplinary team-based care, and Factor 3 (3 items) measures perceived patient/client centeredness associated with interdisciplinary team-based care (see Table 2). Factors 1 (α = .87), 2 (α = .73), and 3 (α = .50) evidenced good, acceptable, and poor internal consistency, respectively. Following reliability analyses and revisiting conceptual fits, we determined the 2-factor model was most appropriate and psychometrically defensible. Consequently, the final ATIHCT is a 2-factor 6-item measure. See Supplemental Material for the entire ATIHCT.

DISCUSSION

The findings from the current study indicate that the ATIHCT is a psychometrically strong measure of perspectives of interdisciplinary team-based care. The ATIHCT is a 6-item measure with response options on a 6-point Likert scale

ITEM NO.	ITEM STATEMENT	FACTOR 1	FACTOR 2	FACTOR 3
1	Working in interdisciplinary teams unnecessarily complicates things most of the time.	**.918**	—	—
7[a]	Patients/clients are less satisfied with their care when it is provided by a team.	**.892**	—	—
9	When developing interdisciplinary patient/client care plans, much time is wasted translating jargon from other disciplines.	**.760**	—	—
11	Developing an interdisciplinary patient/client care plan is excessively time consuming.	**.622**	—	—
13	In most instances, the time required for interdisciplinary team collaborations could be better spent in other ways.	**.877**	—	—
14[b]	Patients/clients who receive interdisciplinary team care are better prepared for discharge from care than other patients/clients	—	**.724**	—
15[a]	The interdisciplinary team approach makes the delivery of care more efficient.	—	**.538**	—
16[b]	The interdisciplinary team approach permits health/behavioral health providers/clinicians to meet the needs of family caregivers as well as patients/clients.	—	**.722**	—
5	Patients/clients receiving interdisciplinary team care are more likely than other patients to have their physical, behavioral, developmental and educational needs met comprehensively.	—	—	**.484**
6[a]	Working on an interdisciplinary team keeps most health/behavioral health providers/clinicians enthusiastic and interested in their jobs.	—	—	**.720**
8[a]	Developing a patient/client care plan with other interdisciplinary team members avoids delivering suboptimal care.	—	—	**.421**
12	The give and take among interdisciplinary team members help them to make better patient/client care decisions.	—		**.461**
2	The interdisciplinary team approach improves the quality of care to patients/clients.	—	—	—
3	Interdisciplinary team meetings foster communication among team members from different disciplines.	—	—	—
4	An individual provider/clinician has the right to alter patient care plans developed by the team.	—	—	—
10	Health/behavior health providers/clinicians working on interdisciplinary teams are more responsive than others to personal (e.g., financial, billing support, social support) needs of patients.	—	—	—

Table 2 Items and Factor Loadings for the ATIHCT.

Note: – denotes items with factor loads less than .40.

[a]Removed due to poor conceptual fit. [b]Removed due to poor subscale reliability.

with two factors: (1) *Efficiency* and (2) *Service Quality*. *Efficiency* measures respondents' perceptions of how time-conscious and useful interdisciplinary teams are (e.g., time, complications). *Service Quality* measures perceived degree to which patient/client needs were met and their preparation to discontinue services. The ATIHCT may be used in both clinical and research contexts as a measurement of attitudes towards working in interdisciplinary healthcare teams. In clinical contexts, using the ATIHCT may be particularly important in measuring program evaluation such as outcomes of trainings designed tailored to interprofessional education (IPE) and clinical training and education programs centered around interprofessional collaboration (IPC). Researchers may also use the ATIHCT in studies focused on IPC and IPE. Using measures that quantify perspectives in interdisciplinary team-based care is invaluable as it provides researchers with a systematic and validated tool allowing for more accurate measurement and direct comparisons across studies who use the ATIHCT. Per the EFA findings, we recommend scoring the ATIHCT using raw scores associated with each subscale and not creating an overall total score.

LIMITATIONS AND FUTURE DIRECTIONS

There are limitations with the current study. First, we only conducted internal consistency (reliability) and an EFA (validity). Although the results were promising, additional research may consider further validating the ATIHCT by conducting other reliability and validity analyses. For example, test-retest reliability analysis will provide

additional validity information regarding the stability of the ATIHCT. Similarly, future research should evaluate whether the ATIHCT is sensitive to change by determining pre-post scores before and after education or training. Sensitivity to change is important to establish if the ATIHCT is appropriate to measure program evaluation effectiveness. Future validity analyses may include face validity as well as convergent and divergent validity to further solidify the ATIHCT is measuring attitudes toward interdisciplinary healthcare teams. Moreover, future studies should conduct a confirmatory factor analysis (CFA) to further confirm that the 2-factor structure of the ATIHCT is an appropriate fit.

Second, our sample was representative of multiple disciplines, but was more narrowly focused on professionals who had at least some explicit training in autism and related neurodevelopmental disabilities. Further validating this measure with additional healthcare professionals that have training in other services areas is also important. Furthermore, our sample was specific to healthcare professionals in community settings (e.g., hospitals, community clinics). Including professionals from other settings in future validation studies, such as education, is important given the multiple professional disciplines represented in school contexts. Finally, our sample consisted of healthcare professionals. Given the emphasis on interdisciplinary education and training among pre-service professionals (e.g., graduate students) validating the ATIHCT with this population is also critical. This may be of particular importance if the ATIHCT is to be used for program evaluation with pre-service trainees.

CONCLUSIONS

Results from the current study show promise for the use and applications of this tool, particularly with interdisciplinary healthcare professionals. The ATIHCT is a valid and reliable tool that measures healthcare professionals' attitudes towards interdisciplinary healthcare teams in both clinical and research contexts. The ATIHCT allows for measurement of professionals' attitudes towards interdisciplinary healthcare teams using a validated tool, which allows for more standardized and direct comparisons of this construct across research studies. The ATIHCT may also be used for training and professional development endeavors designed to develop skills and knowledge related to interprofessional collaboration and teams within healthcare settings.

COMPETING INTERESTS

The authors have no competing interests to declare.

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