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A Systematic Review and Evaluation of Clinical Practice Guidelines for Children and Youth with Disruptive Behavior: Rigor of Development and Recommendations for Use

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Abstract

Clinical practice guidelines (CPG) provide a framework for evidence-based practice; however, few studies have assessed the methodological quality of CPGs relevant to child and youth mental health. This study was a systematic review of CPGs for the assessment, prevention and treatment of disruptive behavior, including attention-deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), conduct disorder (CD) and aggression in children and youth. Systematic review identified 29 CPGs meeting inclusion criteria that were appraised using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) validated tool. Twenty-two guidelines addressed ADHD, 2 CD, 1 ODD, 2 for Behavior Disorders collectively and 2 for Aggression. Among the 29 guidelines, two that were developed for ADHD (NICE 2013a; Spanish Ministry of Health, 2010) and one practice guideline developed for CD (NICE 2013b) met high quality criteria; one guideline for behavior disorders (Gorman et al. 2015), two for ADHD (AAP 2011a, b; SIGN 2009a, b, c, d, e), and two for aggression (Knapp et al. 2012; Scotto Rosato et al. 2012a, b) met minimum quality criteria. Findings from this review provide important information for clinicians and organizations who want to utilize guidelines to implement best-practice clinical services for children and youth with disruptive behavior.

Keywords ADHD · ODD · CD · Children · Youth · Practice guidelines

Children and youth with attention-deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), conduct disorder (CD) and aggression (i.e., hereafter referred to collectively as "disruptive behavior"), are some of the most frequently referred groups to mental health centers (Lin et al. 1996; Merikangas et al. 2011), likely because they experience disproportionately high peer and family impairments, academic underachievement (Leadbeater and Ames 2017) and increased likelihood of youth and adulthood diagnoses of depression, anxiety, and antisocial behavior (Copeland et al. 2009; Nock et al. 2007). Excess mortality is also higher in these children compared to the general population (Scott et al. 2017). As such, the burden of suffering experienced by children with disruptive behavior and their families is substantial and results in a significant financial strain on society with high public costs (Foster et al. 2005). It is estimated that a child with disruptive behavior will cost the social system approximately 10 times that of a non-disruptive peer (Foster et al. 2005). Early and effective intervention to prevent negative outcomes and promote adaptive social, emotional and

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behavioral functioning for these children is of paramount importance. However, a variety of factors, including lack of knowledge of evidence-based practices, organizational, resource and systemic barriers may prevent children with disruptive behavior from getting effective mental health care (Rushton et al. 2004).

Adoption of high quality clinical practice guidelines (CPG's) for the assessment, prevention, and treatment of disruptive behavior in children may improve outcomes because these provide the clinician with trustworthy recommendations about interventions demonstrated to benefit patients in rigorous studies (Epstein et al. 2008; Leslie et al. 2004). This is because clinical practice guidelines provide important information to systematically direct evidence based assessment, prevention, and treatment selection. Further, implementation of guidelines in other domains of health has contributed to improved patient outcomes (Grimshaw et al. 2012; Institute of Medicine (US) Committee on Standards for Developing Trustworthy Clinical Practice Guidelines 2011). Although a number of guidelines exist to direct intervention for child and youth mental health (CYMH), the methodologic rigor by which existing guidelines for specific categories of disorders were developed has not been evaluated systematically (Bennett et al. 2016, 2018). As such, in addition to other notable systemic barriers that may limit implementation of evidence-based practice, identifying and selecting a good quality guideline among the many available is a challenge for clinicians and constitutes a barrier to their adoption and implementation.

Evidence-based criteria have been developed to identify high-quality practice guidelines. The most widely used appraisal tool, the Appraisal of Guidelines for Research and Evaluation (AGREE II), used in the present systematic review, includes six domains; scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. AGREE II was developed by an international multidisciplinary team and its measurement properties and validity have been documented (Brouwers et al. 2010a, b, c). Further, it has been identified as the international standard (Vlayen et al. 2005). The present study applies AGREE II methodology to the evaluation of practice guidelines for the assessment, prevention and treatment of child and youth disruptive behavior. Information from this systematic review is necessary to establish which existing guidelines for childhood disruptive behavior difficulties were developed with rigor to help decision-makers choose CPGs based on quality.

Previous findings from members of our group using the broader child and youth mental health literature showed that the methods used by organizations to develop guidelines are often weak (Bennett et al. 2016). Using systematic review methods, five sets of eligible guideline development methods were identified in 70 CPG's addressing child and youth mental health. Three of these sets adhered to all (National Institute for Health and Care Excellence; Scottish Intercollegiate Guidelines Network) or most (U.S. Preventive Services Task Force) AGREE II domains and Institute of Medicine (IOM) standards, but were only used to develop 31.4% of CPGs. Important weaknesses were found in the two remaining sets of development methods (e.g. lack of mandatory rigorous systematic reviews, lack of multidisciplinary development groups, or lack of transparent methods to manage conflict of interest) and were associated with 21.4% of CPGs. No development methods could be identified in 40.0% of available CPGs. These findings suggest that roughly 60% of the methodologic frameworks used to develop guidelines for CYMH show low evidence of methodological rigor. This is concerning given that guidelines are designed to influence clinical practice, and as such may be adopted by clinicians who are unable to identify potentially flawed CPGs due to lack of time or necessary skills. Appraising the methodological rigor of individual guidelines is necessary to identify which of the many available are of high quality, and should be recommended to clinicians.

For the purpose of the present systematic review, we group ADHD, ODD, CD and aggression collectively as *disruptive behavior difficulties*. Although this grouping approach differs from existing categorization systems (i.e., DSM-5), this decision was made to enhance the usefulness of findings based on the following logic. First, these diagnoses/problems are highly comorbid, especially in clinical samples of children and youth to which the reviewed practice guidelines apply (Acosta et al. 2008). For example, epidemiologic studies suggest that ADHD co-occurs with other disorders at rates between 50% and 90% (Biederman et al. 1991; Spencer et al. 1999). Second, although the risk factors for these disorders may be somewhat distinct, the behavioral impairments reported by families presenting to clinics with these disorders overlap. For instance, children with ADHD, ODD, or CD show dysregulated behavior that interferes with their home, school and peer functioning (Burke et al. 2002). Further, parents and children may be less concerned about a specific diagnosis and more about an intervention that matches the child's emotional and developmental skills needs (Miller and Prinz 2003). Third, clinicians who assess and treat children with disruptive behavior frequently work with each of these diagnosed groups, so collectively reviewing guidelines that represent each of these disorders, and providing more general recommendations that are applicable to all categories may be highly relevant to 'real world' clinical practice. Fourth, factor analyses document that these disorders group together in the externalizing spectrum (Bezdjian et al. 2011). Finally, newer approaches to the classification of disorders, like the National Institutes of Mental Health (NIMH) Research Domains Criteria (RDoC)

taxonomy emphasize cross-cutting processes that are relevant to multiple disorders (NiMH 2008).

Methods

Literature Search

A research librarian (MR) developed and conducted a detailed literature search to identify potentially eligible guidelines as described below. Search strategies and methods used in this study are similar to those used previously (Courtney et al. 2018) and follow the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PRISMA guidelines are an evidence-based minimum set of items to help authors report findings from systematic reviews. Further details of the search strategies are available in Supplement 1, available online.

Electronic Databases of Health Literature

Medline (OVID), EMBASE (OVID), PsycINFO (OVID; including Dissertation Abstracts International) and CINAHL (EBSCO) were searched from January 2005 to June 2017. Subject heading and text terms for mental health AND guidelines AND children/youth were searched. The search strategy was developed in Medline, and was then adapted for terms appropriate for each database. Peer review of the search strategy was completed using the Canadian Agency for Drugs and Technology in Health (CADTH) Peer Review Checklist for Search Strategies (Canadian Agency for Drugs and Technologies in Health.). The search terms for guidelines are from the CADTH guidelines search filter (Canadian Agency for Drugs and Technologies in Health 2014).

Grey Literature

Guideline databases including the National Guideline Clearinghouse, Canadian Medical Association Infobase, National Institute for Health Care Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), Guidelines International Network (G-I-N) International Guideline Library, and Australia's Clinical Practice Guidelines Portal were searched. Text word terms for mental health AND children/youth were searched. Google Advanced Search engine was used for a broader search and a search of mental health-related organizations (e.g., American Academy of Child and Adolescent Psychiatry, the Canadian Mental Health Association) was also completed. Complete list of grey literature sources searched can be found in Supplement 1, available online.

Other Sources

In addition, we considered the following (i) CPGs referenced in ineligible CPG summaries or CPG announcements identified in database or grey literature searches; (ii) reference lists of eligible CPGs; and (iii) CPGs suggested by team members.

Removal of Duplicate Records

All records identified by the literature search were compiled into a single database using Reference Manager software and duplicate records were removed.

Inclusion/Exclusion Criteria

Eligible records were identified that met the following inclusion criteria: (i) English language; (ii) documents labeled practice guideline, practice parameter, or consensus or expert committee recommendations, or documents with the explicit objective or methods to develop original guidance/recommendations; (iii) published, revised, updated or reaffirmed between 2005 and 2017; (iv) addressed the assessment, prevention or treatment of disruptive behavior difficulties, specifically ADHD, CD, ODD, or aggression; and (v) relevant to children and youth ≤ 18 years of age. Documents meeting the inclusion criteria were excluded if determined to be a literature review that contained summary statements regarding clinical implications/recommendations.

Designating CPGs as Up-to-Date

Consensus regarding whether or not a CPG is up-to-date and still valid has not been achieved in the literature. Given the practice of the National Guideline Clearinghouse (The National Guideline Clearinghouse 2014), we designate guidelines published or renewed from June 2005, and on or before June 2017, as 'up-to-date'.

Title, Abstract and Full Text Screening

Members of the research team (SD, BA) who have expertise in the identification and quality assessment of CPGs independently screened titles and abstracts of all unduplicated identified records and those that did not meet inclusion criteria were excluded at this stage. Full-text records for all potentially relevant articles identified during title and abstract screening were obtained by a research assistant. Three members of the research team with expertise in methodology (KB, SD, BA) then applied inclusion criteria to full-text documents to identify eligible CPGs.

Guideline Quality Assessment Tool: AGREE II

The AGREE II tool was used to assess the quality of eligible CPGs (Brouwers et al. 2010a, b, c). AGREE II includes 23 items that assess six domains: scope and purpose (overall aim of the guideline, health questions and target population—3 items); stakeholder involvement, (whether the guideline was developed by the appropriate stakeholders—three items); rigor of development (quality of the methods used to gather and synthesize the evidence, formulate and update recommendations—eight items); clarity of presentation (language, structure, and format of the CPG—three items); applicability (likely barriers and facilitators to implementation, resource implications and strategies to improve uptake—four items); and editorial independence (methods used to manage conflict of interest and insure recommendations are not unduly influenced by bias or competing financial or intellectual interests—2 items) (3–6). Items are rated on a 7-point Likert scale ranging from '1 = strongly disagree' to '7 = strongly agree' (3–6). Two additional items assess: (i) overall quality ('1 = lowest possible quality' to '7 = highest possible quality') and (ii) whether the CPG should be recommended for use (yes, yes with modifications, or no) (Brouwers et al. 2010a, b, c).

Quality Assessment Process

Quality assessment was performed by two sets of trained reviewers—a child and adolescent psychiatrist (DC) and a methodologist (SD) and two psychology post-doctoral fellows (MA and SC). The training exercise involved completion of the online AGREE II Overview Tutorial (The AGREE Research Trust), a detailed review of the AGREE II User's Manual (AGREE Next Steps Consortium 2013), followed by an online practice assessment of an example CPG (The AGREE Research Trust). Following training, the four reviewers independently applied AGREE II criteria to each eligible CPG (The AGREE Research Trust). For each item, reviewers indicated their score and justified it by recording page and paragraph numbers for the information supporting each item in the comment box. When applying AGREE II criteria, reviewers ensured that any companion documents for a given CPG (e.g., tools and resources to aid CPG implementation, technical reports, health economic analyses, CPG evaluation tools, etc.) were considered in addition to the main CPG document. Inter-rater differences ≥ 2 points on initial item scores were identified and discussed. This cut-point was chosen as it is both pragmatic and conservative with respect to capturing scoring differences that arise from misinformation (Courtney et al. 2018). After discussion, reviewers were allowed to revise their item scores; however, no attempt was made to reach numerical agreement on the score assigned for each AGREE II item. Thus, any scoring differences that remained following discussion represent between rater differences in judgment rather than failure to detect specific pieces of information within CPG documents. These item scores were then considered final for each reviewer and used to calculate domain scores using the method described in the preceding section.

Inter-rater Agreement

The one-way random intraclass correlation coefficient (ICC) for average measures was calculated to assess inter-rater agreement (Fleiss and Cohen 1973) and classified as per Fleiss' categories: poor (0–0.40), fair to good (0.41–0.75), and excellent (> 0.75) (11). Analyses were performed using the statistical software SPSS, version 23 and in Microsoft Excel.

PG Quality Ratings

The AGREE II User's Manual does not provide criteria to designate CPGs as high or low quality (AGREE Next Steps Consortium). Thus, the interpretation of domain scores are determined by the user (AGREE Next Steps Consortium 2013). We used scores on three AGREE II domains—stakeholder involvement, rigor of development and editorial independence—to classify CPGs according to methodological quality. These three domains were selected because they address the extent to which risk of bias was minimized in the identification and interpretation of the evidence used to derive guideline recommendations. The remaining three domains, although important, do not evaluate risk of bias in the assessment of the relevant research evidence; rather they focus on the problem statement, clarity of presentation, and implementation. Minimum quality CPGs were defined as those that received a domain score ≥ 50% on all three domains. High-quality CPGs were defined as those that obtained a domain score ≥ 70% on all three domains.

AGREE II Domain Score Quality Ratings

Again, the AGREE II User's Manual does not provide criteria to denote high or low quality for each domain score obtained by a CPG. Therefore, to evaluate the performance of the eligible CPGs on each of the six AGREE II domains we report for each domain the proportion of guidelines achieving domain score cut-points of ≥ 50% and ≥ 70%.

Results

Search and Screening

The search identified 5261 unduplicated records (see Fig. 1). Following screening, 29 guidelines met inclusion criteria: 2

addressed diagnoses as a group (including ADHD, CD and ODD); 22 addressed ADHD; 2 addressed CD; 1 addressed ODD; and 2 addressed aggression.

PG Characteristics

Table 1 presents the characteristics of the 29 eligible guidelines. Those developed for ADHD ($n=22$) represented the largest number of eligible guidelines. These were roughly equally developed by government, specialty society or independent expert groups and were developed for the purpose of assessment, treatment, screening/diagnoses, psychosocial intervention, and medication. Guidelines for CD ($n=2$) and ODD ($n=1$) were developed by government or specialty societies. These guidelines covered screening/diagnosis, assessment, prevention, psychosocial intervention, and medication treatment. Guidelines for aggression ($n=2$) were developed by independent expert groups for the purpose of assessment and treatment and focused on screening/diagnosis, psychosocial intervention, and medication treatment. Guidelines for behavior disorders as a group ($n=2$) were developed by an independent expert group and university-based psychiatric research institute. Both of these guidelines covered treatment and medication with the latter also describing assessment, screening, and psychosocial intervention.

PG Quality Ratings: Minimum and High Quality

Among the 29 eligible guidelines, five met criteria for minimum quality and three met criteria for high quality. Table 2 lists the 29 guidelines and indicates which ones met these designations. Those meeting minimum quality included two for ADHD (Scottish Intercollegiate Guidelines Network 2008) (American Academy of Pediatrics 2011b) two for aggression (Knapp et al. 2012;

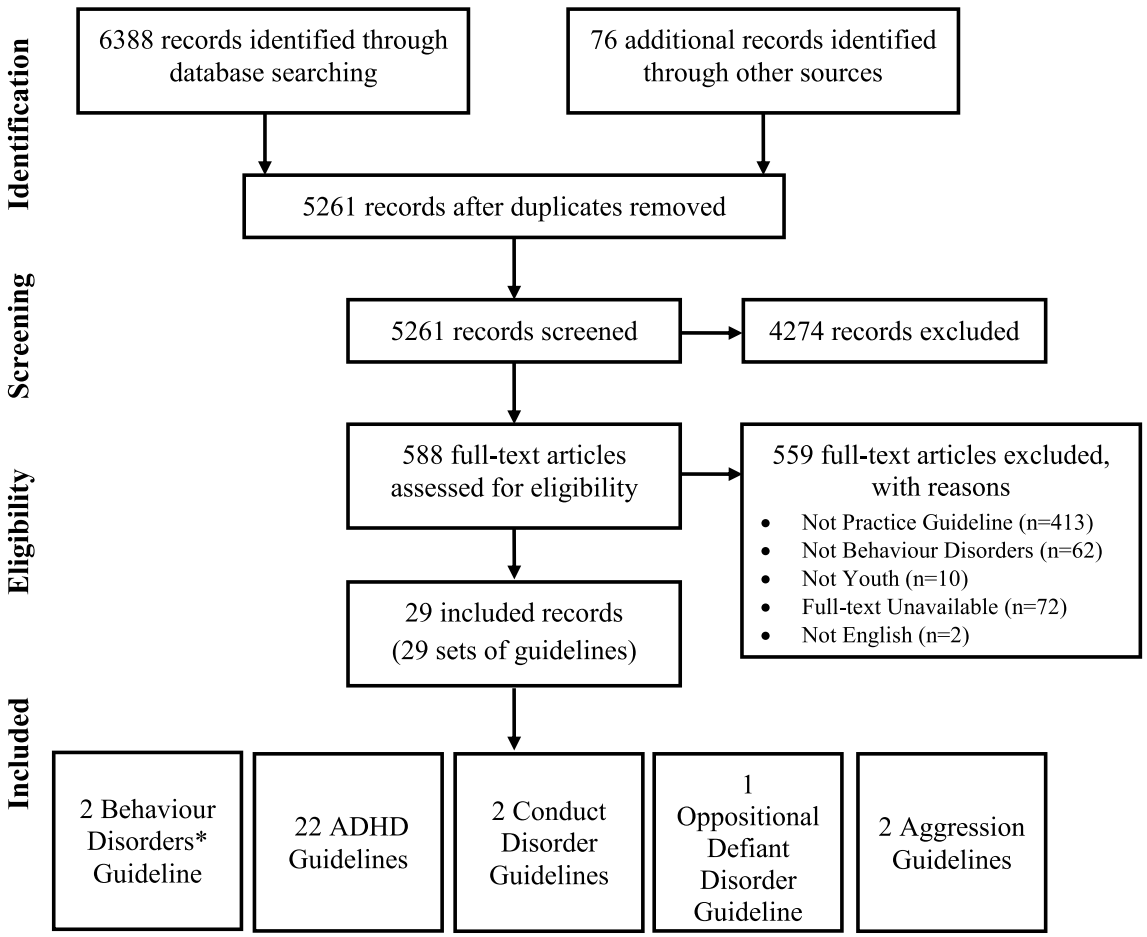

Fig. 1 PRISMA flow diagram

Table 1 Characteristics of eligible practice guidelines (2005–2017)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
Behaviour disorders as a group ($n=2$)																		
Gorman et al. (2015)			✓		Canada	✓				✓			✓				Guideline (Gorman et al. 2015)	15
																	Systematic review 1 (Pringsheim et al. 2015a)	10
																	Systematic review 2 (Pringsheim et al. 2015b)	10
Gathright and Tyler (2014)				✓	USA	✓		✓		✓	✓	✓	✓				Guideline	28
ADHD ($n=22$)																		
Bolea-Alamanac et al. (2014)		✓			UK		✓			✓		✓	✓			✓	Guideline (Bolea-Alamañac et al. 2014)	25
Fung et al. (2014)	✓				Singapore	✓		✓		✓	✓	✓	✓	✓	✓	✓	Guideline [71] Journal Article (Fung et al. 2014)	83 5
Cortese et al. (2013a)			✓		Europe	✓				✓				✓			Guideline (Cortese et al. 2013a)	20
Cortese et al. (2013b)			✓		USA/Canada	✓				✓				✓			Guideline (Cortese et al. 2013b)	13

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
NICE (2013a)	✓				UK		✓	✓		✓	✓	✓	✓			✓	Full guideline (National Collaborating Centre for Mental Health, 2013a)	664
																	Online appendices 17–19 (National Institute for Health and Care Excellence 2013c)	412
																	Online tools and resources (National Institute for Health and Care Excellence 2008)	*N*/A[a]
																	NICE Guidelines Manual (National Institute for Health and Clinical Excellence 2006)	147
																	NICE Charter (National Institute for Health and Care Excellence 2013d)	6

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
University of Michigan Health System (2013)				✓[b]	USA		✓	✓		✓	✓	✓	✓		✓	✓	Guideline (University of Michigan Health System 2013)	41
Mahajan et al. (2012)			✓		USA/Canada	✓		✓		✓	✓		✓				Guideline (Mahajan et al. 2012)	14
NHMRC (2012)	✓				Australia	✓		✓		✓	✓	✓	✓		✓	✓	Guideline (National Health and Medical Research Council 2012)	29
																	Appendices (National Health and Medical Research Council, 2012)	56
AAP (2011a, b)		✓			USA	✓		✓		✓	✓	✓	✓				Guideline (American Academy of Pediatrics, 2011a)	16
																	AHRQ Review (Charach et al. 2011)	366
																	CDC review[c]	N/A[c]

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
																	Online Supplement (American Academy of Pediatrics, 2011b)	21
CADDRA (2011)				✓[d]	Canada		✓	✓		✓	✓	✓	✓	✓			Guideline (Canadian Attention Deficit Hyperactivity Disorder Resource Alliance (CADDRA) 2011)	160
Castro and Brown (2011)				✓	USA	✓		✓		✓	✓	✓	✓	✓			Guideline	15
Graham et al. (2011)			✓		Europe	✓				✓				✓			Guideline (Graham et al. 2011)	21
List and Barzman (2011)			✓		USA	✓				✓		✓	✓				Guideline (List and Barzman, 2011)	10
Spanish Ministry of Health (2010)	✓				Spain	✓		✓	✓	✓	✓	✓	✓		✓		Guideline (Clinical practice guidelines in the Spanish NHS, 2010)	234
Hamilton et al. (2009)		✓			Canada	✓		✓			✓[e]						Guideline (Hamilton et al. 2009)	7

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
SIGN (2009a, b, c, d, e)	✓				Scotland	✓		✓		✓	✓	✓	✓	✓	✓	✓	Full guideline (Scottish Intercollegiate Guidelines Network 2008)	52
																	Search Strategy (Scottish Intercollegiate Guidelines Network 2009d)	10
																	Quick Reference Guide (Scottish Intercollegiate Guidelines Network 2009c)	2
																	Summary of Recommendations (Scottish Intercollegiate Guidelines Network 2009e)	2

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
																	Patient Information Leaflet (Scottish Intercollegiate Guidelines Network 2009b)	2
																	Apple and Android Apps (Scottish Intercollegiate Guidelines Network 2009a)	N/A
																	Guideline Developer's Handbook (Scottish Intercollegiate Guidelines Network 2008)	110
Ministry of Health Malaysia (2008)	✓				Malaysia	✓		✓		✓	✓	✓	✓	✓	✓	✓	Guideline (Ministry of Health Malaysia 2008)	67
Vetter et al. (2008)		✓			USA	✓		✓		✓	✓[e]		✓	✓			Guideline (Vetter et al. 2008)	22
Nutt et al. (2007)		✓			UK		✓			✓		✓	✓				Guideline (Nutt et al. 2007)	32

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
Pliszka (2007)		✓			USA	✓		✓		✓	✓	✓	✓	✓			Guideline (S. Pliszka, 2007)	28
Pliszka et al. (2006)			✓		USA	✓				✓			✓				Guideline (Pliszka et al. 2006)	16
Remschmidt (2005)			✓		Global	✓		✓		✓	✓	✓	✓				Guideline (Remschmidt 2005)	11
Conduct disorder ($n=2$)																		
Ministry of Social Development (2015)	✓				New Zealand	✓				✓		✓					Guideline (Ministry of Social Development 2015)	21
NICE (2013b)	✓				UK	✓		✓	✓	✓	✓	✓	✓				Full Guideline (National Collaborating Centre for Mental Health 2013b)	468
																	Online Appendices 7, 10, 15, 16, 18–21 (National Institute for Health and Care Excellence 2013a)	330
																	Online Tools & Resources (National Institute for Health and Care Excellence 2013b)	N/A[a]

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
																	NICE Guidelines Manual (National Institute for Health and Clinical Excellence 2009)	147
																	NICE Charter (National Institute for Health and Care Excellence 2013d)	6
ODD ($n=1$)																		
Steiner and Remsing (2007)		✓			USA	✓		✓	✓	✓	✓	✓	✓				Guideline (Steiner and Remsing 2007)	16
Aggression ($n=2$)																		
Knapp et al. 2012			✓		USA	✓		✓			✓						Guideline (Knapp et al. 2012)	15
																	T-May Toolkit (The REACH Institute 2010)	39
Scotto Rosato et al. (2012a, b)			✓		USA	✓				✓		✓	✓	✓			Guideline (Scotto Rosato et al. 2012a)	10

Table 1 (continued)

Guideline	Guideline development group				Country of origin	Target population		Purpose			Guideline recommendation focus						Source documentation	# of Pages
	Government	Specialty Society	Independent expert group	Other		Child/youth Only	Child/youth and adults	Assessment	Prevention	Treatment	Screening/diagnosis	Psychosocial Interventions	Medication	Side Effect Management	CAM	Diet		
																	Supplemental Information (Scotto Rosato et al. 2012b)	22
																	Related Guideline (Scotto Rosato et al. 2012a)	15
																	T-May Toolkit (The REACH Institute 2010)	39
Behaviour disorders as a group ($n=2$)	0	0	1	1	–	2	0	1	0	2	1	1	2	0	0	0	–	–
ADHD ($n=22$)	6	6	7	3	–	17	5	15	1	21	15	15	18	10	6	7	–	–
Conduct disorder ($n=2$)	2	0	0	0	–	2	0	1	1	2	1	2	1	0	0	0	–	–
ODD ($n=1$)	0	1	0	0	–	1	0	1	1	1	1	1	1	0	0	0	–	–
Aggression ($n=2$)	0	0	2	0	–	2	0	1	0	1	1	1	1	1	0	0	–	–
TOTAL $N=29$	6	7	10	2	–	20	5	16	3	23	16	16	20	9	5	6	–	–

Table 1 (continued)

AAP American Academy of Pediatrics, *CADDRA* Canadian Attention Deficit Hyperactivity Disorder Resource Alliance, *CAM* complementary and alternative medicine, *CDC* centers for disease control and prevention, *N/A* not applicable, *NHMRC* National Health and Medical Research Council, *NICE* National Institute for Health and Care Excellence, *SIGN* Scottish Intercollegiate Guidelines Network

[a]Various multimedia

[b]Expert group made up of members of the University of Michigan Faculty Group Practice

[c]Reference for CDC review not provided in AAP guideline and attempts to obtain the review from the AAP guideline Writing Committee members were unsuccessful

[d]Independent, not-for-profit association

[e]Assessment of cardiovascular risk in children with ADHD being considered for stimulant treatment

Scotto Rosato et al. 2012a), and one guideline for behavior disorders (Gorman et al. 2015). High-quality guidelines included two for ADHD (Clinical practice guidelines in the Spanish NHS 2010; National Institute for Health and Care Excellence 2013d) and one for CD (National Institute for Health and Care Excellence 2013d).

Table 2 Guideline quality

Guideline	Minimum quality[a]	High quality[b]
Behaviour disorders as a group ($n=2$)	1/2	0/2
Gorman et al. (2015)	✓	X
Gathright and Tyler (2014)	X	X
ADHD ($n=22$)	4/22	2/22
Bolea-Alamanac et al. (2014)	X	X
Cortese et al. (2013a)	X	X
Cortese et al. (2013b)	X	X
NICE (2013a)	✓	✓
University of Michigan Health System (2013)	X	X
Mahajan et al. (2012)	X	X
NHMRC (2012)	X	X
AAP (2011a, b)	✓	X
CADDRA (2011)	X	X
Graham et al. (2011)	X	X
List and Barzman (2011)	X	X
Spanish Ministry of Health (2010)	✓	✓
Hamilton et al. (2009)	X	X
SIGN (2009a, b, c, d, e)	✓	X
Ministry of Health Malaysia (2008)	X	X
Vetter et al. (2008)	X	X
Nutt et al. (2007)	X	X
Pliszka (2007)	X	X
Pliszka et al. (2006)	X	X
Remschmidt (2005)	X	X
Fung et al. (2014)	X	X
Castro and Brown (2011)	X	X
Conduct disorder ($n=2$)	1/2	1/2
NICE (2013b)	✓	✓
Ministry of Social Development (2015)	X	X
ODD ($n=1$)	0/1	0/1
Steiner and Remsing (2007)	X	X
Aggression ($n=2$)	2/2	0/2
Knapp et al. (2012)	✓	X
Scotto Rosato et al. (2012a, b)	✓	X

[a]Domain score ≥ 50% on all three domains: stakeholder involvement, rigor of development, and editorial independence

[b]Domain score ≥ 70% on all three domains: stakeholder involvement, rigor of development, and editorial independence

Table 3 Frequency of guidelines achieving domain score quality cut-points (overall and by disorder sub-group)

AGREE II domain	Overall, $N=29$		≥ 50%, *n* (%)					≥ 70%, *n* (%)				
	≥ 50%, *n* (%)	≥ 70%, *n* (%)	Behaviour disorders as a group ($n=2$)	ADHD ($n=22$)	Conduct disorder ($n=2$)	ODD ($n=1$)	Aggression ($n=2$)	Behaviour disorders as a group ($n=2$)	ADHD ($n=22$)	Conduct disorder ($n=2$)	ODD ($n=1$)	Aggression ($n=2$)
Scope and purpose	19 (76.0)	8 (32.0)	1 (50.0)	16 (72.7)	2 (100.0)	0 (0.0)	2 (100.0)	1 (50.0)	7 (31.8)	1 (100.0)	0 (0.0)	0 (0.0)
Stakeholder involvement	15 (60.0)	4 (16.0)	1 (50.0)	12 (54.5)	1 (100.0)	0 (0.0)	2 (100.0)	0 (0.0)	4 (18.1)	1 (100.0)	0 (0.0)	0 (0.0)
Rigor of development	9 (36.0)	4 (16.0)	1 (50.0)	5 (22.7)	1 (100.0)	0 (0.0)	2 (100.0)	1 (50.0)	2 (9.0)	1 (100.0)	0 (0.0)	0 (0.0)
Clarity of presentation	23 (92.0)	15 (60.0)	1 (50.0)	20 (90.9)	1 (100.0)	1 (100.0)	2 (100.0)	1 (50.0)	13 (59.1)	1 (100.0)	0 (0.0)	1 (50.0)
Applicability	5 (20.0)	1 (4.0)	0 (0.0)	4 (18.2)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)
Editorial independence	15 (60.0)	5 (20.0)	1 (50.0)	11 (50.0)	1 (100.0)	0 (0.0)	2 (100.0)	1 (50.0)	3 (13.6)	1 (100.0)	0 (0.0)	0 (0.0)

ADHD attention deficit hyperactivity disorder, *ODD* oppositional defiant disorder

AGREE II Domain Score Quality Ratings

Table 3 shows the proportion of eligible CPGs that achieved a domain score cut-point of ≥ 50% and ≥ 70% for each of the six AGREE II domains. For guidelines developed for ADHD, achievement of high quality in domains assessed ranged between 0 (applicability) and 59.1% (clarity of presentation). The guideline developed for CD achieved high quality in all domains assessed. For behavior disorders as a group high quality criteria was met by one out of two guidelines (50%) on scope and purpose, rigor of development, clarity of presentation and editorial independence. For aggression, one of the two guidelines met high-quality standards on clarity of presentation.

Inter-rater Agreement

Across all scores for all guidelines, inter-rater differences were ≥ 2 for 30.5% ($n=79$ out of 259) of the scores. Inter-rater agreement on the AGREE II overall item score was excellent (ICC = 0.92, 95% CI 0.84–0.96). Excellent inter-rater agreement was also observed for each AGREE II domain (scope and purpose: ICC = 0.95, 95% CI 0.90–0.97; stakeholder involvement: ICC = 0.98, 95% CI 0.96–0.99; rigor of development: ICC = 0.98, 95% CI 0.97–0.99; clarity of presentation: ICC = 0.90, 95% CI 0.80–0.95; applicability: ICC = 0.95, 95% CI 0.91–0.98; editorial independence: ICC = 0.98, 95% CI 0.96–0.99).

Comparison of AGREE II Domain Score Quality Ratings by Guideline Development Group Type

To compare guideline quality between the four groups of developers who produced the 29 guidelines (i.e., government organizations, specialty medical societies, independent expert group, other group), we applied the ≥ 50% and ≥ 70% cut-points to characterize the ratings of individual domain scores. As shown in Table 4, guidelines developed by government organizations were rated with a relatively greater frequency of high quality methods with regards to stakeholder involvement, rigor of development, editorial independence, scope and purpose, and clarity of presentation. The applicability domain was generally not rated as high quality regardless of development group type.

Discussion

The purpose of this systematic review was to identify trustworthy clinical practice guidelines based on an evaluation of the methodological rigor on which the guidelines were developed. The review focused on practice guidelines developed for assessment, prevention, and treatment of children

Table 4 Frequency of Guidelines achieving domain score quality cut-points (by guideline development group)

AGREE II domain	Government, $n=8$		Specialty society, $n=7$		Independent expert group, $n=10$		Other, $n=4$	
	≥50%, *n* (%)	≥70%, *n* (%)	≥50%, *n* (%)	≥70%, *n* (%)	≥50%, *n* (%)	≥70%, *n* (%)	≥50%, *n* (%)	≥70%, *n* (%)
Stakeholder involvement	7 (100.0)	5 (66.7)	3 (42.9)	0 (0.0)	5 (50.0)	0 (0.0)	1 (25.0)	0 (0.0)
Rigor of development	4 (66.7)	3 (50.0)	1 (14.3)	0 (0.0)	4 (40.0)	1 (10.0)	0 (0.0)	0 (0.0)
Editorial independence	5 (83.3)	4 (66.7)	4 (57.1)	0 (0.0)	5 (50.0)	1 (10.0)	1 (25.0)	0 (0.0)
Scope and purpose	8 (100.0)	6 (83.3)	6 (85.7)	1 (14.3)	6 (60.0)	2 (20.0)	1 (25.0)	0 (0.0)
Clarity of presentation	7(100.0)	7 (100.0)	7 (100.0)	3 (42.9)	9 (90.0)	6 (60.0)	2 (50.0)	0 (0.0)
Applicability	4 (66.7)	1 (16.7)	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

with disruptive behavior difficulties (i.e., those with ADHD, ODD, CD and aggression). An established systematic review approach identified 588 full text articles, of which 29 met study inclusion criteria, with the majority developed for ADHD. A validated evaluation tool (AGREE II) was used to assess the quality of the methodology used to create these 29 guidelines. Findings showed that 8/29 (28%) of these guidelines met minimal quality standards but only 3/29 (10%) met high-quality standards. Of those meeting high-quality standards, two were developed for ADHD and one for CD. All three of the guidelines judged to be high quality were developed by government agencies.

Findings from this systematic review highlight that although a large number of CPGs are available; very few meet minimum standards of methodologic rigor of development according to AGREE II criteria. The lack of methodological rigor is concerning given that clinicians may not be aware of quality differences and may choose to adopt a guideline potentially containing biased or incomplete recommendations that may lead to wasted resources or poor treatment outcomes. Further, use of guidelines that do not meet quality standards for rigor of development may not result in improved client outcomes and possibly contribute to decreased confidence in the utility, usefulness or value of guidelines in general. It is also possible that factors other than guideline development rigor may influence their selection by clinicians and use. For example, clinicians may be more likely to use guidelines developed by their professional society than those developed by government organizations. However, the degree to which guidelines are being used in clinical practice, or their influence on the quality of practice or clinical outcomes, is beyond the scope of the present study and in need of further investigation.

Two guidelines developed for ADHD (National Institute for Health and Care Excellence 2013a; Spanish NHS 2010) showed high quality on the three domains of AGREE II included in our appraisal approach related to risk of bias (i.e., stakeholder involvement, rigor of development and editorial independence). This was similarly the case for one practice guideline for CD (National Institute for Health and Care Excellence 2013b). These findings are encouraging and point to the presence of methodologically rigorously developed and high-quality guidelines that have the potential to influence clinical practice and improve clinical outcomes. However, of concern, high-quality guidelines for ADHD were not rated as applicable (i.e., not ready for clinical implementation), which means that clinicians will need to take some extra steps to implement the recommendations, possibly via locally developed and integrated care pathways, that provide an evidence-based framework to direct multidisciplinary and multi-agency services (Rees et al. 2004).

From a clinician perspective, it is exceedingly challenging to determine which assessment or treatment approach best meets the complex mental and behavioral health needs of children and youth with disruptive behavior difficulties. Comorbidity is standard in clinical settings. Further, each clinical setting may have local restrictions with regard to available resources and mental health professionals. As such, the development of feasible, relevant, applicable, and evidence-based models of clinical care that systematically meet the complexity of client's needs across multiple clinical settings is imperative but challenging. For example, the NICE clinical guideline for antisocial behaviour and conduct disorders in children and young people: recognition and management (National Institute for Health and Care Excellence), emphasizes integrated and person-centered service delivery with key priority areas. These include recommendations for: (1) comprehensive assessment, (2) parent training programs, (3) foster care/guardian training programs, (4) child-focused programs, (5) multimodal interventions, (6) pharmacological interventions, and (7) improving access to services. Research recommendations are also provided. The guideline includes general principles of care to consider, such as safety, informed consent, and ways to take into account culture, ethnicity and social inclusion. Specific recommendations are provided for each of the key priority areas. For example, guidance on conducting a comprehensive assessment includes details of symptom domains to assess and coexisting conditions to take into account. As such, the guideline is rich with information about which principles

clinicians should consider to conduct evidence-based assessment and treatment. For the assessment and management of ADHD, both guidelines that met methodological high-quality standard (i.e., NICE 2013a, Spanish NHS 2010) provide guidance on evidence-based strategies and specific tools for assessment, diagnosis, and treatment. Treatment strategies include psychosocial and pharmacological. Additionally, both guidelines include information about methods to manage common comorbid conditions. However, as indicated in these guidelines, generalizability to specific clinical settings, or the "how" to implement the principles, are determined by the local clinical leadership group, practicing clinicians and client stakeholders.

From a guideline development perspective, findings showed that government groups were more likely, compared to specialty societies or independent expert groups, to develop methodologically high-quality guidelines. This discrepancy may be due to monetary and other resources at the disposal of government organizations that allow for implementation of thorough methodology and infrastructure for ongoing guideline dissemination and adaptation. Further, time limitations or other logistical issues (e.g., scheduling meetings with experts, competing demands) may reduce the scope of methodological rigor possible for non-governmental groups. Given that guideline development is a time-consuming and intensive process, findings from this systematic review highlight the need for groups to be thoughtful about the extent of resources required for methodologically rigorous guideline development and the potential benefit of pooling resources or partnering with government to sustain these guideline development efforts. Additionally, prior to engaging in the arduous and costly process of developing a guideline, it may be prudent to investigate existing guidelines through online databases or other repositories and ascertain the methodological rigor by which the guideline was developed.

Review Strengths and Limitations

This was the first systematic review of clinical practice guidelines for CYMH with a focus on disruptive behavior difficulties. The approach was based on established methodology and used a well validated tool to evaluate guidelines. However, a few limitations should be considered. First, this study evaluated the methodological quality of the guideline development process but did not assess the likelihood of guideline implementation, the potential benefits of guideline implementation, or the impact of a specific guideline on clinical outcomes. Determining these outcomes is much needed; however, beyond the scope of the present review. Second, although methodologic criteria for CPG's like AGREE II have been around for many years (Shaneyfelt et al. 1999), it is not fully clear whether guideline developers used the tools a priori or whether they made all of the background information on development available in the final document. As such, guideline developers may have used rigorous methods but may not have reported these. Third, cutoffs of 50% (Minimum) and 70% (High) for quality ratings, although meaningful, were not empirically determined. Other stakeholders may choose other cutoffs. Fourth, we were not able to access full texts for 12% of positively screened records. Finally, the review included guidelines developed up to June 2017. Guidelines developed or augmented since then were not included in the review. For example, selective review of an updated guideline developed by CADDRA, released in the Fall of 2017, include enhancements in all categories and discussion of comorbidity, with notable improvements in the description of the aim and scope, stakeholder involvement in development, clarity of presentation, and editorial independence, all of which now meet at least minimum quality on AGREE-II.

Implications and Future Directions

Findings from this systematic review highlight the relatively few guidelines that have been developed using internationally recognized methodologic standards. However, the presence of so many guidelines ($n = 29$) suggests the likely acceptance of the importance of guideline *development* to enhance clinical practice with children with disruptive behavior difficulties. Findings from this review provide guidance as to which CPGs are developed based on methodologically rigorous processes to potentially reduce guideline selection as a barrier to implementation. However, it is clear that guideline availability alone is not sufficient to shift clinical practice. Although guidelines are designed to influence clinical practice, these need to be considered within a context with attention to locally determined facilitators and barriers to use. Notably, more systematic work is required by well-resourced organizations to develop and maintain guidelines, create guideline implementation tools to facilitate use in local settings and to determine whether guidelines are used and improve intervention selection and patient outcomes. Although trials of CPG implementation are available, the results are mixed and call for additional rigorous studies that build on what has been learned so far (Girlanda et al. 2017).

A growing body of research in child and youth mental health emphasizes ongoing challenges with the implementation of evidence-based intervention services in mental health clinics (Chorpita et al. 2011). Despite the availability of evidence-based treatments, clinicians often do not use these approaches partly because of their perception that these are prescriptive/inflexible, not relevant to their population, or costly (Kazdin 2011), and the impression that different guidelines contradict each other. The present

review identified the lack of high-quality CPGs for ODD and aggressive behavior, and an absence of CPGs with a prevention focus. In addition, in contrast to the substantial comorbidity that characterizes clinical populations of children with disruptive and aggressive behavior (Biederman et al. 1991), CPGs, along with many evidence-based interventions, are diagnosis specific. Future development of CPG's should acknowledge the realities of clinical practice and be developed with comorbidity in mind. Guidelines that are developed with methodological rigor, and are relevant to clinicians, clients and communities may be one important step to support changing practice and improving outcomes for children and youth with disruptive behavior difficulties. Further, information from high-quality guidelines can be integrated into curriculum to augment training of new healthcare providers to influence future practice.

Conclusion

This systematic review of clinical practice guidelines for the assessment, prevention and treatment of disruptive behavior difficulties identified two guidelines for ADHD and one for CD that met high-quality criteria and five that met minimum quality criteria based on AGREE-II methodological rigor of development scores. Given that practice guidelines hold promise for enhancing evidence-based practice and optimizing outcomes for children with disruptive behavior, findings from this review highlight the need for guideline developers to increase the attention given to quality standards in the guideline development process, and provide important information regarding guideline choice for clinicians and organizations that want to implement best-practice clinical services for children with disruptive behavior.

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Compliance with Ethical Standards

Conflict of interest The authors, Brendan F. Andrade, Darren Courtney, Stephanie Duda, Madison Aitken, Stephanie G. Craig, Peter Szatmari, Joanna Henderson, Kathryn Bennett declare that he/she has no conflict of interest.

Ethical Approval This article does not contain any studies with human participants performed by any of the authors.

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