

## REVIEW

# Interventions addressing challenging behaviours in Arab children and adults with intellectual disabilities and/or autism: A systematic review

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## Abstract

**Background:** Arabs with intellectual disabilities and/or autism may exhibit challenging behaviour that affects them and their caregivers. Early, appropriate intervention may reduce these effects. This review synthesised and critically appraised challenging behaviour intervention research for this population.

**Methods:** All published empirical research on challenging behaviour interventions for Arabs with intellectual disabilities and/or autism was included. In September 2022, 15 English and Arabic databases yielded 5282 search records. Studies were appraised using the MMAT. Review findings were narratively synthesised.

**Results:** The 79 included studies ( $n = 1243$  participants) varied in design, intervention, and evaluation method. Only 12.6% of interventions were well-designed and reported. Arab interventions primarily targeted children, were applied collectively on small samples, lacked individualised assessment, and were based on an inconsistent understanding of challenging behaviour.

**Conclusion:** The evidence base on interventions for Arabs with intellectual disabilities and/or autism and challenging behaviour needs strengthening. Attention should be given to culturally relevant adaptations.

## KEYWORDS

Arab population, autism, challenging behaviour, intellectual disability, systematic review

## 1 | INTRODUCTION

Individuals with an intellectual disability and/or autism have a much-increased likelihood of developing challenging behaviours, such as aggressive and self-injurious behaviours (Emerson et al., 2001). Emerson and Einfeld (2011) define challenging behaviour as:

Culturally abnormal behaviour(s) of such an intensity, frequency, or duration that the physical safety of the person or others is likely to be placed in serious

jeopardy, or behaviour which is likely to seriously limit use of, or result in the person being denied access to, ordinary community facilities. (p. 4)

An international systematic review (Simó-Pinatella et al., 2019) suggests that children with intellectual disabilities have high rates of challenging behaviour (48%–60%), and prevalence can be up to 90% in autistic children. A high prevalence of challenging behaviour is similarly reported in Arab individuals with intellectual disabilities and/or autism. For example, Greg and Abu Fakhr (2013) found in a population-based

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study that 43.3% of children with intellectual disabilities attending special government schools in Damascus displayed challenging behaviour. Hussein et al. (2015) also found that 47% of participating Egyptian adults with intellectual disabilities exhibited challenging behaviour. Prevalence estimates may vary depending on factors such as sampling and study methods. However, the existing literature suggests that at least a significant minority of individuals with intellectual disabilities or autism may engage in challenging behaviours.

In their conceptual framework for understanding challenging behaviour, Hastings et al. (2013) identified biological and psycho-social vulnerability factors linked with the development of challenging behaviour. They also emphasised the necessity of understanding the social contextual processes responsible for maintaining challenging behaviour. Challenging behaviour serves one or several functions for the individual, which should be understood to inform interventions and increase the chances of intervention success. A comprehensive meta-analysis (Harvey et al., 2009) suggested that behavioural interventions that used a functional analysis were more effective in reducing challenging behaviour in individuals with developmental disabilities than interventions that did not incorporate this. Patterson et al. (2010) evaluated the evidence for function-based behavioural interventions that aimed to reduce stereotypical and repetitive behaviour in autistic people. Despite reporting the positive effects of several behavioural intervention methods to reduce challenging behaviour, the quality of evidence supporting these interventions was 'moderate'.

Although systematic reviews of the evidence surrounding interventions of challenging behaviour for individuals with intellectual disabilities and/or autism have been performed (e.g., Heyvaert et al., 2010; O'Regan et al., 2022; Patterson et al., 2010), Western cultures were overrepresented in these reviews. It is important to consider research from other cultures, such as Arab cultures, to determine whether challenging behaviour interventions for people with intellectual disabilities and/or autism are effective when applied in diverse cultures. Critically, challenging behaviour has been described as a social construction, both in terms of being outside of social "norms" for a culture and in respect of the consequences of challenging behaviour on society (Emerson & Einfeld, 2011). This suggests that challenging behaviour may take on a distinct form in Arab societies or be perceived differently. Therefore, interventions undertaken in the Arab world may have different characteristics, operational methodologies, and research focus than those implemented elsewhere due to cultural differences. Arab stakeholders' engagement in interventions for challenging behaviour may also differ from those of Western stakeholders.

There is a body of Arab research (e.g., Abdel Raheem et al., 2010; Abdeslam & Ajwa, 2019) investigating the effectiveness of different types of interventions designed to address challenging behaviours in people with intellectual disabilities and/or autism. However, to the best of the authors' knowledge, no systematic reviews of interventions for challenging behaviour have been published focused on the Arab cultural context. Therefore, the current review focused on reviewing and synthesising the evidence from Arab intervention studies. The quality of the research studies and intervention reporting was also evaluated. The review considered the following main review question and sub-questions: What research has been published on

interventions addressing challenging behaviour in Arab children and adults with intellectual disabilities and/or autism? Sub-questions:

1. What is the quality of the published evidence on interventions for challenging behaviours in Arab children and adults with intellectual disabilities and/or autism?
2. What is the quality of reporting interventions for challenging behaviour in Arab children and adults with intellectual disabilities and/or autism?

## 2 | METHODS

This systematic review was developed and reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline (Page et al., 2021). The four reviewers developed and agreed on a wider systematic review protocol to identify the published research on challenging behaviour in children and adults with intellectual disabilities and/or autism in Arab countries and Arab cultures. In August 2020 (CRD42020191969), the first reviewer registered the protocol in the International Prospective Register of Systematic Reviews (PROSPERO) database. An updated protocol version was submitted indicating the changes (e.g., appraisal tool) made to the planned methods. Due to the large number of studies included in the wider systematic review (see Figure 1), the findings were divided into two research papers. This paper focuses on the 79 studies on interventions addressing challenging behaviour in Arabs with intellectual disabilities and/or autism.

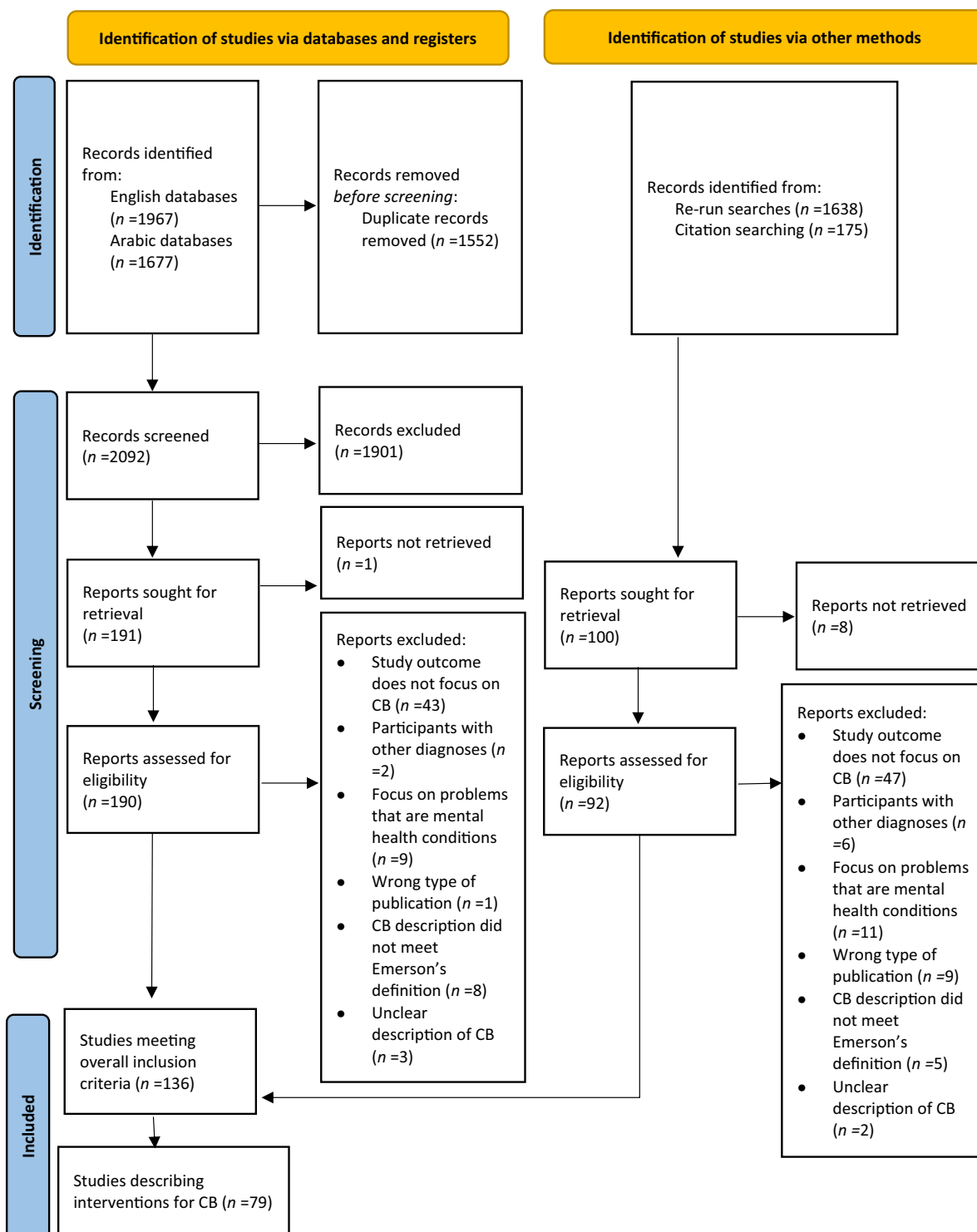
### 2.1 | Eligibility criteria

The modified PICo framework (Munn et al., 2018) was followed to structure the review question, as shown in Table 1.

### 2.2 | Information sources

Relevant literature was identified through a comprehensive search in 15 English and Arabic electronic databases (English databases: Web of Science, PsycINFO, PubMed, ERIC, Applied Social Sciences Index and Abstracts, British Education Index, Education Research Complete and Scopus; Arabic databases: EduSearch, Arabbase, Humanindex, Ask-Zad, Al Manhal, Arab World Research Source and Dar Al-Mandumah). All identified findings from the Arabic database search were imported from the Saudi Digital Library, as it includes most Arabic databases and ensures searching in a comparable way across all databases.

The first reviewer conducted the searches in June 2020. The included studies were subjected to a backward and forward reference search to ensure that all relevant literature was included in the review. The Social Science Citation Index (SSCI) was searched to identify any further relevant research written in English, while Google Scholar and ResearchGate were used to citation search for Arabic literature. All searches were re-run in September 2022.



**FIGURE 1** A flow diagram of the review information using PRISMA (2020) template. CB, challenging behaviour.

## 2.3 | Search strategy

A list of three groups of search terms was developed and then piloted by conducting an extensive scoping search in four databases (Web of Science, ERIC, Education Research Complete and EduSearch). The first

group of search terms included terms about intellectual disabilities and autism, while the second group contained terms for challenging behaviour, and the third group was a list of Arab countries. Terms in each group were separated by the OR function, and the findings from searching for each group were combined with the AND function (see Appendix D in

**TABLE 1** Eligibility criteria.

PICo acronym	Inclusion criteria	Exclusion criteria
P—Population	<ol style="list-style-type: none"> <li>1. Arab children and adults with any degree of intellectual disability and/or autism (with no restrictions on gender or age)</li> <li>2. Individuals who display challenging behaviour that meets Emerson and Einfeld's (2011) definition of challenging behaviour</li> <li>3. Studies with a mixed population if at least 70% of the study sample met the inclusion criteria or when results were reported separately for the population of interest</li> </ol>	<ol style="list-style-type: none"> <li>1. Individuals with other diagnoses, such as specific learning disabilities (e.g., dyslexia)</li> <li>2. Individuals who display challenging behaviour that is a mental health condition (e.g., conduct disorder, psychotic disorder, ADHD)</li> </ol>
I—Phenomenon of interest	<ol style="list-style-type: none"> <li>4. Any intervention study addressing challenging behaviour, including proposed interventions</li> </ol>	<ol style="list-style-type: none"> <li>3. Non-interventional studies</li> </ol>
Co-context	<ol style="list-style-type: none"> <li>5. Studies conducted on an Arab population, whether they resided in an Arab or another country, and in any setting</li> </ol>	<ol style="list-style-type: none"> <li>4. Studies conducted in other countries did not include an Arab population</li> </ol>
Publication language/period	<ol style="list-style-type: none"> <li>6. Arabic, English, and French/no restrictions on the period of publication</li> </ol>	<ol style="list-style-type: none"> <li>5. Other languages</li> </ol>
Publication types	<ol style="list-style-type: none"> <li>7. Journal paper reporting research data relevant to the review question</li> </ol>	<ol style="list-style-type: none"> <li>6. Dissertations, books, book chapters, meeting abstracts, conference papers, review papers, reports and working papers</li> </ol>

Abbreviation: ADHD, attention deficit hyperactivity disorder.

Data S1). The search was limited to titles or abstracts and refined by the document type (article) and languages (English, Arabic or French).

For literature in Arabic, a similar systematic search strategy was followed to be as comparable as possible to the search strategy in English databases. However, the final group of search terms (Arab countries) was excluded when searching in Arabic databases, as the search was already in the Arabic context. Search terms were translated into Arabic by the first reviewer (SA) and then discussed with another bilingual reviewer (NA) to ensure the equivalent Arabic search terms were used. Some English terms did not have an equivalent or were not used in the Arabic context; therefore, they were excluded. Searching for Arabic literature was limited by document type only.

## 2.4 | Selection process

The EndNote reference management software package was used to manage the databases' search findings. Duplicates were removed automatically and manually. SA independently screened titles and abstracts of all identified records, including those identified via citation and updated searches. After training in applying the inclusion and exclusion criteria (see Table 1), another bilingual reviewer (NA) independently and randomly assessed 500 studies inclusion (from the June 2020 searches). The extent of agreement between the two reviewers was 97% (Cohen's  $k = .63$ ; substantial agreement).

SA evaluated the included studies using a checklist with the inclusion and exclusion criteria developed to record the reasons for excluding full-text articles. While screening full texts, SA could not decide on 10 articles; the review team considered these articles a panel. NA also independently assessed 68 of the selected full-text articles for inclusion (from the June 2020 searches). The extent of agreement

calculated between the two reviewers was 94% (Cohen's  $k = .56$ ; moderate agreement). Disagreements related to four articles were resolved through discussion.

## 2.5 | Data collection process

A bespoke data extraction form (Excel spreadsheet) was developed to extract data from each study on (a) the article characteristics (title, author(s), country of origin, year and journal); (b) participants' characteristics (number of participants, age range, nationality, gender, diagnosis, IQ/level of disability); (c) study characteristics (objectives/questions, challenging behaviour definition/description, study design, inclusion/exclusion criteria, sampling approach, recruitment procedures, measures/assessments, the total number of measures, what is measured (e.g., challenging behaviour frequency/severity), development/translation of measures, reliability and validity of measures and study setting); (d) intervention characteristics (name, date, duration, focus, social validity, number of sessions, session length, delivery format, administrator and primary place); (e) study outcomes (primary and secondary outcomes, data analysis method, generalisation, limitations, and follow-up data). We extracted the relevant data that would help in answering the review questions. All studies' corresponding authors were contacted if any information was missing.

SA independently extracted data from all papers that met the inclusion criteria for the wider review. The data extraction form was piloted by NA, who independently reviewed a sample of the included papers ( $n = 10$ ); four of these were intervention studies. The review team assessed agreement between reviewers through a qualitative comparison of the two sets of extracted data, and there was good correspondence with no significant disagreements.

## 2.6 | Quality appraisal process

The quality appraisal process was guided by the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). The MMAT was created to assess both quantitative and qualitative studies, and therefore, it is suitable for appraising the different types of study methodologies included in the review. Another reason for selecting the MMAT is that its validity and reliability have been established (Pace et al., 2012), and it has already been used in several reviews (e.g., Steel et al., 2020; Xu et al., 2021).

Included studies were appraised at the study level depending upon the study's design (see Appendix B in Data S1). Two screening questions were used to determine empirical studies with clear aims and outcomes eligible for evaluation. Five criteria were used in the form of questions to assess the quality of each research design. The value of each criterion was “1” if the study achieved this criterion and “0” if it did not. The findings were presented following the suggested method of reporting the results of the MMAT (Reporting the results of the MMAT—version 2018, 2020). Studies were given an overall quality score that ranged from 0 to 5. A score of five or four from five indicated a “high” quality study. Receiving a score of three showed a study of “medium” quality, and a study of “low” quality scored two or one. The review includes all papers, regardless of methodological quality.

The quality of Intervention reporting was completed for all included papers, using the template for intervention description and replication (TiDieR) checklist (Hoffmann et al., 2014). The TiDieR checklist assesses the key aspects of the intervention's description using 12 items. Each study received a total score in the form of a percentage for the quality of the intervention description (see Appendix C in Data S1). Some items, such as intervention tailoring and modification, were excluded from the overall scoring for most studies since they were not applicable to the included intervention. We used descriptors for scoring ranges to help synthesise the intervention studies. Studies scoring 80% or higher were considered to have a “well-reported” intervention, and an overall 60% and 79% score indicated an “acceptable” intervention reporting. A total score of reporting items of 59% or lower was deemed to be a “poor” description of the intervention.

After training with NA on the MMAT and TiDieR checklist by piloting them on 20 papers, SA independently assessed the quality of the included studies' designs and intervention reporting. NA also independently examined a random sample of 20 of the included studies; 13 were intervention studies.

## 2.7 | Data synthesis

For this review, intervention studies were classified into four main categories based on the type of intervention. Depending on the intervention strategy/approach used, subcategories were assigned to each primary category. A clear description of each category and subcategory is given below (see results section). The classification of intervention studies is presented in Table 2.

**TABLE 2** Classification of interventions.

Category of intervention	Sub-category of intervention
(1) Behavioural interventions	(1) Interventions that use antecedent and/or consequence strategies (2) Interventions that include training on the self-management of challenging behaviour (3) Interventions that redirect challenging behaviour using gentle teaching techniques
(2) Caregiver training interventions	(1) Interventions that include behaviour skills training (2) Interventions that include family counselling
(3) Skills training interventions	(1) Interventions that include social skills training (2) Interventions that include adaptive behaviour skills training (3) Interventions that include communication skills training (4) Interventions that include cognitive skills training
(4) Occupational, sensory, and art interventions	(1) Interventions that use physical/motor activities (2) Interventions that use sensory-based activities (3) Interventions that use art-based activities

Narrative synthesis (Popay et al., 2006) was used to analyse the review findings, including the quality appraisal results, as a meta-analysis was unsuitable for the review questions and the included heterogeneous literature. A descriptive summary of the studies can be found in Appendix A in Data S1. Studies were tabulated in study reference/country, design and measures used, participants' characteristics, a brief description of the intervention, primary outcomes, follow-up evaluation, and an overall quality score of research design and intervention description.

## 3 | RESULTS

### 3.1 | Study selection

Searching in Arabic databases identified 1677 articles, whereas English databases yielded 1967. Citation searching and updated database searches identified 1813 studies. Titles and abstracts of all identified records ( $n = 3905$ ) were screened after removing duplicates. Full texts of the identified records ( $n = 291$ ) were obtained, apart from nine articles that could not be procured from the Arabic databases (Ahmed, 2007; Al-Khateeb, 1989; Al-Ajami, 2014; Al-Qudsi & Kayali, 2012; Farag, 2009; Farouk & El-Sherbiny, 2013;

**TABLE 3** Key characteristics of included studies.

Characteristic	N
Publication language	
1. Arabic	73
2. English	6
Country of origin	
1. Egypt	36
2. Kingdom of Saudi Arabia	20
3. Iraq	5
4. Jordan	3
5. Algeria	3
6. United Arab Emirates	2
7. Kuwait	2
8. Palestine	2
9. Tunisia	1
10. Bahrain	1
11. Egypt and the Kingdom of Saudi Arabia	1
12. No information	3
Settings	
1. Educational	61
2. Social care	10
3. Healthcare services	3
4. Mental health treatment	2
5. No information	3
Research design	
1. Randomised controlled trials	5
2. Non-randomised controlled trials	69
3. Mixed methods studies	2
4. Qualitative studies	1
5. No information	2
Overall number of participants	
1. People with intellectual disabilities	794
2. Autistic people	333
3. People with intellectual disabilities and autism	116
4. Professionals/caregivers	207
People with intellectual disabilities and/or autism gender	
1. Males	418
2. Females	311
3. No information	514
Professionals/family carers gender	
1. Females	168
2. Males	39
Participants age range	
1. People with intellectual disabilities and/or autism	3–21
2. Professionals/caregivers	20–50
Most addressed challenging behaviours	
1. Aggression	52
2. Self-injury	31

(Continues)

**TABLE 3** (Continued)

Characteristic	N
3. Stereotypy	16
4. Withdrawal	13
Measurement tools of challenging behaviour	
1. Standard international measures	15
2. Previously developed Arabic measures	26
3. Bespoke measures	44

Mohamed, 2000a, 2000b; Omar et al., 2021). After screening the full text of 282 articles against the overall inclusion criteria, 136 papers were included in the wider review. This review includes 79 studies that described interventions for challenging behaviour (see Figure 1).

### 3.2 | Study characteristics

The key characteristics of included intervention studies are summarised in Table 3. A more comprehensive description, including outcomes, can be found in Appendix A in Data S1. The included studies were conducted between 1997 and 2022 in 10 Arab countries. Three studies failed to report their country of origin. Hamada's (2016) study was conducted on Arabs without specifying their nationality or the study location, while Al-Shakhs et al. (2010) and Suleiman et al. (2016) proposed interventions for Arabs rather than reporting the results from an intervention study.

### 3.3 | Quality appraisal

Using the MMAT scores, 28.5% of studies were rated as “high” quality, 48% were considered “moderate”, and 23.3% of studies were of “low” quality. Two papers describing proposed interventions (Al-Shakhs et al., 2010; Suleiman et al., 2016) were not appraised. The small number of RCTs mostly did not meet the quality criterion of reporting adherence to the assigned intervention and appropriate performance of randomisation. Most quantitative non-randomised studies, the majority of included studies, also failed to fulfil two key quality criteria: administration of the intervention as planned and representativeness of the targeted population. Mixed methods studies lacked information on integrating qualitative and quantitative components.

Using the TiDieR checklist, 37.9% of studies had a good level of reporting, 39.2% had an acceptable level of intervention description, and 22.7% were poorly described. Almost all studies (97.4%) lacked information on intervention fidelity, and 43% of papers reported adherence to the planned intervention. Some reporting items, such as the backgrounds and experience of intervention providers, were either not reported very well or were missing. In most studies (92.4%), the rationale that supported the intervention was reported, but not the theoretical concepts/underpinnings.



### 3.4 | Interventions for challenging behaviour

The included Arab intervention studies that targeted challenging behaviour in individuals with intellectual disabilities and/or autism were classified into four primary categories based on intervention type as follows:

#### 3.4.1 | Behavioural interventions

We defined behavioural interventions as those that use behavioural strategies to directly intervene to reduce challenging behaviour in people with intellectual disabilities and/or autism. The 26 behavioural intervention studies were sub-categorised based on three intervention approaches: using antecedent and/or consequence strategies to reduce challenging behaviour ( $n = 21$ ), training on the self-management of challenging behaviour ( $n = 2$ ) and redirecting challenging behaviour using gentle teaching techniques ( $n = 3$ ). The duration of behavioural interventions varied from 4 weeks to 40 weeks. Follow-up evaluation of study outcomes was conducted in only 16 studies. The largest sample size in this category of interventions was 30 participants with intellectual disabilities and/or autism (Abdulaziz, 2005; Al-Rahamneh, 2019; Shaaban, 2009). A full summary of the behavioural intervention studies can be found in Appendix A (Table A.1) in Data S1.

Twenty-one behavioural intervention studies used antecedent strategies, such as environmental (re)arrangements and/or consequence strategies, like extinction procedures, to reduce challenging behaviour. Five of the antecedent/consequence interventions included pre-intervention functional assessments (Al-Ajami & Al-Nwaiser, 2016; Gobrial, 2017; Mohammed, 2011; Omar, 2011; Qalander, 2021). The remaining 16 antecedent/consequence-based intervention studies applied behavioural technologies but were not informed by a pre-intervention functional assessment.

The antecedent/consequence-based intervention studies included a variety of study designs and levels of quality. There was only one randomised control trial (Abdulaziz, 2005), and this was rated as medium quality, although the intervention itself was reported to a high standard. The intervention was applied at the group level to reduce challenging behaviours in 30 children with intellectual disabilities, utilising either token reinforcement or time-out without performing a functional behaviour assessment.

In addition, six single-subject experimental design studies were reported on a small number of participants, with 12 children with intellectual disabilities and/or autism constituting the largest sample size (Abdel Raheem et al., 2010; Tounsi et al., 2022). These studies addressed challenging behaviour by implementing positive behaviour support strategies, positive reinforcement techniques, providing choice, classroom management strategies and behavioural techniques like differential reinforcement of other behaviours. Four of these studies were rated as high-quality, with two interventions well described (Gobrial, 2017; Tounsi et al., 2022) and two studies having

an acceptable level of intervention reporting (Abdel Raheem et al., 2010; Al-Ajami & Al-Nwaiser, 2016). Karima's (2017) and Alwahbi's (2022) studies were rated as medium quality, and the interventions were well-reported.

The remaining 14 antecedent and/or consequence intervention studies used group designs for evaluation: five non-randomised controlled trials and nine uncontrolled single-group studies with pre-and post-test outcome measurement. These interventions comprised individual functional communication training, a function-based behaviour intervention plan, multi-skilled long-term training based on Lovaas (1987), pictorial activity schedules, behavioural training using behavioural procedures like reinforcement strategies, and group counselling sessions using positive reinforcements. All included small sample sizes, with the largest sample size being 30 participants (Mahrez & Bekkal, 2022).

Only two of the 14 group design studies were rated as high quality; the level of intervention description was well in Al-Sherbini (2013) and acceptable in Abdul Hamid (2014). Eight studies were rated as medium quality, with two well-described interventions (Hussein, 2019; Omar, 2011), five acceptable descriptions of interventions (Abdeslam & Ajwa, 2019; Ibrahim, 2007; Mahrez & Bekkal, 2022; Mohammed, 2002; Mohammed, 2011), and a poorly reported intervention (Muhammad, 1997). Four studies had inadequate levels of quality, with three acceptable intervention reporting (Al-Najjar et al., 2016; Hamza, 2013; Qalander, 2021) and an unsatisfactory intervention description (Ahmed et al., 2011).

The second subgroup of behavioural interventions is two studies that provided group training on a set of self-management skills to autistic children to help them assess, monitor, and evaluate their challenging behaviours. The self-management training intervention studies were non-randomised controlled trials that lacked a baseline assessment of self-management abilities. Abdul Hamid (2016) used self-management techniques such as self-monitoring in training 16 autistic children, while Al-Rahamneh (2019) utilised various counselling techniques such as discussion to teach 30 autistic children to control their emotions and manage stress. Both studies were rated high in design quality, and the level of intervention descriptions was acceptable.

The third grouping of behavioural interventions consists of three studies that redirected the challenging behaviours of autistic children or with intellectual disabilities using gentle teaching techniques (ignoring, redirecting, rewarding, and interrupting) to reduce these behaviours. Shaaban (2009) had the largest sample size, with 30 children with intellectual disabilities and evaluated the effectiveness of the gentle teaching techniques compared to reinforcement and punishment procedures. These interventions used group designs for evaluation: two non-randomised controlled trials and one uncontrolled single-group study with pre-and post-test outcome measurement. Ahmed et al.'s (2013) and Shaaban's (2009) studies were evaluated as medium-quality designs, and the level of intervention description was acceptable in Ahmed et al. (2013) but poor in Shaaban (2009). Al-Qallaf et al.'s (2019) study was poorly designed and poorly described the intervention.

### 3.4.2 | Caregiver training interventions

Caregiver training interventions, in this review, were defined as those that offer family counselling or behaviour skills training for caregivers of individuals with intellectual disabilities and/or autism to enhance their skills and help them manage and reduce challenging behaviour. The summary in Table A.2 (see Appendix A in Data S1) shows that all 13 caregiver training intervention studies were delivered at the group level. Caregiver training intervention duration was between 5 weeks and 12 weeks. Eight caregiver training interventions were solely offered to family carers, mostly mothers, while three were provided to special educators. However, two interventions were simultaneously delivered to families and professionals. Thirty-three Arab and non-Arab parents of autistic children comprised the largest sample size in caregiver training interventions (Gaad & Thabet, 2016). Eight caregiver training intervention studies had a follow-up evaluation of the training delivered.

The first set of caregiver training interventions is nine studies that trained carers on behavioural assessment and/or behaviour management strategies to help them manage and reduce challenging behaviour. Three of these interventions (Gaad & Thabet, 2016, 2017; Hasib, 2015) offered training on functional assessment. Mohammed (2013) did, however, teach parents of autistic children how to monitor challenging behaviour using observation forms. Two randomised controlled trials (Al-Beri & Al-Samadi, 2017; Ismail, 2014) were used to evaluate these interventions, but they were poorly designed. Ismail (2014) reported the intervention well, but Al-Beri and Al-Samadi's (2017) description of the intervention was inadequate. Ismail (2014) educated 16 mothers of children with intellectual disabilities on reducing challenging behaviour using behavioural techniques such as extinction. Al-Beri and Al-Samadi (2017) also offered behaviour management training to 12 teachers of autistic children to develop their skills and knowledge of managing challenging behaviour and promoting desirable behaviours, but they did not specify what the training included.

The remaining seven caregiver training interventions that offered behaviour skills training involved several research designs: three non-randomised controlled trials, two uncontrolled single-group studies with pre-and-post-test designs, and two mixed methods studies. These seven intervention studies included: functional behaviour skills training, positive behaviour support training, behaviour management/modification training, and parent training on a set of skills (e.g., communication skills). Only Al-Bahas (2007) was rated as high-quality, and the intervention was also well-reported. Three studies were evaluated as medium quality, with two acceptable reporting of the interventions (Al-Khatib, 2004; Hasib, 2015) and one poorly reported intervention (Mohammed, 2013). Three studies had poor design, one with a good description of the intervention (Gaad & Thabet, 2017) and two with inadequate intervention reporting (Gaad & Thabet, 2016; Saleh & Hanafi, 2015).

The second set of caregiver training interventions is four studies that presented group family counselling sessions to parents of children with intellectual disabilities and/or autism that primarily focus on

guiding parents in managing and reducing challenging behaviour. Three interventions also sought to enhance family interaction and support parents in understanding and coping with the child's disability (Al-Buhairi et al., 2018; Aziz et al., 2018; Mohammed, 2001). These intervention studies used group designs for evaluation: two uncontrolled single-group studies with pre-and-post-test designs and two non-randomised controlled trials. Mohammed's (2001) study was of medium quality, and the intervention was satisfactorily described. However, three studies were rated as low quality, with one well-reported intervention (Ahmed, 2013), one acceptable reporting (Al-Buhairi et al., 2018), and one poorly reported intervention (Aziz et al., 2018).

### 3.4.3 | Skills training interventions

Skills training interventions were defined as those that mainly focus on teaching people with intellectual disabilities and/or autism new developmental skills or improving their existing skills in a direct attempt to reduce challenging behaviour. Skills training interventions primarily employed behavioural methods to teach the targeted developmental skills in this category: social, adaptive behaviour, communication, and cognitive skills. In eight studies, special educators were responsible for teaching developmental skills. Families were only involved in two studies on skills training (Mohammed, 2009; Nashat et al., 2017). For example, Saleh (2021) asked teachers to implement the Son-Rise programme, although it is a home-based programme targeted at parents as the primary therapists.

Skills training interventions were primarily offered to children, apart from Al-Shammari et al.'s (2010) study which included a male age 21. Saad and Hassanein's (2020) study had the largest sample size in the skills training interventions, with 40 children with intellectual disabilities. Most skill training interventions ( $n = 15$ ) were applied at the group level. Three studies featured a combination of group and individual training sessions. Just two intervention studies provided one-on-one training sessions. Less than half of the skills training intervention studies ( $n = 10$ ) started with assessing the individuals' skill levels. The duration of skills training interventions varied from 2 weeks to 14 weeks. A long-term follow-up of the intervention effects was conducted in 13 studies. Table A.3 (see Appendix A in Data S1) summarises the 22 skills training intervention studies.

Fourteen social skills training interventions formed the first sub-category of studies focusing on developing social skills in individuals with intellectual disabilities and/or autism to reduce challenging behaviour. Social skills training (SST) was also included in two adaptive behaviour skills training intervention studies (Al-Garhi et al., 2005; Al-Shakhs et al., 2010). The SST intervention studies varied in design and quality. Two studies were randomised controlled trials (Atallah, 2018; El-Shazly et al., 2014) that were evaluated as medium quality. The intervention was also poorly described in El-Shazly et al.'s (2014) paper, but Atallah (2018) provided sufficient reporting of the intervention. Atallah (2018) trained school teachers to use pictorial activity schedules and behavioural techniques such as role-playing to engage



14 children with intellectual disabilities in individual and collective activities to reduce their challenging behaviour. El-Shazly et al. (2014) used social and behavioural therapy to teach six children with intellectual disabilities how to relax, interact socially, communicate, and manage emotions to reduce their challenging behaviour.

The remaining 12 intervention studies in this first sub-group included two clinical case studies, nine non-randomised controlled trials, and one single group study with a pre and post-test design. These interventions used different methods in teaching social skills, including group counselling, social stories, Discrete Trial Training, Direct Instruction, Son-Rise programme principles, a Social Information Processing Model informed approach, and involvement in social activities like group play. Five studies were deemed to be of high quality, with four interventions that were well described (Al-Shammari et al., 2010; Al-Waeli & Al-Qaisi, 2010; Saleh, 2021; Shash, 2013) and one intervention description that was acceptable (Saleh, 2012). Five other studies were of medium quality; two (Bakhash, 2002; Habib, 2016) had interventions that were well-reported, two (Abdel Kawi, 2016; Bakhash, 2007) were reported at an acceptable level, and one was poorly described (Abdullah, 1997). The final two studies were rated low quality; one intervention description was acceptable (Saad & Hassanein, 2020), and one was poorly reported (Al-Khatib, 2017).

The second subcategory of skills-training interventions included five studies that provided non-targeted training on a set of adaptive behaviour skills, such as self-care skills, to individuals with intellectual disabilities and/or autism to improve their skills and reduce challenging behaviour. Adaptive skills training included using behavioural procedures (e.g., reinforcement), applied behaviour analysis techniques (e.g., prompting), the Discrete Trial Training method, and self-management procedures like self-monitoring. Group designs were used to assess the effectiveness of these interventions: three non-randomised controlled trials and two uncontrolled single-group studies with pre and post-test measurements. All were rated as moderate quality research, with two reporting the intervention well (Nashat et al., 2017; Suleiman et al., 2016) and three poorly describing the interventions (Al-Garhi et al., 2005; Al-Nomrosy, 2010; Al-Shakhs et al., 2010).

The third subcategory of skills training intervention studies comprised only one communication skills training targeting verbal and non-verbal communication skills in children with intellectual disabilities and autism to reduce challenging behaviour. Alzare (2012) taught six children with intellectual disabilities and autism to communicate effectively in various settings to reduce aggression. This a non-randomised controlled trial was rated as high-quality, but the intervention was poorly described. Training on communication skills was also included in other skills training interventions but was not the main focus (Al-Garhi et al., 2005; Al-Khatib, 2017; Al-Shakhs et al., 2010; Saleh, 2012).

The last subcategory of skills training intervention studies is two targeting cognitive skills training with autistic children or with intellectual disabilities to reduce challenging behaviour. Hamada's (2016) study offered executive function skills training to reduce aggressive behaviour in children with intellectual disabilities. Mohammed (2009) used a picture exchange communication system and some behavioural

exercises to develop autistic children's joint attention and imitation skills to reduce withdrawal behaviour. Both were non-randomised controlled trials; Mohammed's (2009) trial was rated as medium quality, and the intervention reporting was acceptable. Hamada's (2016) trial was rated as low-quality and had a poor level of intervention description.

### 3.4.4 | Occupational, sensory, and art interventions

Occupational, sensory, and art interventions for the purpose of this review are those that use physical/motor, sensory, or art activities with individuals with intellectual disabilities and/or autism to reduce or manage challenging behaviour. Most interventions in this category ( $n = 16$  studies) were applied at the group level. Al-Khafaji's (2012) physical intervention was the only one individually implemented on five autistic children. Hijazi and Shaheen (2004) provided a mix of individual and collective training sessions on gymnastics games. Most interventions in this category ( $n = 16$  studies) were not based on individualised assessments, such as functional behaviour assessment or sensory profile. Sixty adolescents with intellectual disabilities comprised the largest sample size (Mohammed, 2014). The duration of occupational, sensory, and art interventions varied from 6 weeks to 20 weeks. Nine interventions completed a long-term follow-up evaluation of the intervention provided. For a detailed description of the 18 occupational, sensory, and art intervention studies, see Table A.4 (Appendix A in Data S1).

The first subgroup is 10 occupational (i.e., physical activity-based) interventions that used one or multiple forms of physical activities with children with intellectual disabilities and/or autism to manage challenging behaviour. These interventions included using physical restraints like weights, kinetic games or stories, sports activities (e.g., walking), gymnastics games, volleyball skills training combined with self-counselling, and physical exercise training. Behavioural techniques like modelling were used to train motor tasks (Ali, 2017; Atwa, 2020; Matar, 2012). Only two intervention studies included a pre-intervention evaluation of the individual's motor abilities (Hijazi & Shaheen, 2004; Siraj, 2018).

Al-Khafaji (2012) was the only single-case experimental design, and this was rated as medium quality, but the intervention was well-reported. The other occupational intervention studies are four one-group pre-test and post-test studies and five non-randomised controlled trials. Five studies were evaluated as high-quality; only two described the intervention well (Hijazi & Shaheen, 2004; Mohammed, 2014), two had an acceptable level of intervention reporting (Saleh & Gharib, 2014; Siraj, 2018), and one was poorly reported (Atwa, 2020). Three studies were rated as medium quality, with two well-reported interventions (Ali, 2017; Matar, 2012) and one inadequate level of reporting (Mohamed et al., 2020). Just one study was rated low-quality (Hussain, 2015), but the intervention had an acceptable level of reporting.

The second subgroup of studies is two sensory intervention studies that included a group of structured activities and experiences that

help improve sensory-motor skills in autistic children to reduce challenging behaviour. Karamuddin et al. (2016) trained 10 autistic children on sensory-motor skills, such as visual discrimination, to improve their interactions with their environment and reduce self-injury behaviour. Similarly, Mahmoud (2015) provided motor-sensory training to 16 autistic children using the discrete trial training method to reduce self-injurious behaviour and improve the five sensory responses and their use. Karamuddin et al. (2016) is a medium-quality non-randomised controlled trial, but the intervention reporting was unsatisfactory. Mahmoud (2015) is a medium-quality single-group pre-test and post-test study group design that reported the intervention satisfactorily.

The last subgroup comprised six intervention studies that used collective artistic activities to alleviate challenging behaviour in children with intellectual disabilities and/or autism. All art activities-based interventions used behavioural techniques, such as modelling. These interventions used different art activities like practising artistic freedom, making 3D artistic models for children's storyboards, creative drama, psychodrama, therapeutic activities (e.g., music), and collaborative play involving artistic and story activities. Five studies were non-randomised controlled trials, and one was a single-group study with pre and post-test design. Only two studies were rated high in design quality (Mahfouz, 2011; Saleh & Al-Banna, 2008); all provided an acceptable level of intervention reporting. Three studies had a medium-quality design, with two well-reported interventions (Faraj, 2012; Yusef & Muhammad, 2016) and an acceptable intervention description (Ibrahim et al., 2011). Al-Shahawi's (2009) study was rated as poorly designed, but the intervention reporting was adequate.

## 4 | DISCUSSION

We identified 79 eligible challenging behaviour intervention studies published between 1997 and 2022 executed in 10 Arab countries. Egypt accounted for 48% of the examined studies, whereas the Maghreb region contributed only 5%. This could be because Egypt has the largest Arab population, and 43.3% of the population with intellectual disabilities within the Arab world (Saad & Borowska-Beszta, 2019). Most Arab research on challenging behaviour interventions were implemented in educational settings (77.2%), suggesting a paucity of clinical research for Arabs with intellectual disabilities and/or autism and challenging behaviour.

We searched extensively in three languages, but studies were primarily in Arabic (92.4%). We found no relevant challenging behaviour intervention study that included Arabs and was conducted in a non-Arab country. Such research may have existed, but it would only have been included in this review if outcomes were reported separately for the Arab group or if Arabs constituted the majority of the sample. The current review findings indicate that any review on interventions for challenging behaviour in Arabs with intellectual disabilities and/or autism undertaken in English only would overlook a substantial body of research. However, there is likely a gap in the international

literature on interventions for challenging behaviour among Arab populations with intellectual disabilities and/or autism in non-Arab countries.

All 79 Arab challenging behaviour intervention studies were evaluated on small samples, with 81 participants constituting the largest sample size (Al-Khatib, 2004). This is consistent with O'Regan et al.'s (2022) systematic review, in which the largest sample size in international intervention studies for challenging behaviour in community settings was 60 participants. However, small samples with unclear representativeness suggest that included Arab literature may not represent the Arab population with intellectual disabilities and/or autism. Furthermore, Arab interventions for challenging behaviour were mainly offered to children, indicating a scarcity of Arab research on intervention studies for adults with intellectual disabilities and/or autism and challenging behaviour.

Arab interventions were evaluated using a wide range of research designs. Although it is considered the gold standard (Aggarwal & Ranganathan, 2019), only 6.3% of Arab intervention studies used a randomised controlled trial design. Single-subject experimental designs, often used in behavioural interventions, were limited to 8.8% of the studies. 28.5% of included research was well designed, but none had a true experimental design. This highlights a lack of a robust experimental research design in Arab literature and questions the quality of the evidence base. 37.9% of included Arab interventions were satisfactorily reported, but most intervention procedures are unclear; thus, they are unlikely to be easily replicated. Since few included studies (12.6%) had a high-quality research design and a well-described intervention, there is probably insufficient reliable evidence on Arab interventions for challenging behaviour to be evaluated.

It seems that much Arab intervention research draws upon behaviour analysis literature without necessarily demonstrating a good understanding of its core principles. To illustrate, five training interventions (Abdeslam & Ajwa, 2019; Al-Bahas, 2007; Al-Khatib, 2004; Ismail, 2014; Yusef & Muhammad, 2016) use extinction procedures without conducting a functional analysis of the challenging behaviour. Extinction procedures are based on withholding an identified maintaining reinforcer for challenging behaviour. Without conducting a functional analysis and identifying the maintaining reinforcer, it is unlikely that any extinction procedure will be effective (Richman et al., 1998). Beforehand putting in place an intervention, it is recommended that Arab researchers be well-trained in behaviour analysis principles, including functional analyses. Research centres can collaborate, support, and exchange knowledge and expertise with researchers to improve the Arab evidence.

75.9% of Arab interventions for challenging behaviour were applied in group formats, despite the fact that the functions of challenging behaviour are likely to differ from one individual to another, and individually targeted interventions are typically recommended in practice (NICE, 2015). 74.6% of Arab interventions were not based on individualised assessments (e.g., functional behaviour assessment). While internationally used challenging behaviour measures and established Arabic instruments for challenging behaviour exist, 55.8% of the Arab research employed a bespoke (typically questionnaire)

measurement tool to evaluate challenging behaviour outcomes. Validating current Arabic challenging behaviour tools or providing culturally adapted translated versions of the international ones would improve challenging behaviour outcome assessments' reliability.

The above-mentioned findings may reflect that neither challenging behaviour nor its function is defined consistently in Arab literature. For example, Al-Sherbini (2013) described stereotyped behaviour as "repetitive, non-functional, and aimless". Potential discrepancies in interpreting challenging behaviour may also play a role in the choice of intervention approaches. Most Arab interventions aimed to reduce challenging behaviour rather than understand its functions and replace it with culturally appropriate alternative behaviour. A consensus and accurate understanding of challenging behaviour and its function in Arab cultures is crucial to more effective assessments and support for individuals exhibiting challenging behaviour across different settings. Adopting a standard definition of challenging behaviour would be helpful here.

Most (81.1%) of Arab caregivers participating in challenging behaviour interventions were female (mothers or specialists). This might indicate a gender-specific carer role for children with intellectual disabilities and/or autism in Arab societies. In Arab cultures, it is typically the mother's responsibility to deal with children's problems and seek support. This is often the case in international research, but it may not be as much of a cultural expectation. However, other cultural variables, including spoken language and religion, were not reported in the included intervention research. Similar to other reviews (e.g., Engstrand et al., 2018), cultural factors in developmental disability research have been found to be poorly or not reported.

Likewise, despite the significance of cultural adaptations to challenging behaviour interventions, none were reported in the included research. Gaad and Thabet (2016) trained a group of Arab and non-Arab parents of children with intellectual disabilities and/or autism in the UAE in Western-produced Positive Behaviour Support. However, it is unclear if researchers made cultural adjustments or considered cultural differences among participants, like language and cultural rules or expectations. This may be a reporting failure, reflect the lack of attention to the cultural context, or both. Although some practices may be considered universal, various contextual factors around interventions would require some adaptation. For example, gender roles will likely inform adjustments to some interventions in the Arab world. Interventions for Arab parents might primarily focus on mothers since they are the most engaged with their children and likely influence children's behaviour. Otherwise, culturally unresponsive interventions may lead to Arab parents' resistance or disengagement with the intervention.

There are several strengths to the current review. This is the first Arab and international review of its kind that systematically synthesises and analyses the evidence on challenging behaviour interventions for people with intellectual disabilities and/or autism in a specific culture, "the Arab cultures". This review highlights the importance of understanding the cultural context of challenging behaviour when intervening in such behaviour, which was not considered in previous reviews. Additionally, the review's strength lies in the extensive search strategy applied across multiple databases and three languages.

This review also has strength in that, unlike most other reviews, it evaluated the quality of the intervention reporting and the quality appraisal of the research studies.

Notwithstanding these strengths, searching for materials in Arabic databases was a methodological challenge for this review. Searching in each Arabic database could hinder obtaining accurate search results. For instance, it is difficult to combine searches with 'and/or', as those options may not exist in some databases (e.g., AskZad database). This could be because Arabic electronic databases were recently formed and still developing. We had also difficulty searching forward citations of Arab intervention studies, limiting the ability to implement a systematic review protocol fully. We noticed some research (e.g., Bakhash, 2002) had been cited in later publications but was not captured in the Arabic databases.

Further, the inconsistency in intervention studies precludes meta-analysis methods from being applied to Arab research, which hinders fully evaluating its effectiveness. Inadequate reporting of the interventions was a significant challenge to understanding the intervention methods used. Although the TiDieR checklist was helpful for intervention reporting quality, it provided no insight into the quality of the intervention itself. For instance, Abdeslam and Ajwa's (2019) intervention reporting has been rated as "moderate", but it is unclear how they implemented behavioural techniques to reduce challenging behaviour in autistic children.

Our review findings suggest multiple areas for future research. More rigorous, high-quality, and person-centred intervention research is needed to enhance the existing literature on challenging behaviour interventions for Arabs with intellectual disabilities and/or autism. Arab intervention studies should also be grounded in evidence-based intervention approaches, such as function-based interventions, to increase the likelihood of effectively addressing challenging behaviour. Future Arab interventions should be clearly described to enhance replication opportunities and evidence synthesis and also to identify any cultural adaptations applied. Future research could then also evaluate the effectiveness of any cultural adaptations to challenging behaviour interventions.

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## CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to disclose.

## DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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