Review

Tele-practice for children and young people with communication disabilities: Employing the COM-B model to review the intervention literature and inform guidance for practitioners

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Abstract

Background: Many healthcare and educational services providers have undergone a rapid transition from a face-to-face to a tele-practice mode of service delivery in the context of the COVID-19 outbreak. This, in turn, has led to a need to understand better the evidence underpinning such moves. Based on a review of existing reviews, this paper critically analyses the relevant literature related to intervention with children with communication disabilities drawing on the COM-B model.

Methods & Procedures: Ten reviews were identified following a systematic searching of electronic databases. These were then coded according to both PRISMA criteria and the components of the COM-B model. Based on these findings, a critical analysis of the state of the tele-practice intervention literature is discussed and fed into evidence-based advice for practitioners transitioning to this mode of service delivery.

Outcomes & Results: The COM-B mapping suggests that the existing literature has provided primary evidence for physical opportunity and reflective motivation (e.g., participants have the time to take part and the necessary materials, as well as a desire to do it). It has also focused on elements of social opportunity (e.g., having support and prompts from others to take part). However, there are significant gaps in the description and analysis of both physical and psychological capability components.

Conclusions & Implications: Whilst the evidence for tele-practice interventions for children and young people with communication disabilities is growing, it is also lacking a comprehensive framework to support its implementation. In times of rapid transitions, researchers and practitioners alike need to understand how to evaluate comprehensively the impact of changing the mode of intervention delivery. The COM-B model provides a powerful tool to reflect on the key elements for the successful design and implementation of tele-practice interventions.

Keywords: Tele–practice, communication disability, children, young people, rapid review, COM-B model.

What this paper adds

What is already known on this subject

• Tele-practice has been a feature of service delivery for speech and language therapists working with children and young people with speech and language disorders for many years, as it has in other areas of practice. This came into sharp focus during 2020 during the ‘lock-down’ following the start of the COVID-19 pandemic when most practice went online.

What this paper adds to existing knowledge

• This study set out to provide a framework for understanding service delivery, drawing on the COM-B behaviour change model. This is applied using a rapid review methodology to 10 systematic and narrative reviews of the existing literature published since 2005. The findings suggest that while most studies...
demonstrated efficacy, there was a lack of information regarding specific aspects of the model which would affect their implementation.

What are the potential or actual clinical implications of this work?

• It is anticipated that the paper has the potential to have a direct bearing on how tele-practice services for children and young people with speech and language disorders will be delivered in the future. The paper concludes with a series of recommendations for practice and research in terms of the application of the COM-B model to tele-practice in speech and language therapy.

Introduction: Background

Tele-practice (also known as telehealth, telecare or telemedicine) is defined by the World Health Organization (WHO) as the delivery of services where ‘a health care provider and a patient are separated by distance’ (WHO 2016). In many areas of healthcare, tele-practice emerged in the 1990s to address physical barriers of access to interventions, such as when living in remote areas (Cochrane et al. 2018) or for individuals with physical disabilities (Glueckauf et al. 2002). Supported by increasingly accessible technology, interventions designed to be delivered via tele-practice have become an area for service development in and of itself (as opposed to being a substitution for face-to-face interventions). There is as great a need to examine methodically this approach to service delivery as it is to test the interventions themselves, and this is the focus of the present paper.

This process of shifting from person to person to online approaches to service delivery has been dramatically accelerated in the rapid, profound and potentially long-lasting impact caused by the COVID-19 pandemic. This, in turn, has led to an examination of the evidence underpinning such services, for example, with regard to the delivery of children’s services (Martin et al. 2020). To increase understanding of the specific impact of COVID-19 upon speech and language therapy provision in the UK, the Royal College of Speech and Language Therapists (RCSLT) distributed a survey during a key week in April 2020 (RCSLT 2020). Unsurprisingly, respondents reported a steep increase in the use of tele-practice, but with accompanying concerns about critical aspects of the change and the evidence underpinning such changes.

Several studies have focused on tele-practice interventions for children who stammer (McGill et al. 2019, Lowe et al. 2014), children with a hearing impairment (Edwards et al. 2012), and increasingly so for children with autism spectrum disorders (Sutherland et al. 2018, Boisvert et al. 2010). Studies focusing on more general speech and language difficulties and speech and language therapy practice appear scarce. Crucially, the research evidence has mainly been built around the adequacy of the technology itself (Keck and Doarn 2014), the comparison of outcomes for children receiving tele-practice as opposed to face-to-face interventions (Speyer et al. 2018), and the attitudes of practitioners and clients to engage in tele-practice interventions (Tucker 2012a, 2012b). The demand for cost-effective evaluations of tele-practice interventions also appears to be a major concern in the field, but has seldomly been addressed.

The evidence is fragmented and does not offer a comprehensive account of the critical elements at play in tele-practice interventions. For example, a recurring theme in this body of literature is the high levels of attrition, where participants drop out or fail to complete the intervention, although the reasons, such as access to technology, the medium of intervention delivery and the participants’ motivation, are rarely explored. The lack of an overall narrative and comprehensive framework to conceptualize the key elements of tele-practice interventions is a significant omission. There is a strong incentive to move away from the traditional considerations of effectiveness based on the comparison of outcomes between tele-practice and face-to-face interventions (which may well be irrelevant in contexts where the choice no longer exists—as it has recently been illustrated in the context of a pandemic). Instead, considering and appraising the key elements for successful implementation of tele-practice interventions has the potential to inform practice more meaningfully.

The COM-B model: A promising tool to design, evaluate and reflect on a tele-practice intervention

The COM-B model represents a promising framework to structure the narrative and evidence on tele-practice interventions. COM-B stands for Capability, Opportunity and Motivation—Behaviour (Michie et al. 2014). The three interacting domains Capability, Opportunity and Motivation—Behaviour each include two subcategories (table 3). Thus, Capability is split into Physical capability (e.g., having the physical skills) and Psychological capability (e.g., having the knowledge).
Opportunity is split into Physical opportunity (e.g., the opportunity afforded by the environment such as time) and Social opportunity (e.g., the opportunity afforded by interpersonal influences such as social cues or cultural norms). Motivation is split into Reflective motivation (e.g., involving plans) and Automatic motivation (e.g., involving emotional reactions). The model makes it possible to tease apart the key elements of an intervention, building it into a whole (Michie et al. 2011). But equally it allows one to use it as a framework to examine the existing literature. The approach has started to be used in relation to communication disability (Stringer and Toft 2016a, 2016b, Toft and Stringer 2017) and related areas (Nickbakht et al. 2020).

Conventionally COM-B is the core part and usually starting point of the Behaviour Change Wheel (BCW) (Michie et al. 2014) and can be used to design an intervention focusing on behaviour change (bottom up), but also for understanding behaviour contextually (top down). In the bottom-up process key features of an intervention are identified—e.g., by using the Theoretical Domain Framework (TDF) and identifying Behaviour Change Techniques (BCTs) from the Behaviour Change Technique Taxonomy Version 1 (BCTTv1)—and combined to make up a new intervention. In the present analysis the COM-B model is used to understand behaviour in the occurring context, the change from face-to-face speech and language therapy to tele-practice. Hence, the COM-B model here serves as a top-down framework to critically analyse and reflect on key elements of tele-practice intervention as practitioners move from face-to-face intervention to tele-practice intervention.

**Aims of the paper**

This paper reviews the literature on tele-practice interventions for children and young people with communication disabilities through the lens of the COM-B model. Initially, a rapid review was conducted, and each selected review was critically appraised using the relevant PRISMA quality criteria. The reviews were subsequently examined in relation to the components of the COM-B model. By using this comprehensive framework, the paper provides researchers and practitioners with a useful tool with which to reflect upon the core elements to consider when designing and implementing interventions for this demographic.

The following questions are addressed:

- To what extent do the identified reviews on tele-practice interventions for children and young people with communication disabilities meet PRISMA quality criteria?

**Methods**

**Rapid review**

A rapid review was conducted of existing reviews of the literature. A rapid review is the production of a knowledge synthesis of the available evidence in which components of the systematic review process are simplified or omitted to produce information in a short period of time (Roberfroid et al. 2016). More specifically, the study adopted a condensed approach to rapid review that includes a broad-brush review of the literature within a restricted time frame and without an in-depth analysis of the data (Polisena et al. 2015). The benefits of this approach are twofold. First, this approach is appropriate in scope as it provides a general yet representative window into this body of literature. Indeed, given that reviews are themselves inherently informed by the content of the original studies, reviewing reviews allows one to identify the key contributions and limitations of the field. Second, this approach offers an opportunity to produce a rigorous scientific output within a short timescale to inform practice and research.

This rapid review was carried out between April and May 2020. It draws together what is currently known about tele-practice related to interventions for children and young children with communication disabilities. It includes interventions delivered remotely (either in the person’s home or in another facility) and administered by a speech and language therapist or any other professionals, so long as the intervention targeted communication skills. The tele-practice interventions are more traditionally delivered from the clinic, but for the purposes of this review, they should be transferable to the therapist’s own home.

**Search strategies**

The following seven databases were searched using customized search strategies (see appendix A):

- EBSCO (ERIC/CINAHIL).
- PubMed; OVID EMBASE 1996–2020.
- OVID Medline 1946–2020.
In addition, the research team also searched the Cochrane, Campbell and Prospero databases.

**Inclusion criteria**

- Systematic or narrative reviews of tele-practice interventions in speech, language or communication for children and young people with identified communication disabilities aged between 0 and 18 years. These communication disabilities could be broad or specific (such as autism spectrum disorder, developmental speech and language disorders and stuttering).
- Interventions delivered by specialist practitioners such as speech and language therapists, teachers, behaviour specialists, etc.
- The tele-practice intervention has the potential to be delivered to the child/parent in the home. This could be from the clinic or another location and, in practical terms, could be delivered in school.
- Published since 2005. This date was used because it represents a critical time in terms of access to broadband connection and internet use. By 2005, one-third of people in Europe (the figure was twice that in the United States) had access to the internet, making tele-practice a realistic possibility for many (de Argaez 2005).
- Focus on person-to-person interventions delivered remotely (i.e., over the internet or by telephone).

**Exclusion criteria**

- Reviews where the primary focus is the use of clinical equipment that is not readily available in the practitioner’s home.
- Reviews that include the use of hospital and clinic-based interventions.
- Reviews that focus on assessment only or some other aspects of tele-practice services.

**Analytic approach**

The identified reviews were initially examined in relation to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, commonly applied to systematic reviews and meta-analyses to provide an overview of the scientific quality of the reviews and to indicate their relative strengths and weaknesses. The COM-B framework was then applied to each review by two authors working independently and the extent to which each category was reported. Differences between reviewers were resolved with discussion. A narrative overview of each aspect of the COM-B model as applied to the reviews themselves was then provided.

**Results**

*To what extent do the identified reviews on tele-practice interventions for children and young people with communication disabilities meet PRISMA quality criteria?*

Our search strategies identified 10 reviews published in the peer reviewed literature. Two of the 10 were not identified by the search strategies but were referenced in one of the other reviews. The Prospero database generated 230 reviews, but none included speech and language therapy. The flow chart illustrating the inclusion process is provided in figure 1. For the purpose of the paper, the reviews are numbered 1–10; this nomenclature will be used throughout rather than repeating review citations. The characteristics of included studies and their findings are summarized in table 1.

Six of the included reviews were systematic and four were narrative. The number of studies included in the reviews ranged from two to 103. Six reviews focused on the use of tele-practice with speech and language therapy clients in general, two focused on its use with children who stutter, and two with those with autism spectrum disorders. Most of the sample sizes of the studies reported in the 10 reviews were relatively small. Meta-analysis was only attempted in two studies (2, 8) and this is probably a result of sound decisions rather than an omission given the varied analytical approaches and heterogeneity of the samples. Effect sizes are either not calculated or not reported in a way which would make them comparable. Therefore, it is not possible to be specific about the relative value of tele-practice with one group relative to another. It is also often difficult to ascertain the nature of the difficulties experienced by the children concerned. For example, a systematic review on the use of tele-practice services for children with autism spectrum disorders (1) did not only include children with the aforementioned diagnosis. Included studies vary as to whether the tele-practice intervention has been compared with no intervention, what might be termed standard care or an alternative treatment with controlled delivery although the two are rarely teased apart in the reviews. Nonetheless, as the broad conclusions of the 10 reviews identified in this study
| Review no. | Author | Year | Title* | Type | Target group | Intervention delivered by | Studies included | Participants | Key outcomes |
|-----------|--------|------|--------|------|--------------|--------------------------|-----------------|--------------|--------------|
| 1         | Boisvert et al. | 2010 | Tele-practice in the assessment and treatment of individuals with autism spectrum disorders: A systematic review | Systematic | Autism | Child only | Teachers, researchers, behavioural consultants, psychologists | 8 | 46 | Tele-practice services for ASD included behavioural and diagnostic assessments, educational consulting, guidance and supervision of behavioural interventions, and coaching/training in intervention. Seven of the eight studies reviewed reported successful implementation and positive outcomes of services delivered via tele-practice (one study reported ‘technological and programmatic challenges were never fully overcome’). |
| 2         | CADTH | 2015 | Telehealth for speech and language pathology: A review of clinical effectiveness, cost effectiveness and guidelines | Rapid response—narrative | Stuttering | Child only | Speech–language pathologists | 2 | 52 | Speech–language pathology treatment delivered via videoconferencing or an in-person service model improved children’s speech–language impairments. No significant differences between the two approaches were found. |
| 3         | Edwards et al. | 2012 | Expanding use of tele-practice in speech–language pathology and audiology | Narrative | SLT | Child and adult | Speech–language pathologists, occupational therapists, physical therapists, psychologists | 15 | n.s. | All studies report tele-practice as an effective way to diagnose and treat speech–language pathology. Outcomes indicate high agreement between tele-practice and face-to-face services. |
| 4         | Lowe et al. | 2013 | Review of telehealth for stuttering management | Narrative | Stuttering | Child and adult | Speech–language pathologists, teachers | 11 | n.s. | Studies report positive outcomes for telehealth stuttering treatment, but report little evidence for treatment of young children, and no studies focused on stuttering assessment using telehealth models. |
| 5         | Mashima et al. | 2008 | An overview of telehealth activities in speech–language pathology | Narrative | SLT | Child and adult | Speech–language pathologists | 40 | n.s. | Studies report favourable clinician and patient response to telehealth, but there is a need for evidence from clinical trials to validate speech–language pathology telehealth protocols including technical specifications, clinical efficacy and outcomes, and economic analyses. |
| 6         | McGill et al. | 2019 | Tele-practice treatment of stuttering: A systematic review 2019 | Systematic | SLT | Child and adult | Speech–language pathologist | 7 | 78 | All seven studies reported successful implementation and positive outcomes of services delivered via tele-practice using the Camperdown Program, Lidcombe Program and an integrated treatment protocol. |
| Review no. | Author                   | Year | Title                                                                 | Type          | Target group                  | Intervention delivered by                        | Studies included | Participants | Key outcomes                                                                                                                                                                                                 |
|-----------|--------------------------|------|-----------------------------------------------------------------------|---------------|-------------------------------|-----------------------------------------------|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7         | Molini-Avejonas et al.   | 2015 | A systematic review of the use of telehealth in speech, language and hearing sciences | Systematic SLT | Child and adult (26% child) | Speech–language clinician and audiologists     | 103              | n.s.        | A total of 85.5% of studies concluded that telehealth had advantages over the non-telehealth alternative approach; 13.6% reported that it was unclear whether the telehealth procedure had advantages. Some barriers still need to be overcome, such as technology, training, regulation, acceptance and recognition of the benefits of this practice by the public and professionals. |
| 8         | Rudolph et al.           | 2015 | Tele-practice vs on-site treatment: Are outcomes equivalent for school-aged children? | Systematic Speech and Language disorders | Child only | Speech–language pathologists | 6                | n.s.        | All studies reported equivalent or greater improvement from tele-practice compared with on-site intervention; however, confidence intervals associated with the effect sizes were large. |
| 9         | Sutherland, Trembath and Roberts | 2018 | Telehealth and autism: A systematic search and review of the literature | Systematic Autism | Child and adult | Speech–language clinician, teachers (trained) | 14               | 284         | A range of services were provided via telehealth, including diagnostic assessments, early intervention and language therapy. Results suggested that services delivered via telehealth were equivalent to services delivered face to face, and superior to comparison groups without telehealth sessions. |
| 10        | Wales, Skinner and Hayman | 2017 | The efficacy of telehealth-delivered speech and language intervention for primary school aged children: A systematic review | Systematic Speech and Language disorders | Child only | Speech–language pathologists | 7                | n.s.        | Findings showed that there is some evidence to support the use of telehealth when delivering SLP intervention services to school-age children. However, the amount of research into speech and language intervention for children via the telehealth service delivery model is limited and of variable quality. |

Notes: *For the journals of publication, see the references section. n.s., Not specified.*
demonstrate, there is evidence suggesting that telepractice approaches have, in most cases, at least as good a result as face-to-face standard care, whether in clinic or school.

We examined the reviews using the fourteen categories in the PRISMA Criteria (Moher et al. 2009). This provides a framework to identify the presence (or absence) of key elements to be reported in a review. We started by checking the title for a statement about the nature of the review (systematic review, meta-analysis, etc.) [1] and a structured summary of the review [2]. The rationale for the review needed to be reported [3] with an explicit statement of the research questions with reference to participants, interventions, comparisons, outcomes, and study design (PICOS) [4]. Recording of a review protocol was recorded [5] with detailed descriptions of the study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale [6]. There then needed to be a description of all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched [7] and details of the electronic search strategy [8]. The reviews were checked for the process for selecting studies [9] (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis) the description of method of data extraction from reports [10] (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators and the definition of variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made [11]. We looked for a description of methods used for assessing risk of bias [12] of individual studies (including specification of whether this was done at the study or outcome level), and how this information was to be used in any data synthesis and statement about the principal summary measures (e.g., risk ratio, difference in means) [13]. And, finally, there needed to be the synthesis of results [14]. Each review was appraised according to this framework, and

Figure 1. Flowchart of study inclusion [Colour figure can be viewed at wileyonlinelibrary.com]
the relevant page number of the items numbered above specified (table 2).

As table 2 indicates, the quality of the reviews was variable. Whilst most provide a rationale for the review process, only four provided clear objectives. Only one provided reference to a registered protocol, and four of the studies provided clear eligibility criteria for the studies included in the review. The risk of bias in the review or in the papers included in the review was not addressed. Where summary measures for study results were included, reviews did not clearly provide the synthesis of results although outcomes were summarized narratively. Most studies included a narrative synthesis whereby results were reported in relation to different outcomes such as study group or topic, intervention type, diagnostic outcomes, or benefits and barriers. Overall, many reviews lacked clarity in their methodological approach, but they provided more comprehensive accounts of results and discussion.

The narrative nature of these reviews and the range of outcomes reported across them relating to, for example, client group, topic of intervention, intervention approach, barrier and benefits, makes it possible to map the findings of these reviews onto the COM-B model.

To achieve this, each review was then examined for explicit reference to the key characteristics of the COM-B model. Table 3 provides examples of evidence for all COM-B categories; table 4 is a summary of the COM-B mapping for the 10 reviews. Three ratings were adopted when examining the reviews. If a COM-B category was clearly and explicitly discernible, this was labelled as ‘Observed’. If there was no evidence to support the consideration of issues associated with a COM-B category, this was labelled as ‘Unobserved’. If the COM-B category was considered implicit but present, this was indicated by the label ‘Inferred’. Each of the 10 reviews was considered by two members of the research team and agreement reached as to the category and label.

**Narrative synthesis using COM-B categories**

**Physical capability**

The physical capability of the therapist, child or parent is either inferred (3–7, 10) or unobserved (1, 8, 9). For reviews where physical capability was inferred, references to skills which are clearly linked to this category were identified. Even though individual technical skills can be identified as potential barriers to tele-practice, very little reference is made to the technical skills of the parent or the tolerance of the child to, for instance, sit and work at a computer for extended periods. Only one other review states that professionals have to be familiar with the available technologies to engage with tele-practice interventions (7). Furthermore, only four reviews express challenges referring to physical capability in tele-practice interventions, such as concerns about the child’s reduced attention (10), challenges regarding children’s behaviour (6), the difficulty of managing every client effectively regardless of their age (4, 7), and the need for helping children to operate with technical equipment in telehealth sessions (7). Interestingly, reviews that also included adults reported differently on aspects of physical capability (4, 5). For example, being able to sit in front of a monitor, following (verbal) directions, operating a keyboard, visual abilities and speech intelligibility (5) are hardly discussed in reviews addressing children only, but seem to be given consideration for patients with neurogenic communication disorders or dysphagia (5). It is also mentioned that tele-practice interventions can be associated with added advantages when compared with face-to-face interventions for adolescents, as their increased autonomy and experience with technical equipment can foster treatment adherence (4). In general, the reviews on tele-practice interventions for children and young people with communication disabilities mainly infer physical capability (table 3).

**Psychological capability**

Psychological capability was either inferred or unobserved in the reviews (1–10). There is no reference to explicit external exigencies behind the decision to switch from face-to-face to remote service delivery, except for reasons of physical opportunity such as access to services in rural areas. One may assume that the decision to offer tele-practice interventions is mainly driven by the studies’ research design and inquiry, rather than a genuine consideration into the ways in which the psychological capability of children and young people with communication disabilities interacts with this mode of service delivery. We did not find any explicit reference to the parent or the child’s decision-making process. Two reviews (5, 7), which also included studies with adults, mention cognitive ability to be a relevant consideration for offering tele-practice interventions. About half of the selected reviews consider age and attention, which could be used as proxies for psychological capability (4–7, 10). One review also adds education level as an important indicator of whether tele-practice intervention is beneficial (7). It is noteworthy that some reviews referred to the severity of the communication disorder as a possible barrier for the use of tele-practice, which directly concerns psychological capability (3, 5). However, these comments were made with reference to adults in reviews reporting on both children and adults. There is no hard
Table 2. Included studies summarized using PRISMA criteria (page number provided if available)

| Review no. Authors | 1 Boisvert et al. (2010) | 2 CADTH et al. (2015) | 3 Edwards et al. (2012) | 4 Lowe et al. (2013) | 5 Mashima (2008) | 6 McGill et al. (2019) | 7 Molini-Avejonas et al. (2015) | 8 Rudolph (2015) | 9 Sutherland et al. (2018) | 10 Wales et al. (2017) |
|--------------------|--------------------------|------------------------|--------------------------|---------------------|-------------------|------------------------|-----------------------------|----------------|-----------------------------|---------------------|
| Title              | 1 423 – – – – – 359 1 – – 324 55 |                       |                          |                     |                   |                        |                             |               |                             |                     |
| Abstract           |                          | 2 423 – – 223 – 359 1 – – 324 55 |                          |                     |                   |                        |                             |               |                             |                     |
| Structured summary |                          |                        | 3 Rationale             | 1 424 223–225 1101 360 1 – 325 56 |                     |                        |                             |               |                             |                     |
| Rationale          |                          |                        | 4 Objectives            | 424 229 – – – – 2 – – 2 325 56 |                     |                        |                             |               |                             |                     |
| Methods            |                          |                        | 5 Protocol and registration |                   |                   |                        |                             |               |                             |                     |
| Eligibility criteria |                        |                        | 6 Information           | 425 2 229 – – – – 2 2 – 2 325 56 |                     |                        |                             |               |                             |                     |
| Search             |                          |                        | 7 Data sources          | 1101–2 360 2 2 2 325 56 |                     |                        |                             |               |                             |                     |
| Study selection    |                          |                        | 8 Additional analyses   |                   |                   |                        |                             |               |                             |                     |
| Data-collection process |                    |                        | 9 Results               |                   |                   |                        |                             |               |                             |                     |
| Data items         |                          |                        | 10 Study characteristics |                   |                   |                        |                             |               |                             |                     |
| Risk of bias in individual studies |          |                        | 11 Summary measures     | 426 3/13 – – – – – 2 – – 2 – – 2 – – 2 – – |                     |                        |                             |               |                             |                     |
| Synthesis of results |                        |                        | 12 Risk of bias across studies |                   |                   |                        |                             |               |                             |                     |
| Additional analyses |                        |                        | 13 Results              |                   |                   |                        |                             |               |                             |                     |
| Study selection    |                        |                        | 14                       |                   |                   |                        |                             |               |                             |                     |
| Study characteristics |                        |                        | 15                       |                   |                   |                        |                             |               |                             |                     |

Continued
| Review no. | Authors | 1: Boisvert et al. (2010) | 2: CADTH (2015) | 3: Edwards et al. (2012) | 4: Lowe et al. (2013) | 5: Machima (2008) | 6: McGill et al. (2019) | 7: Molin-Avejonas et al. (2015) | 8: Rudolph (2015) | 9: Sutherland et al. (2018) | 10: Wales et al. (2017) |
|------------|---------|----------------|-----------------|------------------------|----------------------|-----------------|----------------|-------------------------|-------------------|----------------------|------------------|
| Risk of bias within studies | 19 | – | – | – | – | – | – | – | – | – | 60/63 |
| Results of individual studies | 20 | 426 | 11 | – | 234 | 110 | 362 | 11 | 10 | 328 | 66 |
| Synthesis of results | 21 | – | – | – | – | – | – | – | 4 | – | – |
| Risk of bias across studies | 22 | – | – | – | – | – | – | – | – | – | – |
| Additional analysis | 23 | – | – | – | – | – | – | – | 7 | – | – |
| Discussion | | | | | | | | | | | |
| Summary of evidence | 24 | 429 | – | 237 | 230 | – | 366 | 6 | – | 333 | 61 |
| Limitations | 25 | – | 6 | – | – | – | 366 | – | – | 334 | 63 |
| Conclusions | 26 | 431 | 6 | – | 233 | 1107 | 367 | 7 | – | 335 | 63 |
| Funding | 27 | 431 | – | – | 233 | – | 367 | 7 | – | – | 63 |

Source: Moher et al. D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. https://doi.org/10.1371/journal.pmed.1000097.
| Physical capability          | General example                                                                 | General telehealth example                                                                 | Therapists                                                                 | Parents                                                                 | Children                                                                 |
|-----------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Physical skill, strength or stamina | Know how to do it, have physical skills, have physical strength, overcome physical limitations, have physical stamina | Have the skill to conduct telehealth sessions (e.g., technical skills)                     | Have the physical skills to sit next to the child during the session and support therapist as, for example, co-therapist, being able to open, for example, an internet browser or install special programs, etc. | Have physical skills to sit in front of the computer and work with therapist on remote throughout a session |
| Psychological capability    | Knowledge or psychological skills, strength or stamina to engage in the necessary mental processes | Know why it is important, have mental skills to do it, overcome mental obstacles, have mental stamina to do it | Understand the impact of continuing SLT intervention via telehealth (compared with, for example, no intervention during COVID-19); reduction of unwanted feelings such as fear of failure during telehealth sessions (overcome mental obstacles by, for example, reducing unwanted urges or feelings) | Know why it is important to proceed with therapy (e.g., compared with pausing for a long time), have mental capability to plan and conduct sessions during (the current) different daily routine | Have mental skills and mental stamina to take part in a telehealth session (themselves, not counting for parent-led interventions). This is clearly a negotiated process and one where equity needs to be closely monitored for those not meeting this criterion |

| Physical opportunity        | Opportunity afforded by the environment involving time, resources, locations, cues, physical ‘affordance’ | Have time to do it, have money to do it, have necessary materials, have it easily accessible | Being able to conduct telehealth sessions in, for example, a clinic/at home, have the right resources for implementing telehealth sessions (e.g., technical equipment and other tools such as therapy material online, etc.), have a program which is easily accessible, have time to plan and conduct telehealth sessions | Being able to take part in telehealth sessions because the technical equipment is available (internet access, computer, headphone, printer if needed, etc.), have a quiet room/space in which the telehealth sessions can take place, have time and resources to plan sessions during (the current) different daily routine (single parents, more siblings, too much to do with home-schooling, etc.) | Have the opportunity to concentrate on telehealth sessions because of an own quiet room/space, are familiar with technical equipment from other games/exercises and know how to use, for example, a tablet/computer, having technical equipment (see parents, overlap) |

| Social opportunity          | Opportunity afforded by interpersonal influences, social cues and cultural norms that influence the way that we think about things, for example, the words and concepts that make up our language | Have more people around doing it, have triggers to prompt it, have support from others | Have colleagues who conduct telehealth sessions, be part of a team who implements telehealth sessions, have support by a team leader or more members to conduct telehealth sessions | Know other parents and children who also take advantage of telehealth services, get additional support from therapists for setting up the online session and for procedure (e.g., information material) | Know other children who take part in telehealth services, get support by parents during the session, are familiar with technical equipment because used often at home, etc. |

Continued
### Table 3. (Continued)

| Reflective motivation | General example | General telehealth example | Therapists | Parents | Children |
|-----------------------|-----------------|-----------------------------|------------|---------|----------|
| Reflective processes involving plans (self-conscious intentions) and evaluations (beliefs about what is good and bad) | Feel that you want to do it enough, feel that you need to do it enough, belief that it would be a good thing to do | Feel that you want to do it enough, for example, feel more of a sense of pleasure or satisfaction from doing it (being able to proceed with therapy and services this way rather than stopping it and doing nothing); inner beliefs that the conduction of telehealth is good and reasonable; develop a stronger sense that one should carry out telehealth services | Feel that telehealth sessions are reasonable, good and beneficial for the child’s progress and speech–language development, belief telehealth works, feel relieved to get support via online sessions by experts, open-minded towards online services and comfortable and familiar with handling technical equipment, feel like you can still do something to support the child’s development | Look forward to seeing the therapists and work with him/her in online sessions |
| Automatic motivation | Automatic processes involving emotional reactions, desires (wants and needs), impulses, inhibitions, drive states and reflex responses | Develop better plans for doing it, develop a habit of doing it | Feel anticipated pleasure at the prospect of carrying out telehealth sessions online via technical services; develop a routine in offering telehealth services online; develop clearer plans for the delivery of telehealth services in SLT interventions and what it takes to carry online sessions out successfully, know automatically what to do if problems such as bad internet connection occur during the sessions | Used to working closely with therapists, establish a routine in starting the programme, a routine in which materials are being used and are good to have close to the working space, know what to do if, for example, the session closes due to bad internet connection, develop a routine in the procedure of online sessions, prepare the child appropriately before each session as parents know better what happens after a couple of intervention sessions | Used to working with the therapist and parent in front of a computer, develop a routine and ask for, for example, the sound machine as reward automatically, ask for games that have been played the session before because of familiarity and guaranteed success (security) |
evidence of whether the severity of the communication difficulty impacts the use (and utility) of tele-practice interventions for children and young people.

**Physical opportunity**

In all reviews, the physical resources necessary for the intervention and the technical skills are assumed (1–10). The technology for delivering the intervention is often described in detail but the quality of the interface with the parents and children is rarely considered (only in 5), or indeed the availability of a quiet space in the home. Venues for conducting tele-practice interventions are discussed, with mention of hospitals, care facilities and the client’s home (1–5, 7, 9, 10). Naturalistic and everyday settings are considered to be very suitable, and this is particularly highlighted for early years intervention. Only one review (4) makes reference to location and general household circumstances, stating that these aspects need to be considered when offering tele-practice interventions. One review mentioned the specific challenges that emerge when children are not physically in the clinic room, such as the need to adapt therapy materials and their use (4). The poor quality of technical equipment is seen as a barrier to tele-practice interventions (3, 4, 10). Some reviews argue that the cost of tele-practice interventions is lower than their face-to-face equivalent (2, 4, 5, 7, 9). However, this issue has not been systematically reported, and economic analyses are needed (1, 4). Insurance coverage and reimbursement of tele-practice interventions are also rarely mentioned (5, 7). Tele-practice is seen very positively in light of the traditional physical barriers to service access, such as transportation difficulties (e.g., rural areas), work commitments and family constraints (1–10). The time required to plan sessions is not covered. The perspective of the therapist addressing therapy material resources and session planning time is, except for the brief mention in one review (6), absent.

**Social opportunity**

Most reviews suggest that tele-practice interventions rely heavily on support and mediation by a parent or a carer (3–9). Parents play an active role in tele-practice, even before/after the sessions as they interact with the therapists to exchange information about procedures, materials and setting. This liaising process between the parent and therapist can happen in different forms, such as text-messaging, additional e-mails and/or phone calls (4, 6, 9). Although, while this is described, it is rarely explicitly evaluated. Hence, tele-practice interventions offer many possibilities for parental involvement and provide the opportunity for parents to actively participate in the sessions with their children and to gain

| Table 4. Explicit reference to key characteristics of the COM-B model applied to 10 reviews |
|--------------|-----------|----------------|----------------|----------------|----------------|
| 10           | Wales     | Not observed   |                 |                |
| 9            | Suthern   | Inferred       |                 |                |
| 8            | Rudolph   |                |                 |                |
| 7            | Molin-Avejonas |            |                |                |
| 6            | Mc Gill   |                |                 |                |
| 5            | Mushima   |                |                 |                |
| 4            | Lowe      |                |                 |                |
| 3            | Edwards   |                |                 |                |
| 2            | CADTH     |                |                 |                |
| 1            | Boisvert  |                |                 |                |

| Capability   | Opportunity | Motivation |
|--------------|-------------|------------|
| Physical     | Psychological | Social   |
| Reflective   | Automatic   |            |

*Key: Not observed, Inferred*
The satisfaction of parents and therapists with telepractice services is reported across reviews (1, 3–7, 9, 10). One review (2) only mentions satisfaction surveys from a study without reporting on outcomes, and another (8) makes no reference to satisfaction. Levels of acceptance from parents are reported as high (3–7, 9, 10). Parents are comfortable engaging with the therapists online and satisfied with their child’s level of interaction with their therapist (4, 7–10). There is only one brief report on children’s satisfaction (6). In this review, two children were asked whether they prefer tele-practice or face-to-face interventions: one selected tele-practice whereas the other preferred face-to-face interventions. However, it is reported that adolescents may better appreciate the autonomy of tele-practice interventions (4). Although this is not covered in detail in every review, it is clear that the practitioners believe that tele-practice is an appropriate way forward (1, 4, 5, 7, 9, 10). Compliance on the part of the parents and children, and the given data from the reviews, mirror this to some extent. However, one review reports a high dropout rate in one study, without giving any further explanations (4). Most of these reviews emphasized the need for further research on reflective motivation (1, 4–7, 9).

**Automatic motivation**

How the participants feel about the experience of tele-practice is rarely considered, and attendance is commonly used as a proxy for acceptability. One review (1) mentions the need for further research on practical implementation issues, such as scheduling, workflow and organizational readiness to account for the automatic processes, the routine and professional development of the therapists. The interaction with colleagues for professional growth and skill development is also mentioned in one review (4). In addition, one review indicated that therapists need to be aware that some processes and activities may not readily transfer from routine clinical practice sessions where the therapist is present with the child to telehealth, and may need more time for modifications to practice (6). Apart from the reference to therapists in these three reviews, there is no reference to the motivation of parents, carers or children.

**Comparing the six COM-B categories**

The two domains of physical opportunity and reflective motivation of the COM-B model were the most frequently referenced categories, mentioned in all 10 reviews (1–10). This might seem obvious as physical opportunity includes technical equipment which is fundamental for tele-practice interventions. It can be assumed that reflective motivation is also a key consideration in the literature as parents/children and therapists must agree on this mode of service delivery for it to be implemented. Most of the reviews (3–9) state that parents and carers are highly involved in the tele-practice interventions, illustrating some of the social opportunities that have been reported. Surprisingly, only six of the 10 reviews consider aspects of physical capability, and four only suggest links to psychological capability, despite their evident role in tele-therapy mode of delivery. As a result, capability (physical and psychological) is covered far less than opportunity (physical and social). Indirect links to automatic reflection (such as automatic processes or developing a routine) can be found in only three reviews, which may reflect the relative infancy of tele-practice.

**What practice guidance can be drawn from a critical analysis of the COM-B model on the research literature of tele-practice interventions for children and young people with communication disabilities?**

Using the COM-B framework, we make a series of recommendations for practitioners implementing telepractice interventions for children and young people with communication disabilities (table 5). These
Table 5. Recommendations drawing on the COM-B model

| Recommendation |
|----------------|
| **Physical capability** Make sure that both the child and parent have sufficient skill to work with the technology suggested. Make sure the family has the appropriate physical resources (computer, camera, microphone, broadband connections, appropriate bandwidth for the software to be used, etc.) at home. |
| **Psychological capability** Make sure the child has sufficient attentional skills to manage the interaction online. Make sure the arrangement between the child and the mediator is well described beforehand and that the parent is confident to support the child and knows what will happen when. |
| **Physical opportunity** Make sure the right equipment and space is available to the child to carry out the session. The equipment should be compatible with that operated by the therapist and the space should be free from distractions. |
| **Social opportunity** Consider the role of other family members in the intervention—a network within the family. Consider the possibility of linking children and families together online using an appropriate and safe networking site so that there is mutual benefit and support around the technology and the intervention. |
| **Reflective motivation** Make sure there is a mechanism for testing the child and the parent’s response to the intervention process. In the context of attrition/non-attendance, consider appropriate modifications to the intervention delivery and content. |
| **Automatic motivation** Develop a language around the therapeutic interaction making the process familiar to the child and allowing the child to customize the therapy to make it meaningful to them. Consider the ongoing motivation of the child and parent, perhaps with appropriate reinforcers. |

Discussion

The relatively high number of reviews identified is testimony to the acceptance that evidence-based practice needs to be applied to tele-practice, as it does to all other aspects of interventions for children with communication disabilities. The evidence is certainly promising, but there is still a great deal that needs to be understood. It was possible to map the categories of the COM-B model onto the outcomes of included reviews, but to varying degrees. Physical opportunity and reflective motivation were the categories most addressed by reviews, likely due to their direct influence in tele-practice requiring both the technology and motivation to participate. Overall, the capability categories (physical and psychological) were covered far less than the opportunity categories (physical and social) of the model. This may be a reflection of the relative infancy of tele-practice research, where capability components are overlooked or taken for granted.

By mapping the COM-B categories to the reviews, several recommendations for clinical practice can be made. They can serve as a guide to practitioners when delivering tele-practice interventions and influence behaviour change through increased access, acceptability, and engagement from clients. However, it is also important to be aware of the dynamic nature of behaviour change through increased access, acceptability, and engagement from clients. Therefore, practitioners need to be aware of the requirements of all elements of the COM-B model in their practice, as well as the need to prioritize different aspects at different points of the tele-practice journey. The practitioner may need to be flexible and adapt to the client’s needs and capacity to engage. In the context of attrition/non-attendance, it is important to consider appropriate modifications to the intervention delivery and content. The practitioner should also consider the ongoing motivation of the child and parent, perhaps with appropriate reinforcers.
COM-B categories at the same time, and it is likely that the capacity to meet each one will change over time.

The wider context of COVID-19

It was not the purpose of this review to capture the response to the pandemic more broadly although it is clear that access to technology for remote schooling was very sensitive to family resources (Andrew et al. 2020) and there is a concern that children with communication disabilities, at risk of not receiving vital support services, may miss crucial steps in their development. There are clearly a great many issues involved in this process and for this the reader is referred to the RC-SLT (2020) and American Speech–Language–Hearing Association (ASHA) (2020) for further guidelines and resources.

The role of the young person, their parent/carer and the practitioner

The review has clearly highlighted the crucial role of the parent or carer in tele-practice. Some studies have shown parents successfully engaging in parent–child interaction therapy, but there is limited evidence on their experiences of adopting this new role in the therapy process. Informal feedback suggests that they may find video-conferencing a challenge, perceiving it as invading their private space. The young person’s characteristics are important too. On the one hand, children and young people are likely to be familiar with digital communications and therefore likely to respond to the technology with ease. On the other hand, inequalities of access to the appropriate tools and environment may hinder therapeutic outcomes. It is also often assumed in these reviews that there are no costs of tele-practice to the practitioner, but this narrative overlooks the mental and physical demands associated the delivery of tele-practice interventions for extended periods of time and the well-being of the practitioner needs to be taken into consideration both by the practitioners themselves and their managers.

Tele-practice and technology

One issue that is widely covered in the literature is whether the technology makes a difference to the feasibility, engagement, and therapeutic outcomes. Many technology tools are reported in the reviews selected, with two factors emerging. First, tele-practice interventions are typically compared with face-to-face practice, and no studies attempted to compare two types of tele-practice interventions (although some incorporate hybrid approaches). Second, there appears to be a general recognition that technology is constantly developing, and research is struggling to keep up with this pace. A platform described as ‘state-of-the-art’ in a study soon becomes anachronistic. Clearly the technology that is the most sensitive and responsive to the interactive nature of communication will better facilitate the therapy process.

Tele-practice and ethical considerations

Practitioners must also be aware of ethical issues emerging in tele-practice. There is little mention of these issues across the reviews analysed, with just a few reporting the need for parental consent and none commenting on the children’s perspectives. This is not so much a concern in the intervention studies themselves as they will have received appropriate ethical approvals, but more about the implications in day-to-day clinical practice. While it may be straightforward to infer consent in face-to-face interventions, these assumptions may not hold online. For example, when recording the children’s sessions online, practitioners should consider access, use and storage of this confidential data. These matters must be thoroughly discussed with the parents to ensure informed consent. Special attention should also be given to the choice of the online platforms, especially with regards to their security confidentiality settings. Addressing these ethical concerns, rarely voiced in our reviews, must be an absolute priority in clinical practice in future.

Limitations

Like all systematic reviews, rapid reviews are essentially conservative in reviewing past papers and biases in the original studies are inevitably mirrored in the reviews. The term tele-practice encompasses a variety of different approaches in the literature (e.g., person-to-person contact on screen, remote training of practitioners, etc.), which limits generalizations and transfers across these approaches. The reviews indicate overall acceptance of tele-practice interventions, but participants in these studies may not be representative of practitioners and clients in the wider population, for example, in their access to technology. Therefore, one may have legitimate concerns that intervention studies can over-inflate the effects of their interventions by not transparently reflecting on and addressing these issues. In this review of reviews, several studies were reported in several reviews, and so there is a risk that the effects of individual studies may be unequally weighted. For example, one study was used in six of the 10 selected reviews.
Future research

In the process of developing interventions with the COM-B model, it is important to build up the interventions from their key categories using the Theoretical Domains Framework (TDF) and the Behaviour Change Technique Taxonomy Version 1 (BCTTv1) (Michie et al. 2011). This commonly co-occurs with the COM-B approach within the Behaviour Change Wheel (BCW) (Michie et al. 2014). There would be much to be gained from using these frameworks to systematically appraise intervention studies, to inform the design of new interventions, and even to guide the process of co-designing interventions with parents and children. Moreover, precise recording and monitoring tools can easily be embedded in the context of tele-practice interventions. This not only provides promising opportunities to improve the specificity and replicability of intervention research but can also be used actively to inform practice.

All 10 reviews focused on the tele-practice itself, largely neglecting the attitudes and experiences of the children and their parents. For example, one of the reviews on the use of tele-practice with children with autism (9) identified that tele-practice was not just comparable with traditional face-to-face practice, but actually the children’s preferred mode of service delivery. It would be worth investigating whether the children’s preferences, acceptability and performance associated with tele-practice interventions vary according to their clinical characteristics and whether they potentially lead to improved outcomes.

Finally, it is important to consider the barriers of equitable access to tele-practice interventions. Future research should report their selection criteria in detail and reflect on any selection biases and associated limitations. Transparency on these matters would not only reflect good ethical research practices, but also inform service providers on the variables that can impact access in tele-practice interventions (e.g., internet access, broadband width, tools and platforms, socioeconomic background, etc.). If tele-practice is to be successfully adopted, there is a need to proactively engage with and reflect on the needs and access requirements of all service users and service providers.

Conclusions

The systematic collection of robust data in the field of tele-practice and, by inference, its synthesis has to date proved relatively limited. The COVID-19 pandemic has injected a sense of urgency into the need for such evidence. We have demonstrated that the COM-B model for behaviour change provides a useful framework for understanding tele-practice. Using this model, we identified that this body of literature has provided reasonable evidence into the categories of opportunity and motivation. However, the physical and psychological capability of the children to engage with tele-practice requires further consideration. Key to this is the need for a better understanding the processes of tele-practice and a determination not to compromise on the clinical outcomes when compared with standard models of care.

Tele-practice is clearly here to stay and needs to move into the mainstream of clinical practice. This has significant consequences to the curricula of training programmes specifically for speech and language therapists, which must now cover an understanding of tele-practice alongside face-to-face delivery. National and potentially international professional guidelines need to be agreed and adjusted regularly to keep up to date with latest technology and the emerging evidence base. Yet, in times of such sudden and profound changes, one must be cautious about the narrative of tele-practice being ‘the new normal’ for delivering all speech and language therapy services without the development of the underpinning evidence base. The use of the COM-B model has the potential to inform the evidence-based design and implementation of tele-practice interventions for children and young people with communication disabilities.

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### Table A1. Tele-practice SLT search strategies

| EBSCO (ERIC/CINAHL) Green Thesaurus term, Blue text | PubMed MeSH term, Blue text |
|------------------------------------------------------|-----------------------------|
| (1) Child*                                            | (1) Child*                  |
| (2) Toddler*                                         | (2) Child, Preschool        |
| (3) 1 OR 2                                            | (3) 1 OR 2                  |
| (4) Parent*                                          | (4) Parents                 |
| (5) Therapist*                                       | (5) Telemedicine            |
| (6) Telehealth                                       | (6) Telehealth              |
| (7) Teletherapy                                      | (7) Tele-practice           |
| (8) Telerehabilitation                                | (8) Telerehabilitation      |
| (9) Video equipment                                   | (9) Telecommunications      |
| (10) Video technology                                 | (10) Video equipment        |
| (11) Video technology                                 | (11) Video technology       |
| (12) Video conferencing                               | (12) Video conferencing     |
| (13) 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12    | (13) 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 |
| (14) Speech                                           | (14) Speech                 |
| (15) Language                                         | (15) Language               |
| (16) Speech language pathology                        | (16) Speech–Language Pathology |
| (17) Speech communication                             | (17) Speech Disorders       |
| (18) Speech impairment                                | (18) Language Disorders     |
| (19) Speech therapy                                   | (19) Speech Therapy         |
| (20) 14 OR 15 OR 16 OR 17 OR 18 OR 19                 | (20) 14 OR 15 OR 16 OR 17 OR 18 OR 19 |
| (21) Systematic review                                | (21) 3 AND 13 AND 20        |
| (22) 3 AND 13 AND 19 AND 20                           | Article Type filter—Systematic Review |

| OVID EMBASE 1996–2020 Green subject words, Blue text | OVID Medline 1946–2020 Green subject terms, Blue text |
|------------------------------------------------------|-------------------------------------------------------|
| (1) Child*                                            | (1) Child*                                             |
| (2) Preschool child*                                  | (2) Child Preschool                                    |
| (3) School child*                                     | (3) 1 OR 2                                             |
| (4) Toddler*                                          | (4) Parents                                            |
| (5) 1 OR 2 OR 3 OR 4                                  | (5) Therapist*                                         |
| (6) Parent*                                           | (6) Telemedicine                                       |
| (7) Therapist                                         | (7) Tele-practice                                      |
| (8) Speech Language Pathologist                       | (8) Telerehabilitation                                 |
| (9) Telehealth                                        | (9) Telecommunications                                 |
| (10) Telemedicine                                     | (10) Telehealth                                        |
| (11) Telecommunication                                | (11) Videoconferencing                                 |
| (12) Tele-practice                                    | (12) Video Technology                                  |
| (13) Telerehabilitation                               | (13) Video equipment                                   |
| (14) Video equipment                                  | (14) 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 |
| (15) Video conferencing                               | (15) Speech                                            |
| (16) Video technology                                 | (16) Speech Disorders                                  |
| (17) 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14   | (17) Speech Therapy                                     |
| OR 15 OR 16                                           | (18) Speech–Language Pathology                         |
| (18) Speech                                           | (19) Language                                          |
| (19) ‘Speech and Language’                            | (20) Language Therapy                                  |
| (20) ‘Speech and Language assessment’                 | (21) 15 OR 16 OR 17 OR 18 OR 19 OR 20                  |
| (21) ‘Speech and Language rehabilitation’             | (22) ‘Systematic Review’                               |
| (22) Speech Delay                                     |                                                       |
| (23) Speech Disorder                                  |                                                       |
| (24) Language                                         |                                                       |
| (25) Language therapy                                 |                                                       |
| (26) 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25     |                                                       |
| (27) Systematic review                                 |                                                       |
| (28) 5 AND 17 AND 26 AND 27                           |                                                       |

Continued
| OVID PsychInfo 2002–2020 Green subject terms, Blue free text | Proquest International Bibliography of the Social Sciences (IBSS) |
|-------------------------------------------------------------|---------------------------------------------------------------|
| (1) Child*                                                   | (1) Child*                                                   |
| (2) Preschool children                                      | (2) Toddlers                                                 |
| (3) 1 OR 2                                                   | (3) Preschool children                                       |
| (4) Parents                                                  | (4) 1 OR 2 OR 3                                              |
| (5) Therapists                                               | (5) Parent*                                                  |
| (6) Speech Therapists                                        | (6) Speech therapists                                        |
| (7) Telemedicine                                             | (7) Therapists                                               |
| (8) Telehealth                                               | (8) Telehealth                                               |
| (9) Telecommunications                                       | (9) Tele-practice                                            |
| (10) Tele-practice                                           | (10) Telecommunications                                      |
| (11) Telerehabilitation                                      | (11) Telerehabilitation                                      |
| (12) Videoconferencing                                      | (12) Video conferencing                                      |
| (13) Video-Based Interventions                               | (13) Video equipment                                         |
| (14) 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13     | (14) Web Video                                               |
|                                                           | (15) Video                                                   |
| (15) Language Therapy                                        | (16) 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 |
| (16) Speech Therapy                                          | (17) Speech                                                  |
| (17) Language Delay                                          | (18) Speech Disorders                                        |
| (18) Language Disorders                                      | (19) Speech therapy                                          |
| (19) Speech Language Pathology                               | (20) Language                                                |
| (20) Speech Disorders                                        | (21) Language Disorders                                      |
| (21) 15 OR 16 OR 17 OR 18 OR 19 OR 20                        | (22) Language Impairment                                     |
| (22) Systematic Review                                       | (23) 18 OR 19 OR 20 OR 21 OR 22 OR 23                        |
|                                                           | (24) Systematic review                                       |
|                                                           | (25) 4 AND 8 AND 17 AND 24 AND 25                            |

| Proquest Linguistics and Language Behaviour Abstracts (LLBA) | Proquest Applied Social Sciences Index and Abstracts (ASSIA) |
|-------------------------------------------------------------|---------------------------------------------------------------|
| (1) Children                                                | (1) Child*                                                   |
| (2) Child                                                   | (2) Childhood                                                |
| (3) Preschool Children                                      | (3) Infancy                                                  |
| (4) 1 OR 2 OR 3                                             | (4) Speech disordered children                               |
| (5) Parents                                                 | (5) Preschool children                                       |
| (6) Language therapists                                      | (6) 1 OR 2 OR 3 OR 4 OR 5                                    |
| (7) Speech therapists                                        | (7) Parent*                                                  |
| (8) Speech–language Therapists                              | (8) Speech and language therapists                            |
| (9) Speech/Language Pathologists                            | (9) Speech therapists                                        |
| (10) 5 OR 6 OR 7 OR 8 OR 9                                  | (10) Therapists                                              |
| (11) Telehealth                                             | (11) Tele-practice                                           |
| (12) Tele-practice                                          | (12) Telecommunications                                      |
| (13) Telerehabilitation                                     | (13) Teleconferencing                                       |
| (14) Teleconferencing                                      | (14) Telemedicine                                            |
| (15) Telecommunications                                    | (15) Telehealth                                              |
| (16) Video                                                  | (16) Video systems                                           |
| (17) Videoconferencing                                     | (17) Video therapy                                           |
| (18) Interactive Video                                      | (18) Videoconferencing                                       |
| (19) 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18           | (19) 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 |
| (20) Speech                                                | (20) Speech                                                 |
| (21) Speech Pathology                                       | (21) Speech development                                      |
| (22) Speech Therapy                                         | (22) Speech therapy                                          |
| (23) Language Therapy                                       | (23) Language development                                   |
| (24) 20 OR 21 OR 22 OR 23                                   | (24) Language acquisition                                   |
| (25) Systematic review                                      | (25) Systematic review                                       |
| (26) 4 AND 10 AND 19 AND 24 AND 25                          | (26) 21 OR 22 OR 23 OR 24 OR 25                              |