Online Parent Training for the Initial Management of ADHD Referrals (OPTIMA): Phase 1 - Feasibility of a remote recruitment strategy and usability of the Structured E-Parenting Support (STEPS) app.

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ABSTRACT

Background: The Structured E-Parenting Support (STEPS) app [1] provides support for parents of children with elevated levels of hyperactivity/impulsivity, inattention, and conduct problems, awaiting clinical assessment by child health services. STEPS will be evaluated in a randomised controlled trial (RCT), as part of the OPTIMA research programme in the United Kingdom. Phase 1 of OPTIMA focused on testing the feasibility of participants' recruitment and the app's usability.

Objectives: To (1) adapt a digital routine clinical monitoring system, myHealthE, for research purposes to facilitate waitlist recruitment; (2) test using remote methods to screen and identify participants for the RCT quickly and systematically; (3) pilot the acceptability of the proposed recruitment and assessment protocol; and (4) explore STEPS usability to optimise its value for parents.

Methods: myHealthE was adapted to handle and screen patients' data. Parents and clinicians' feedback on myHealthE was collected and information governance reviews were conducted in clinical services planning to host the RCT. Potential participants for the observational feasibility study were identified from new referrals enrolled on myHealthE and via non-myHealthE methods. Descriptive statistics were used to summarise demographic and outcome variables. We estimated whether the recruitment rate would meet the planned RCT sample size requirements (n = 352). In addition to the feasibility study participants, another group of parents were recruited to assess STEPS usability. They completed the adapted System Usability Scale [2] and responded to open-ended questions about the app, which were coded using the Enlight quality constructs template [3].

Results: 124 potential participants were identified as eligible (121 via myHealthE, 3 via non-myHealthE methods). 107 parents were contacted and 48 consented and were asked if,

hypothetically, they would be willing to take part in the OPTIMA RCT. 21 out of 28 of the feasibility study participants who provided demographic data identified as White (75%). 31 out of 48 children were male (65%) and had an average age of 8.4 years. During the primary recruitment period (June-July 2021), 19 participants per month (84% of all consented) agreed hypothetically to take part in the RCT (95% CI: 13.5 – 26.1), meeting the stop/go criterion of 18 participants per month to proceed with the RCT. All parents were satisfied or very satisfied with the study procedures.

Parents (n=12) recruited to assess STEPS' usability described the app as easy to navigate and use, with an attractive combination of colours and visual design. They described the content as useful, pitched at the right level and presented sensitively. Suggested improvements included adding captions to videos or making the recorded reflections editable.

Conclusions: Remote recruitment and study procedures for testing a parenting intervention app are feasible and acceptable for parents. Parents felt STEPS was a useful and easy-to-use digital parenting support tool.

Trial Registration: The RCT that will be conducted in Phase 2 of the OPTIMA programme has been prospectively registered on 18 November 2021; ISRCTN16523503

Keywords: Parenting intervention; mobile app; ADHD; behaviour problems; mHealth; children; usability

INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental condition with an estimated prevalence of between 2-7% of children worldwide [4, 5]. It is manifested by symptoms of inattention/impulsivity and hyperactivity and is associated with impairment across multiple life domains [6-9]. Over 40% of children with an ADHD diagnosis also display oppositional, disruptive and/or defiant behaviours and meet the criteria for an

oppositional defiant disorder (ODD) diagnosis [10, 11]. Managing this combination of ADHD and ODD is a major challenge for parents [12]. For many parents, it is this combination that motivates them to seek help through a clinical referral to paediatric clinics or child and adolescent mental health services (CAMHS) [13]. Parent training as recommended by the National Institute for Health and Care Excellence (NICE), is the most common evidence-based intervention used to help parents manage their children's disruptive and defiant behaviour [14].

Parent training is traditionally delivered in person by clinically trained professionals. However, universal shortages in healthcare workforces combined with financial challenges facing public health services, mean that parents face substantial waiting times in accessing this kind of support [15]. These considerable delays in access to parent training, increase the risk of further deterioration of the parent-child relationship and the escalation of their child's problems. We have developed a digital mobile phone application, to address this problem. STEPS (Structured E-Parenting Support) [1] was designed to help parents manage the disruptive and defiant behaviour of their children with elevated levels of hyperactivity/impulsivity and inattention symptoms. In comparison with in-person support, STEPS is a low-cost, easy and quick-to-access parenting support intervention, which provides evidence-based advice and support. Its design is inspired by an in-person parent training programme, the New Forest Parenting Programme [16] with content reflecting many years of research about parenting and child behaviour [14, 17-19]. Using audio-visual and graphic elements, STEPS aims to: increase parents' knowledge of children's behaviour problems, build their child's confidence, facilitate effective communication between parents and child and give parents strategies and skills to better manage their child's challenging behaviour.

STEPS is currently being evaluated in a large-scale multi-centre randomised controlled trial (RCT) as a way of delivering support to families of children referred to children's services who are on the waiting list for specialist assessment and treatment. The RCT represents the second phase of the Online Parent Training for the Initial Management of ADHD referrals Programme (OPTIMA RP-PG- 0618-20003). Phase 1 of the OPTIMA programme had four objectives to help prepare for the future RCT.

The first objective was to adapt and implement a digital platform for the remote identification and screening of recently referred families – myHealthE [20]. This is an essential part of OPTIMA as it ensures rapid and systematic screening of ADHD and ODD symptoms in children accepted by clinical services for a wide range of problems and from different referral sources. We asked the question: How does myHealthE need to be adapted so that it can be implemented across a variety of clinical services to support OPTIMA recruitment? Objective two was to test the feasibility of a remote recruitment strategy incorporating myHealthE. Objective three was to test the wider feasibility of the full-scale trial [21]. To achieve objectives two and three, we ran a single-arm non-randomised study. We asked two questions: (1) Can the required number of eligible families be recruited using our remote identification and screening strategy within the planned timeframe to meet sample size requirements and provide sufficient power in the planned RCT? (2) Is the proposed RCT recruitment and assessment approach acceptable to participants? Our fourth objective was to make the final minor updates required to optimise the value of the STEPS app for families. To achieve this objective, we conducted a separate mixed-methods usability evaluation of the STEPS application with a different group of parents of children aged 4-11 years. We asked the questions: (1) What is the experience of parents using the STEPS app? (2) Are there ways they think it can be improved?

METHOD

myHealthE adaptation for OPTIMA (Objective 1)

Adaptation of the platform was conducted based on anecdotal feedback from parents, clinicians, service managers and research governance teams from the participating organisations. This feedback was collected through (1) group meetings with the professionals and the myHealthE team to review the plans and resources required to support implementation and (2) individual interviews with parents who are members of the OPTIMA Patient and Public Involvement and Engagement panel. The initial plan was to integrate myHealthE into the local digital platforms. However, after wide consultation with these stakeholders, it was decided that myHealthE would work better if it was a standalone web application. Depending on the organisation's preference, the flow of patients' personal and clinical information between myHealthE and clinical records would occur either via manual data entry or a process of Robotic Process Automation. Through a set of programmed instructions, the Robotic Process Automation process allows a virtual robot to mimic human front-end tasks, such as manual referral data entry into myHealthE, with high efficiency [22]. This change also enhanced functionality for myHealthE users (i.e., clinicians and clinical administrators) by allowing the use of a report button to generate caregiver and teacher response outcome reports whenever needed. This new report could also be manually uploaded to the patient's electronic clinical notes. Further, the central myHealthE team can provide group clinical outcomes data as an extract on a periodic basis to support business intelligence work, such as outcomes submission to the Mental Health Services Data Set, a repository of information collected via different clinical systems as part of routine patient care, and for the local commissioners. Each organisation received the National Health Service Digital Technology Assessment Criteria pack for myHealthE, which included Data Privacy Impact Assessment and signed the Information Processing Agreements with the lead

organisation. The success of myHealthE implementation as a gateway to STEPS access was measured in terms of both the number of services that adopted the platform and five additional key performance indicators: (1) the number of parents onboarded onto the platform (i.e., their contact details were logged, which triggered the invitation to register with myHealthE), (2) the number who then registered with the platform, (3) the number of those who completed the routine SDQ and (4) provided consent for research contact, and finally, (5) the number of children, whose parents provided consent for research contact, were flagged up as 'OPTIMA-eligible' based on their age, referral date and the SDQ subscale scores for hyperactivity and conduct problems.

Observational feasibility study (Objectives 2 & 3)

Design and setting

This was a single-arm observational feasibility study conducted remotely [21]. Clinical recruitment sites were located in England, in urban areas with catchment populations from a wide range of ethnic and socioeconomic backgrounds. The overall recruitment period covered 2.5 months from mid-May to end of July 2021 with the primary recruitment period restricted to June-July 2021. Participants completed the study questionnaires and accessed the STEPS app using their private device in their preferred setting. The study received ethical approval from London - Riverside Research Ethics Committee on 17 November 2020, reference number 20/LO/1173.

Participants

Participants in the study were parents and teachers. Parents were recruited from four recruitment sites. Three of these sites adopted myHealthE to facilitate trial recruitment. The fourth site used non-digital methods (not myHealthE) to obtain consent for research contact and screen for ADHD and ODD-type symptoms. One further site agreed to support the pilot

and feasibility study but did not recruit any participants. Inclusion criteria specified that participants were parents of new referrals (on waitlist no longer than 6 calendar months; the initial definition for 'new referrals' of being on the waitlist for less than 3 months was modified during the study - modification approved 25 June 2021) of children aged 5 to 11 years that passed the initial triage and had been accepted onto the assessment waiting list but had not yet received a diagnosis of ADHD. The parent had to have rated their child as having a high level of ADHD symptoms (a score of score ≥ 8) and conduct problems (a score ≥ 4) during routine clinical screening with the Strengths and Difficulties Questionnaire (SDQ), a brief questionnaire used to measure symptoms of psychopathology in children and adolescents [23]. Following an initial conversation with researchers, parents were excluded if they lacked access to a suitable electronic device or had an insufficient level of English language, or if a child was under local authority care. Parents meeting eligibility criteria were invited to participate in the study. Those who agreed to participate provided written consent online, including, in most cases, giving consent for the team to contact their child's General Practitioner and school. Reasons for not enrolling in the study were recorded by the study team.

There were no inclusion/exclusion for teachers, but researchers were required to obtain parents' permission for contacting teachers.

Testing feasibility of remote recruitment.

The feasibility of recruiting sufficient participants for the RCT was assessed by asking each study participant a *feasibility question*. More specifically, participants who consented to take part in the observational feasibility study were read a script explaining the proposed design and procedures of the Phase 2 OPTIMA RCT and how it would differ from the current feasibility study. It was explained to participants that taking part in the Phase 2 RCT would involve a longer time commitment than the current study and that they would be randomly

assigned to a group that either received the STEPS app straight away, or would remain on the waitlist without access to the app. Following this explanation, participants were asked to respond "YES" or "NO", if they would be willing to participate in such a study *in principle*.

Power calculations for the planned RCT in Phase 2 of the OPTIMA programme indicated that 13 participants per month would need to be recruited for the trial over the 27-month recruitment period (n = 352) to have sufficient power to test for hypothesised differences on the primary outcome. A more conservative stop/go requirement of 18 participants a month was adopted in the observational feasibility study to take account of potential differences between agreeing in principle in the present feasibility study and actual consent to take part in the OPTIMA RCT. The rate of participants agreeing per month was calculated as the count of participants agreeing in principle to the RCT during the primary feasibility study recruitment period (June-July 2021) with the associated 95% Poisson confidence interval (using an immediate confidence interval command in Stata version 17 specifying a Poisson distribution). We also calculated the proportion of participants agreeing as the number of participants that agreed divided by the number recruited, multiplied by 100.

Piloting the acceptability of the recruitment and assessment protocol

The acceptability of the recruitment and assessment was evaluated by asking parents to provide ratings of satisfaction with consenting procedures and online data collection via the exit questionnaire. In addition, we measured: (1) the time taken to complete remote consenting procedures; (2) the proportion of participants completing all outcome questionnaires within 7 days of receiving a link to online questionnaires out of the number of participants who are in the study; (3) the number of reminder emails about completing outcome questionnaires sent to parents by the research team; (4) the proportion of participants completing the adverse events questionnaire within 7 days of receiving a link to the online questionnaire out of the number of participants who were in the study and (5) the

mean number of reminder emails about completing the adverse events questionnaire sent to parents by the research team. We also assessed the feasibility of collecting data from children's teachers by measuring the time needed to identify teachers and the proportion of teachers' questionnaires returned within 7-days of receiving a link to an online questionnaire out of the number of teachers recruited.

The measures piloted included parent-completed questionnaires: pre-baseline measures to characterise the sample, and outcome measures. The former included the Eyberg Child Behavior Inventory [24], Social Communication Questionnaire [25], and attention deficit and hyperactivity disorder (ADHD) subscale of the Swanson, Nolan, and Pelham Rating Scale [26]. The latter included the O'Leary Parenting Scale [27, 28], the oppositional defiant disorder (ODD) subscale the Swanson, Nolan, and Pelham Rating Scale [26], Parental Sense of Competence [29], the Caregiver Strain Questionnaire [30], and demographic questionnaire, which asked questions about a parent's gender, education and employment status, income, ethnicity, relationship status, the number and ages of other children in the household and whether they have received an ADHD diagnosis. Finally, parents were also asked whether they had received parent training of any type or had any mental health difficulties that required clinical treatment in the prior 6 months. Teachers completed the ODD subscale of the Swanson, Nolan, and Pelham Rating Scale [26] only.

Procedure

Information on the child age, sex, ADHD symptoms and conduct problems was derived from existing referral information. Parents completed questionnaires online using Qualtrics, a secure online data collection platform. Each participant was enrolled in the study for approximately 4 weeks. Those who completed baseline questionnaires were then sent e-mail instructions on how to access the STEPS app. Importantly, they were informed that the use of the app was optional and were not prompted to use it (the plan for the definitive trial is to

monitor and prompt use). Two weeks after baseline questionnaires, parents were sent a link asking them to complete an adverse events questionnaire online. Four weeks after baseline questionnaires, parents were debriefed and asked to complete an exit questionnaire assessing satisfaction with the remote consenting process and the online outcome and adverse events collection procedures. Parents who consented to have their child's teacher contacted, provided teacher contact information so that a Teacher Information Sheet and consent statement could be sent to teachers, along with a link to the teacher online questionnaire.

Data

We recorded baseline demographic information, scale scores from pre-baseline and baseline outcome questionnaires, times taken to complete study procedures, number of reminder emails, satisfaction survey responses, and completion of all online questionnaires within 7 days (number completing as a proportion of the number given access). The number of people who took up the invitation to download the app was also recorded. Safety data were summarised as the number of adverse events and the number of people experiencing adverse events. Pre-baseline and baseline questionnaire scores summaries are presented in Multimedia Appendix 1 (Supplemental Table S1).

STEPS app usability assessment (Objective 4).

Participants

Participants were 12 parents (all female) of children aged 4-11 years recruited from the general population through advertisements on social media as well as through the OPTIMA Patient and Public Involvement and Engagement panel. One further parent took part in the initial session but did not complete the whole study, therefore was subsequently excluded from the sample. The study was approved by [name removed for peer review], reference

number LRS-20/21-21359. Each participant provided written consent online and received a £30 shopping voucher to thank them for their time.

Measures

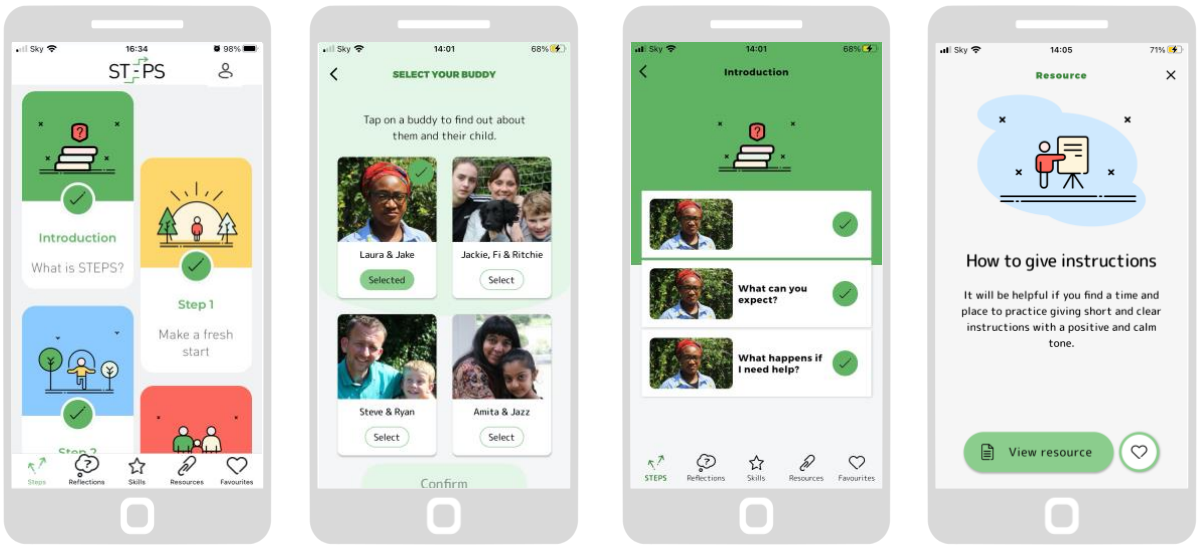
The measures used to fulfil Objective 4 were an adapted System Usability Scale [2], and qualitative data provided through responses to open-ended questions asked in a think-aloud session and follow-up semi-structured interviews. The System Usability Scale is a 10-item questionnaire using a mix of positively and negatively worded items designed to assess the usability of a digital tool (e.g., the ease of use, a user's confidence about using the tool, the perceived amount of technical support that would be required to use the tool, etc.). Responses were made on a 5-point scale ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'. To calculate the overall usability score, 1 is subtracted from each positively worded item and, for the negatively worded items, the individual item score is subtracted from 5, to give a score for each item ranging between 0 and 4, where high scores reflect more positive responses. These item scores are then summed and multiplied by 2.5 to give a total score ranging from 0 to 100.

Open-ended questions probed the participants' first impressions about the app, including its look, feel and navigation, as well as elicited more detailed views about the overall experience of using the app and on each of the elements contained within the app, more specifically.

The STEPS app

A detailed description of the STEPS app is provided in the Multimedia Appendix 2. Because of the unguided nature of the app, a number of design features were implemented in STEPS to improve engagement. First, a 'Buddy', a parent played by an actor, accompanies the user on their journey through STEPS. Upon registering with the app, each user is directed to a screen which provides brief video vignettes of the four available Buddies (see Figure 1) and

is asked to select one. Buddies can be changed an unlimited number of times during subsequent use of the app. Within each module, the selected Buddy provides an overview of the content and then recaps the key points covered. Second, a brief introductory module needs to be completed – here the selected Buddy provides a brief overview of the content and gives advice on how to use STEPS (e.g., take a few days break between the modules, record reflections, etc.). Thirdly, the app has a linear structure to allow users to build up their parenting skills, with a clear visual distinction between the completed modules (and components within each module, Figure 1) and those that are yet to be finished. Users can also make a note of the content that they particularly like or would like to revisit for quick access by including it amongst their favourites. Finally, the content is delivered in short, accessible, 'bite-size' pieces. That is, individual videos or audio clips are no more than 3 minutes long to keep the users engaged and avoid overwhelming them with too much information.



A. STEPS home screen | B. Buddies screen | C. Introduction screen | D. Resources screen

Figure 1. Examples of the STEPS app screens: A. Home screen. B. Buddy selection screen. C. Introduction screen. D. Resources screen.

Procedure

Each participant took part in two remote video sessions facilitated by a trained researcher. In the first, think-aloud, session, participants were asked to download the app, complete a few simple navigation tasks (e.g., select and change a Buddy, watch a video, record a reflection, save an item to favourites, etc.) and speak out loud what came to their mind as they completed these tasks. They also answered questions about their first impressions of STEPS. The second, follow-up, session was scheduled approximately a week later, and the participants were instructed to use the app as much as they could during the intervening time. In the second session, participants were first asked questions about their general mobile phone use and then more detailed questions about their views on the STEPS app. All sessions were audio and video recorded. The automatically generated transcripts were checked, and any identifying information was removed. Participants were also emailed a link to complete the System Usability Scale online via Qualtrics.

Data analyses

The System Usability Scale total and individual item scores were summarised using means and standard deviations. Qualitative data from think-aloud and follow-up sessions were analysed using template analysis method [31]. This is a style of thematic analysis that requires the development of a structured coding template. To align with the themes discussed in the previous relevant studies we adopted a prespecified coding template. Specifically, responses were coded using Enlight quality constructs template developed by Baumel et al. [3]. This template was derived from the systematic review of quality rating criteria for digital health interventions and tested with both mobile phone and web-based interventions and includes the following core constructs:

(1) Usability: the ease of learning how to use the app and the ease of utilising it properly.

(2) Visual design: the look and feel of the app.

(3) User engagement: the extent to which the app's design attracts users to use it.

(4) Content: the content provided or learned while using the app.

(5) Therapeutic persuasiveness: the extent to which the app is designed to encourage positive behaviour changes.

(6) Therapeutic alliance: the ability of the app to create an alliance with the user to motivate change.

(7) Potential: a subjective evaluation of the app's potential to benefit its target users.

RESULTS

myHealthE adaptation (Objective 1)

myHealthE was used by two CAMH and one local authority early behavioural help service. At the end of the overall feasibility recruitment period (31st July 2021), 1,024 patients were onboarded onto the platform, including 952 new referrals and 72 existing patients. Of the new referrals, 768 registered with the platform, 649 completed the routine SDQ and 308 provided consent for research contact. Finally, 121 children, whose parents provided consent for research contact, were flagged up as 'OPTIMA-eligible'.

Observational feasibility study

Participant characteristics

Of 107 eligible referrals, who were approached with an invitation to take part in the study, 104 (97%) were identified by myHealthE and the remaining 3 via non-myHealthE methods. Of 107, 48 (45%) consented to participate in the study (Figure 2). Of the 48 participants, all answered the feasibility question about willingness to participate in principle in an OPTIMA RCT and were given access to the pre-baseline questionnaires, which were completed by 34

(71%) participants. Thirty-eight participants then received access to baseline questionnaires (4 were incorrectly given access), which were completed by 25 participants (66%). These 25 participants were provided with access to the STEPS app (one was given access in error). Of the 25 people who were given access to the app, 21 downloaded it. Of the 24 participants provided with adverse events questionnaire asking about medical and psychological events and difficulties (1 was not provided with it due to the recruitment site closure), there were 15 completers (63%). Information about adverse events reported in the study is included in the Multimedia Appendix 3 (Supplemental Table S2). The same 24 participants were provided with exit questionnaires, with 9 completers (38%). Only one participant out of the total 48 (2%) formally withdrew from the feasibility study due to a house move. Forty out of 48 parents (83%) provided teacher information, and 37 teachers were contacted. Three teachers were not contacted (two due to school holidays preventing contact and one due to a parent requesting a delay to search for an email address for the teacher that was never provided). Only seven out of 37 (19%) teachers completed the questionnaire within the one-week response window.

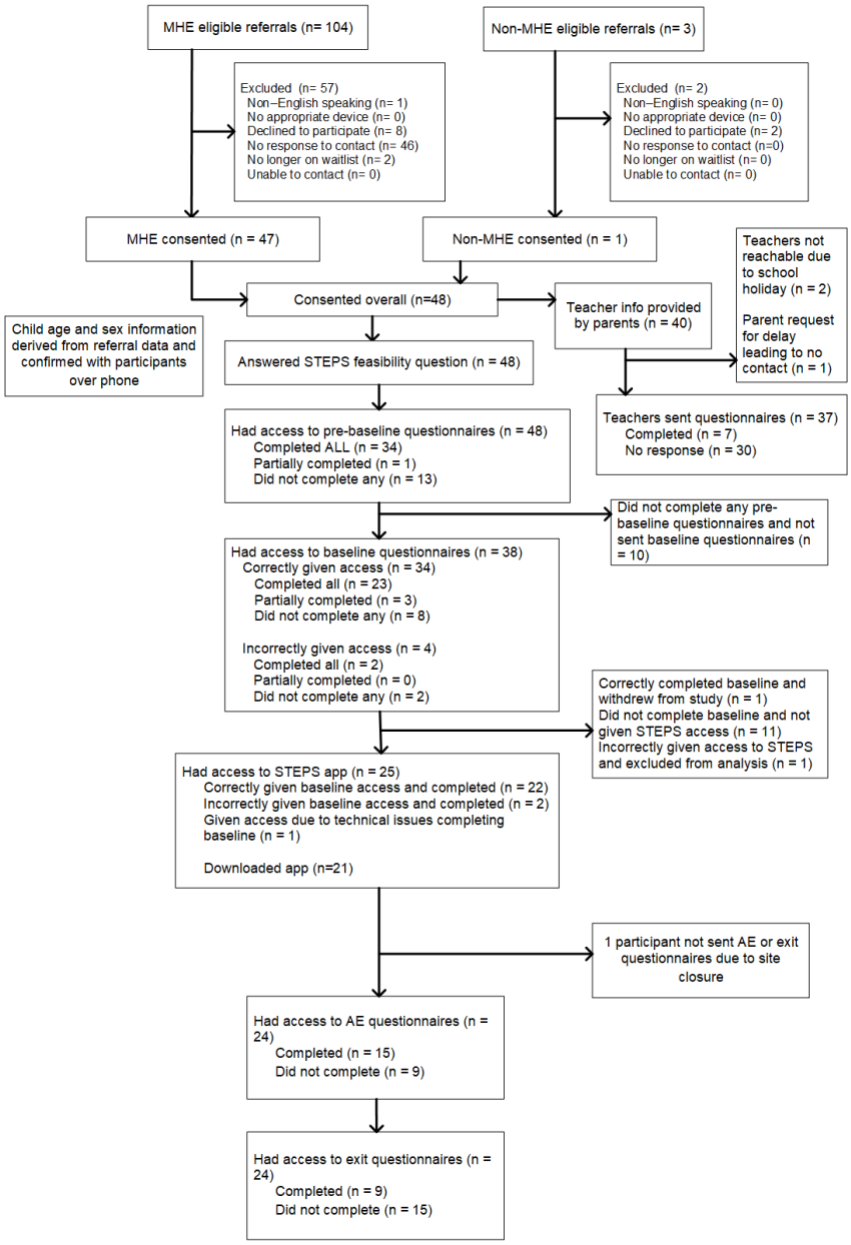


Figure 2. Observational feasibility study CONSORT flowchart.

The mean age of the children in the feasibility participants sample (n = 48) was 8.4 years (SD 1.7) and 31 out of 48 were male (65%). The mean SDQ hyperactivity subscale was 9.5 (SD 0.7) and the mean conduct problems subscale score was 6.2 (SD 1.7). 21 out of 28 parents who provided responses on the demographic questionnaire (75%) were White. 16 of 28 parent respondents were married or in a long-term relationship (57%) and 16 of 28 (57%) had completed GCSE/CSE/O-levels or equivalent qualifications. Participants' demographic information, child ADHD symptoms and conduct problems scores are presented in Table 1.

A summary of clinical outcome measure scores is provided in Supplemental Table S1 in Multimedia Appendix 1.

Table 1. Characteristics of the observational feasibility study participants.

Characteristic	
Child's age, n = 48	
Mean (SD)	8.4 (1.7)
Median (quartiles)	9 (7 – 10)
Child's sex, n = 48	
Female, n (%)	17 (35%)
Male, n (%)	31 (65%)
Child's SDQ hyperactivity subscale score, n = 48	
Mean (SD)	9.5 (0.7)
Median (quartiles)	10 (9 – 10)
Child's SDQ conduct problems subscale score, n = 48	
Mean (SD)	6.2 (1.7)
Median (quartiles)	6 (5 – 7)
Parent ethnicity, n = 28	
Black/Black British, n (%)	6 (21%)
Mixed race - White and Black/Black British, n (%)	1 (4%)
White - British, Irish, other, n (%)	21 (75%)
Parent gender, n = 28	
Female, n (%)	28 (100%)
Parental education, n = 28	
No formal qualifications, n (%)	9 (32%)
Completed GCSE/CSE/O-levels, equivalent, n (%)	16 (57%)
Completed post-16 vocational course, n (%)	2 (7%)
Undergraduate or professional qualification, n (%)	1 (4%)
SES (Income levels), n = 28	

Less than £16,000 a year, n (%)	9 (32%)
£16,000 – £29,999 a year, n (%)	7 (25%)
£30,000 – £59,999 a year, n (%)	11 (39%)
£60,000 or more a year, n (%)	1 (4%)
Parental Marital Status, n = 28	
Single (never married), n (%)	9 (32%)
Married, or in a long-term relationship, n (%)	16 (57%)
Widowed, n (%)	1 (4%)
Divorced, n (%)	1 (4%)
Separated, n (%)	1 (4%)

Findings

Can we recruit sufficient participants using our remote strategy to meet the power needs of the OPTIMA RCT?

All 48 participants answered the feasibility question, with 41 agreeing in principle to take part in an RCT. Focusing on the primary recruitment period (June-July 2021), 38 out of 45 participants agreed in principle to take part in an RCT. This was a rate of 19 participants a month (95% CI: 13.5 – 26.1) which exceeded the conservative stop/go criterion of 18 participants per month set a priori. We note that the lower limit of the confidence interval excludes 13 per month, that is, the less conservative estimate of the number needed from the power calculation. This suggests we will likely be able to recruit more than 13 families per month.

Is the recruitment and assessment protocol acceptable?

On average, the time from a service accepting a referral onto a waitlist to completion of remote consenting by the participant was 51 days (SD = 40). The mean parent rating of

satisfaction with consenting procedures was 4.6 out of 5 (SD = 0.5); 4 out of 9 of parents were ‘satisfied’ (44%) and 5 out of 9 (56%) were ‘very satisfied’.

Of the 38 parents who provided baseline outcome data, 23 (61%) completed all questionnaires within 7 days. The mean number of reminder emails about online data completion sent to parents was 1.1 (SD = 1.6, median = 0, IQR = 0-3). The mean parent rating of satisfaction with online data collection was 4.4 out of 5 (SD = 0.7); 1 out of 9 (11%) selected a ‘neutral’ response, 3 out of 9 (33%) were ‘satisfied’ and 5 out of 9 (56%) were ‘very satisfied’. Finally, 9 out of 24 parents (38%) completed adverse events questionnaires within 7 days and the mean number of reminder emails about adverse events questionnaire completion sent to parents was 0.67 (SD = 0.70). The average time from participant consent date to teacher identification was 1.5 days (SD = 6.3, median = 1; IQR = 0-1) and 7 out of 37 teachers (19%) returned questionnaires within 7 days.

STEPS usability evaluation

Participant characteristics

Of 12 participants, who were recruited specifically for the STEPS usability study, eight worked part- or full-time and four were stay-at-home parents. All participants reported using mobile phones frequently for a variety of purposes, for example, communication, leisure, banking, navigation, or shopping. None reported any general difficulties with using mobile phone technology. Four participants reported less mobile phone use on the weekend, compared with weekdays. The main reason cited for a reduced weekend mobile phone use was ‘family time’.

Findings

System Usability Scale analysis

Parents rated the app's usability as very high; the overall STEPS usability score on the System Usability Scale was 94.8 out of 100 (SD = 4.8). Individual item responses also showed that the participants' experience of using STEPS was positive (Table S3 in Multimedia Appendix 4).

Template analysis of open-ended questions about the app.

(1) Usability

All participants found the app simple to use and straightforward to navigate. Many commented that the app was "*intuitive*", navigation was *"obvious"* and *"self-explanatory"*. Detailed quotes are presented in Supplemental Table S4 in Multimedia Appendix 5. Some participants attributed the ease of use to the fixed linear structure of the app. However, one parent found the need to complete the modules in a fixed order frustrating. Participants found the clear visual distinction between completed and not-completed steps helpful in navigating the app and commented that simple language also improved the usability of the app. Participants made suggestions for improvements, for example, providing captions for videos and transcripts, as well as making the recorded reflections editable. Some also wanted to receive more information about Buddies and their roles.

(2) Visual design

Parents provided very positive feedback about the look and feel of the app. In particular, they commented on the attractive combination of colours and visual design features: *"I really like the look of it, I really like the design and the graphics, they look really classy, but they also just look very professional."* Some participants used the word "friendly" to describe the look and feel of the app: *"It's simple to use and kind of feels nice and modern and friendly"*.

Finally, one participant's comment also suggests that the structure of the app created very positive first impressions about the look and feel: *"I found it made sense and it flowed well. I like the way it's laid out. I think it's going to be easy to use on my first impression, it's certainly not daunting, it's quite clear to understand."*

(3) User engagement

Comments from several participants suggest that receiving information in short 'bite-size' pieces was the key to successful engagement with the app: *[…] and it was also bite-sized amount of information which I liked. It wasn't throwing loads of information at you at once, because obviously that's just overloads yourself [sic], especially if you're busy. I found that quite useful."*

Parents also mentioned that receiving a notification from their Buddy (push notifications) served as a useful reminder to log back into the app: *"If I had like a really busy day and I hadn't looked at it* [the app] *and then I got a notification from my buddy that said about Steps, it was like a little reminder, oh yes, I need to log on and do that and that was actually was [sic] really helpful. It's quite motivating that you've got that little prompt."*

The variety of formats, which included videos, audio clips and text resources, made the app more engaging: *"I liked that there was [sic] different elements, it wasn't all just videos, there was some audio. […] I like the versatility of it and just that there was [sic] different elements, it wasn't just consistently the same thing."*

While the possibility of accessing the app at any time and at any place is created by the general smartphone affordances rather than specifically limited to STEPS, users highlighted such accessibility as an important feature: *"I think it's really useful just to kind of have it in your pocket all the time and to have it readily available."*

Several participants wanted to receive more information about the Reflections feature of the app. Specifically, in relation to the privacy and confidentiality of what is recorded here by users. One participant said that they would "filter" what they would record in Reflections, rather than freely express their thoughts if these were shared with others. Suggestions were also made that while some reflections should be private, it would be useful to be able to choose to share some of these recordings, for example, with a clinician or another professional as *"evidence of the child's behaviour or reflections on what's worked well".*

(4) Content

Participants commented that the content was pitched at the right level and presented in a sensitive way: *"I liked the content I thought it* [expert videos] *was really well written in that it gave you the information that you needed, but it was in a very understandable format and I like again the fact it was a video very relatable, not patronising, I thought it was good."*

The variety of examples included in the app made the content applicable to a wide range of parents, as one participant noted: *"It's quite nice when you first open it* [examples] *that you can just see a range of children and a range of problems of looking like a menu for things and you can sort of spot which ones."*

Participants highlighted the importance of including children's perspectives in the examples and made further suggestions on how to give children more presence in the app. For example, this could be achieved by including real stories of children whose parents used the app successfully, or by creating sections within the app that could be completed by both a parent and a child.

(5) Therapeutic persuasiveness

Participants commented that the aims of STEPS were realistic and the advice straightforward to implement: *"I like the fact that it starts at the very beginning and about reconnecting with*

your child and your relationship with your child and that it works through. I thought the aims were also realistic."

One participant provided an example of how working through the STEPS resources motivated them to reflect on their own situation and to act to effect change: *"I did find them* [resources] *useful. Oh yeah, it was the making quality time for yourself. So, reading through that I actually bought myself a yoga mat in the week 'cause I thought, ok I'm going to sit with my headphones on, forget everything and do that. So yeah, reading through that has made me realise if I'm not at my best because I'm always busy and I'm always doing everything."*

Including children's perspectives in the app's examples was also noted as a factor that may help to motivate change:

"Examples from the children and giving their perspective on things, and I wasn't expecting that, and actually I found that really useful and quite kind of it's almost moving, going and I'm not doing it on purpose and generally don't hear when my mum is telling me to turn off my gaming and that I thought was really, really kind of makes you go oh gosh, yeah [sic]. So, that I think was brilliant having those little bits in, because they are only very short aren't they? I think really quite powerful in a way."

Finally, one parent suggested how reflections could be used to motivate changes by giving users space to write an action plan for which advice/skills to implement:

"The other thing I thought is, the reflections bit at the moment is just getting you to think about stuff but, I wondered from a kind of behaviour change perspective, if whether sometimes that could be used to prompt people to commit to things that they want to try, like what are you going to try this week? Which of these suggestions would be good for you? And how and when are you going to try them out? 'Cause that would then act as something to

stop it just being something that you spent 10 minutes having a quick listen to or look at and then don't do anything with."

(6) Therapeutic alliance

Several participants commented that their Buddies managed to create a sense of personal connection and relatability: *"I think the buddy system is probably my favourite. I've never come across anything like that before…. It makes it easier to connect I think with the buddies."*

They also commented that the inclusion of various examples helped to demonstrate that the app's aims were achievable, and the context was relatable: *"I thought they* [examples] *were really good because they were very accurate and they also made it easier to relate to the Steps programme, because the examples were realistic and were quite common problems that parents would be going through."*

The expert videos also came across as friendly but knowledgeable and the content was delivered using accessible language: *"That's really good. I like that, she's a great speaker. She's very calm. She's not overcomplicating. She's not using loads of jargon and everything which I hate when you start getting into these sorts of things."*

However, the comment from one parent highlighted an important risk that is inherent to unguided parenting interventions, that is, working through the app may create uncomfortable reflections about one's parenting and lead to the feeling of self-blame: *"I think the lady, the doctor that was describing it she was fantastic and she kept it very simple, but sometimes when I was listening to it I felt like oh, not I know that [sic], but it felt like a bit like ok, so everything that's happening in my life […] it felt like it's my fault, like I've not been the best parent up to now."*

(7) Potential

Participants noted the gap in the provision of help and support for parents and thought that the app could help to address some of those unmet needs: *"I think it's a great idea. I have to say I think there is really a gap in parental support […] So actually, to have something that is available absolutely all the time at any point when you need it, I think is really good. I think it's a great way to try and support parents' cause."*

They commented that the app could be helpful to a wide range of parents, regardless of whether their child has received a diagnosis or is on the waitlist: *"I know a lot of parents who've already had their diagnosis and have literally just been given a diagnosis and said congratulations off you go now and that's it [sic]. With no help or support. Just there you go, and they would really benefit from this. So, it would be great if it was more widely available. But also, yes for that for that waiting period it's horrendous and you do know nothing."*

Finally, the app could also be helpful to parents of children who do not have clinical-level needs: *"I think every parent is looking for something like this, because we all struggled […] And of course, parenting is such a difficult thing and there is lots of scope in it, you know to improve yourself, so I think it is giving me a very positive vibe [sic]. In helping myself and my child to manage the behaviour and the steps don't look complicated."*

DISCUSSION

This paper reported on Phase 1 of the OPTIMA programme of research. It had four objectives concerning adaptation and testing the feasibility of the screening and waitlist recruitment strategy facilitated by the myHealthE platform, piloting the acceptability of the proposed remote recruitment and assessment protocol, and exploring the usability of the STEPS mobile app to optimise its functionality for parents. Overall, our findings were positive and demonstrated that the planned recruitment strategy and the assessment protocol were feasible and acceptable to participants. Usability data also supported the use of STEPS to provide

support for families on the child health services waitlist and provided useful recommendations for minor modifications to the app.

Our findings showed that myHealthE could be successfully adapted and used across the three different child health services in the UK. To support timely implementation, the original plan to make the platform interoperable with the local clinical patient records systems had to be modified and myHealthE was implemented as a standalone desktop application that could be accessed via a web browser. This adaptation did not compromise the platform's clinical utility in terms of monitoring patient-reported outcomes, as individual reports could be easily generated by the clinic staff. Crucially, myHealthE provided a systematic and efficient way for researchers to screen and identify eligible families from the waitlist of the participating services without the need to involve members of the clinical care team. Traditional approaches require that a patient's (or, in the case of under-16s, their parent's) consent for research contact is obtained by a clinician and recorded in clinical notes. These are subsequently manually screened to identify potentially eligible participants. Such a process is not only time-consuming, with resulting delays in contact, but also means that clinicians act as the main gatekeepers to providing access to research opportunities. For families on the waitlist, who have very limited or no contact with clinicians until their first assessment appointment, this could be a substantial barrier to being involved in research. Compared with these traditional approaches, myHealthE permitted a straightforward and convenient way of obtaining consent for research contact and facilitated the timely and efficient recruitment of participants from the services waitlist into the study.

Our remote recruitment strategy was also successful. During the primary feasibility study recruitment period, 45 participants consented to take part in the study and 38 of those agreed *in principle* to take part in the RCT, exceeding our conservative assumption of 18 participants per month. This suggests that we should comfortably achieve our planned RCT recruitment

target of 13 participants per month. This finding is important for two reasons. First, meeting trial recruitment targets is essential to ensuring the success of a trial. Second, recruitment from health services can be very challenging (even more so, when participants are recruited from the waitlist), and a substantial proportion of trials either experience delays leading to higher research costs or are stopped due to poor recruitment [32]. It could be that using remote approaches, such as the one adopted in the present study, that give participants the maximum flexibility of completing consenting procedures at the time and place that is convenient to them, help to overcome some of the key barriers to successful recruitment. Importantly, remote recruitment and assessments were also acceptable to parents. Those who provided exit questionnaire data were either satisfied or very satisfied with the study procedures. In addition, the feasibility study provided an important learning opportunity for the research team. We did uncover some errors in the study procedures, such as participants receiving access to online questionnaires or to the app when they should not have. Becoming aware of these potential issues during the feasibility study will help us to develop clear operating procedures to minimise the risk of making errors in the RCT.

Finally, the STEPS app received high usability ratings and parents provided very positive feedback about the app. Participants found the app easy to navigate (mainly thanks to the clear linear structure) and visually attractive. They appreciated easy-to-understand language, clear of psychological jargon and found it useful to have information presented in a varied format (i.e., text, video, and audio). Many parents emphasised that it was helpful to have information presented in short, ‘bite-size’ pieces that could be accessed when they had a few spare minutes (e.g., when waiting to collect their child after school). While some parents found the functionality which allowed them to record reflections useful, a few expressed concerns about the confidentiality of recording their private thoughts within the app. The key recommendation for changes to the app included making improvements to the process of app

registration, making resources shareable, improving video playback, and adding captions to videos.

The use of digitally mediated approaches to identification, recruitment and data collection is efficient from the researchers' point of view and convenient for many participants. We established that myHealthE provided an effective method for screening and participant identification and that our remote recruitment and assessment strategy was feasible and acceptable. However, adopting digital methods may have resulted in a sample that overrepresented those with a high level of digital skills. Moreover, access to myHealthE and the STEPS app relies on having access to a device that is connected the internet, which some families may not have. Ultimately, these families would not be able to access and potentially benefit from the intervention. Research suggests that it is often those already at a disadvantage because of education and employment opportunities, income, disability, or geographical location, who are most likely to be excluded from digital access [33]. If not managed carefully, this may further widen existing health inequalities. Furthermore, we should acknowledge here that the eligibility requirement that study participants have a reasonable understanding of English has inevitably led to the exclusion of parents from linguistically (and culturally) diverse background. Researchers adopting digital methods of recruitment and those developing mobile phone interventions should consider the impact of digital competence and language exclusion on the generalisability and reach of their findings.

This study has demonstrated that digital screening and remote recruitment from child clinical services' waiting lists are feasible. It is also timely, efficient and minimises the burden on the clinical teams, who are typically substantially involved when non-digital recruitment methods are used. Such procedures are also acceptable to participants. Usability data indicate that STEPS has the potential as a way of delivering parenting support for parents of children with ADHD-type symptoms.

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Authors' contributions

ESB is the OPTIMA Chief Investigator and led the original study conceptualisation, the design of Phase 1 of OPTIMA and the writing of the paper with KKA. KKA was responsible for coordinating the observational feasibility and usability studies and analysed the usability study data. CB, BF and EH were responsible for enrolling participants and administering outcome measures and coordinating recruitment in the observational feasibility study. CB co-

coordinated the usability study with KKA. ES, SC, DD, JD contributed to the conception and design of the study and are responsible for liaising with clinical services. JD led on the myHealthE adaptation and implementation. JK contributed to the conception and design of the observational feasibility study and is responsible for overseeing research activities in the Southampton trial centre. KS and CLH are responsible for overseeing research activities in the Nottingham trial centre. NL provides administrative support for the project and for the patient and public involvement activities. KG contributed to the conception and design of the observational feasibility study and supervised feasibility study data analysis. PC conducted feasibility study data analyses. SB contributed to the conception and design of the observational feasibility study and will be responsible for the design and implementation of the economic component of the study. JS contributed to the design of the economic component of the overall programme of research, including the design of the economic measure of service use. MT contributed to the conception and design of the observational feasibility study and the STEPS app development. HK and CG contributed to the conception and design of the observational feasibility study. All authors have read and approved the final version of this manuscript.

Conflicts of Interest

In the last three years SC declares honoraria and reimbursement for travel and accommodation expenses for lectures from the following non-profit associations: Association for Child and Adolescent Central Health (ACAMH), Canadian ADHD Alliance Resource (CADDRA),and the British Association of Pharmacology (BAP), for educational activity on ADHD. DD declares educational talks for Medice and Shire/Takeda. Advisory board attendance for Shire/Takeda. Educational travel from Shire/Takeda, and Medice. He has also received royalties from the sale of a self-help version of the New Forest Parenting Programme on which STEPS is based, payments for providing training on NFPP, non-monetary support from Qb

Tech and research funding from NIHR. ESB declares speaker fees and conference support from Takeda and Medice, honoraria from the Journal of Child Psychology & Psychiatry and Aarhus University and research support from QBTech, MRC, ESRC, NIHR, Waterloo Foundation, Shanly Foundation.

Abbreviations

ADHD	Attention/Deficit-Hyperactivity Disorder
NIHR	National Institute for Health Research
ODD	Oppositional Defiant Disorder
OPTIMA	Online Parent Training for the Initial Management of ADHD Referrals
SDQ	The Strengths and Difficulties Questionnaire
STEPS	Structured E-Parenting Support

Multimedia Appendices

Multimedia Appendix 1: Pre-baseline and baseline questionnaire scores summaries.

Multimedia Appendix 2: The STEPS app.

Multimedia Appendix 3. Adverse event (AE) and serious adverse event (SAE) summary metrics.

Multimedia Appendix 4. The System Usability Scale individual item scores.

Multimedia Appendix 5. Additional quotes from the usability interviews.

References

1. Team O. STEPS animation. 2023.
2. Brooke J. SUS-A quick and dirty usability scale. Usability evaluation in industry. 1996;189(194):4-7.
3. Baumel A, Faber K, Mathur N, Kane JM, Muench F. Enlight: a comprehensive quality and therapeutic potential evaluation tool for mobile and web-based eHealth interventions. Journal of medical Internet research. 2017;19(3):e7270.

4. Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual Research Review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. Journal of Child Psychology and Psychiatry. 2015;56(3):345-65. doi: https://doi.org/10.1111/jcpp.12381.
5. Sayal K, Prasad V, Daley D, Ford T, Coghill D. ADHD in children and young people: prevalence, care pathways, and service provision. The Lancet Psychiatry. 2018 2018/02/01/;5(2):175-86. doi: https://doi.org/10.1016/S2215-0366(17)30167-0.
6. Erskine HE, Ferrari AJ, Nelson P, Polanczyk GV, Flaxman AD, Vos T, et al. Research Review: Epidemiological modelling of attention-deficit/hyperactivity disorder and conduct disorder for the Global Burden of Disease Study 2010. Journal of Child Psychology and Psychiatry. 2013;54(12):1263-74.
7. Fletcher JM. The effects of childhood ADHD on adult labor market outcomes. Health economics. 2014;23(2):159-81.
8. Moyá J, Stringaris AK, Asherson P, Sandberg S, Taylor E. The impact of persisting hyperactivity on social relationships: A community-based, controlled 20-year follow-up study. Journal of attention disorders. 2014;18(1):52-60.
9. Polderman T, Boomsma D, Bartels M, Verhulst F, Huizink A. A systematic review of prospective studies on attention problems and academic achievement. Acta Psychiatrica Scandinavica. 2010;122(4):271-84.
10. Jensen PS, Martin D, Cantwell DP. Comorbidity in ADHD: implications for research, practice, and DSM-V. Journal of the American Academy of Child & Adolescent Psychiatry. 1997;36(8):1065-79.
11. Tung I, Li JJ, Meza JI, Jezior KL, Kianmahd JSV, Hentschel PG, et al. Patterns of Comorbidity Among Girls With ADHD: A Meta-analysis. Pediatrics. 2016;138(4). doi: 10.1542/peds.2016-0430.
12. Theule J, Wiener J, Rogers MA, Marton I. Predicting parenting stress in families of children with ADHD: Parent and contextual factors. Journal of Child and Family studies. 2011;20(5):640-7.
13. Woodward L, Dowdney L, Taylor E. Child and Family Factors Influencing the Clinical Referral of Children with Hyperactivity: A Research Note. Journal of Child Psychology and Psychiatry. 1997;38(4):479-85. doi: https://doi.org/10.1111/j.1469-7610.1997.tb01533.x.
14. Daley D, Van Der Oord S, Ferrin M, Cortese S, Danckaerts M, Doepfner M, et al. Practitioner review: current best practice in the use of parent training and other behavioural interventions in the treatment of children and adolescents with attention deficit hyperactivity disorder. Journal of Child Psychology and Psychiatry. 2018;59(9):932-47.
15. Children Af. Parenting services under pressure: Unequal access to early years support in England. 2022 [20 February 2023]; Available from: https://media.actionforchildren.org.uk/documents/Parenting_services_under_pressure.pdf.
16. Sonuga-Barke EJ, Thompson M, Abikoff H, Klein R, Brotman LM. Nonpharmacological interventions for preschoolers with ADHD: the case for specialized parent training. Infants & Young Children. 2006;19(2):142-53.
17. Sonuga-Barke EJ, Barton J, Daley D, Hutchings J, Maishman T, Raftery J, et al. A comparison of the clinical effectiveness and cost of specialised individually delivered parent training for preschool attention-deficit/hyperactivity disorder and a generic, group-based programme: a multi-centre, randomised controlled trial of the New Forest Parenting Programme versus Incredible Years. European child & adolescent psychiatry. 2018;27(6):797-809.
18. Thompson MJ, Laver-Bradbury C, Ayres M, Le Poidevin E, Mead S, Dodds C, et al. A small-scale randomized controlled trial of the revised new forest parenting programme for preschoolers with attention deficit hyperactivity disorder. European child & adolescent psychiatry. 2009;18(10):605-16.
19. van der Oord S, Tripp G. How to Improve Behavioral Parent and Teacher Training for Children with ADHD: Integrating Empirical Research on Learning and Motivation into Treatment. Clinical Child and Family Psychology Review. 2020 2020/12/01;23(4):577-604. doi: 10.1007/s10567-020-00327-z.

20. Morris AC, Ibrahim Z, Heslin M, Moghraby OS, Stringaris A, Grant IM, et al. Assessing the feasibility of a web-based outcome measurement system in child and adolescent mental health services–myHealthE a randomised controlled feasibility pilot study. Child and Adolescent Mental Health. 2021.
21. Kostyrka-Allchorne K, Ballard C, Byford S, Cortese S, Daley D, Downs J, et al. The feasibility of a strategy for the remote recruitment, consenting and assessment of recent referrals: a protocol for phase 1 of the On-Line Parent Training for the Initial Management of ADHD referrals (OPTIMA). Pilot and Feasibility Studies. 2022 2022/01/03;8(1):1. doi: 10.1186/s40814-021-00959-0.
22. Morris AC, Ibrahim Z, Moghraby OS, Stringaris A, Grant IM, Zalewski L, et al. Moving from development to implementation of digital innovations within the NHS: myHealthE, a remote monitoring system for tracking patient outcomes in child and adolescent mental health services. medRxiv. 2021:2021.06.09.21257998. doi: 10.1101/2021.06.09.21257998.
23. Goodman R. The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness and consequent burden. The Journal of Child Psychology and Psychiatry and Allied Disciplines. 1999;40(5):791-9.
24. Eyberg SM, Ross AW. Assessment of child behavior problems: The validation of a new inventory. Journal of Clinical Child & Adolescent Psychology. 1978;7(2):113-6.
25. Berument SK, Rutter M, Lord C, Pickles A, Bailey A. Autism screening questionnaire: diagnostic validity. The British Journal of Psychiatry. 1999;175(5):444-51.
26. Swanson JM, Kraemer HC, Hinshaw SP, Arnold LE, Conners CK, Abikoff HB, et al. Clinical relevance of the primary findings of the MTA: Success rates based on severity of ADHD and ODD symptoms at the end of treatment. Journal of the American Academy of Child & Adolescent Psychiatry. 2001.
27. Arnold DS, O'Leary SG, Wolff LS, Acker MM. The Parenting Scale: a measure of dysfunctional parenting in discipline situations. Psychological assessment. 1993;5(2):137.
28. Rhoades KA, O'Leary SG. Factor structure and validity of the parenting scale. Journal of Clinical Child and Adolescent Psychology. 2007;36(2):137-46.
29. Ohan JL, Leung DW, Johnston C. The Parenting Sense of Competence scale: Evidence of a stable factor structure and validity. Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement. 2000;32:251-61. doi: 10.1037/h0087122.
30. Brannan AM, Heflinger CA, Bickman L. The Caregiver Strain Questionnaire:Measuring the Impact on the Family of Living with a Child with Serious Emotional Disturbance. Journal of Emotional and Behavioral Disorders. 1997;5(4):212-22. doi: 10.1177/106342669700500404.
31. Brooks J, McCluskey S, Turley E, King N. The Utility of Template Analysis in Qualitative Psychology Research. Qual Res Psychol. 2015 2015/04//;12(2):202-22. PMID: 27499705. doi: 10.1080/14780887.2014.955224.
32. Treweek S, Lockhart P, Pitkethly M, Cook JA, Kjeldstrøm M, Johansen M, et al. Methods to improve recruitment to randomised controlled trials: Cochrane systematic review and meta-analysis. BMJ Open. 2013;3(2):e002360. doi: 10.1136/bmjopen-2012-002360.
33. Ofcom. Digital exclusion: a review of Ofcom's research on digital exclusion among adults in the UK. 2022.