TITLE: Implementing participation-focused services: a study to develop the Method for using Audit and Feedback in Participation Implementation (MAPi)

SHORT TITLE: Audit and Feedback in Participation Implementation

ABSTRACT

Background: It is widely agreed that children's services should use participation-focused practice but that implementation is challenging. This paper describes a method for using audit and feedback, an evidence-based knowledge translation strategy, to support implementation of participation-focused practice in front-line services, to identify barriers to implementation, and to enable international benchmarking of implementation and barriers.

Method: Best-practice guidelines for using audit and feedback were followed. For audit, participation-focused practice was specified as clinicians' three observable behaviours: (i) targets participation outcomes; (ii) involves child/parent in setting participation outcomes; and (iii) measures progress towards participation outcomes. For barrier identification, the Theoretical Domains Framework Questionnaire (TDFQ) of known implementation barriers was used. A cycle of audit and barrier identification was piloted in three services (n=25 clinicians) in a large UK healthcare trust. From each clinician, up to five randomly sampled case note sets were audited (total n=122), and the clinicians were invited to complete the TDFQ. For feedback, data on the behaviours and barriers were shared visually and verbally with managers and clinicians to inform action planning.

Results: A Method for using Audit and feedback for Participation implementation (MAPi) was developed. The MAPi audit template captured clinicians' practices: clinicians targeted participation in 37/122 (30.3%) of the sampled cases; involved child/parent in 16/122 (13.1%); and measured progress in 24/122 (19.7%). Barriers identified from the TDFQ and fed back to managers and clinicians included: clinicians' skills in participation-focused behaviours [Medians 3.00-5.00 (IQRs 2.25-6.00)]; social processes [4.00 (3.00-5.00)]; and behavioural regulation [4.00-5.00 (3.00-6.00)].

Conclusions: MAPi provides a practical, off-the-shelf method for front-line services to investigate and support their implementation of participation-focused practice. Furthermore, as a shared, consistent template MAPi provides a method for generating cumulative and comparable, across-services evidence about levels and trends of implementation and about enduring barriers to implementation, to inform future implementation strategies.

KEY MESSAGES:

- Audit and feedback is an evidence-based knowledge translation strategy but its use requires adaptation to the specific practice(s) under implementation.
- The present study developed a practical method called MAPi for using audit and feedback to support the implementation of participation-focused practices.
- MAPi provides front-line services an off-the-shelf approach to audit and feedback, and to identification of implementation barriers.
- MAPi also provides a template for use in larger-scale benchmarking of participation-focused practices across services, countries, and time.

INTRODUCTION

It is widely agreed that children's services need to be participation-focused i.e. to focus on children's involvement in life situations as a core outcome (Allard et al., 2014; Department of Health, 2012, 2013; World Health Organization, 2001). The past two decades have seen a drive to develop concepts, tools, evidence, and interventions related to participation outcomes e.g. (Adair et al., 2018; Arakelyan, Maciver, Rush, O'Hare, & Forsyth, 2019; Imms et al., 2016; Imms et al., 2017; Kolehmainen et al., 2015; Reedman, Boyd, & Sakzewski, 2017). However, anecdotal evidence and research reports suggest that front-line services find implementation of participation-focused practices challenging (Anaby et al., 2017). Further work is needed to support the implementation of participation-focused practices in everyday service delivery.

Audit and feedback (A+F) is an evidence-based implementation strategy shown to be effective at changing practice. A Cochrane review of 140 randomised controlled trials across many clinical conditions and settings around the world found that A+F can have large, positive effects on practice (Ivers et al., 2012). The review, and subsequent international consensus work (Ivers et al., 2014), concluded that to achieve such effects requires for A+F to be applied appropriately, with attention to its underlying principles. As such, while A+F is an evidence-based, generic implementation strategy, it is not an off-the-shelf template that can be readily picked up by front-line services. Its use requires decisions about how to practically apply it in relation to the target practice, and knowledge about the principles underpinning its effectiveness.

Effective A+F consists of four components (Ivers et al., 2014). First, specification of the target practice so that it is clearly articulated and aligned with personal and organizational priorities. Second, ensuring that the target practice is amenable to feedback, and the people receiving the A+F are capable and responsible for making changes to the target practice. Third, the audit requires valid data on recent performance by the people being audited, with new data collected over time. Fourth, the feedback needs to be multi-modal (e.g. text and talking, or text and graphics); presented to the people whose practice is desired to change; come from a trusted source; and include comparison data with others.

Use of A+F benefits from further plans to address discrepancies between the target practice and actual practice. 'Barrier identification', i.e. identification of barriers and facilitators to implementation, enables this (Colquhoun, Squires, Kolehmainen, Fraser, & Grimshaw, 2017). Several frameworks and checklists of barriers to and facilitators of implementation have been published, varying in focus, length, complexity and extent of use (Flottorp et al., 2013). One of the most commonly used is the Theoretical Domains Framework (TDF) (Cane, O'Connor, & Michie, 2012; Francis, Michie, Johnston, Hardeman, & Eccles, 2005), an established consensus framework of conceptually defined, theory-based, modifiable explanatory variables ('constructs') which have been shown to explain healthcare professionals' practice across settings. The TDF has an accompanying questionnaire, the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg, Gebhardt, Crone, Dusseldorp, & Presseau, 2014; Huijg, Gebhardt, Dusseldorp, et al., 2014), which consists of item stems that can be adapted to

measure people's views about specific target behaviours (see methods). Overall, the TDF provides a scientifically sound and practical tool to inform barriers identification in a healthcare context.

The present study aimed to develop a practical, off-the-shelf method of A+F, and complementary barrier identification, to (i) support the implementation of participation-focused practices by front-line services, and (ii) provide a protocol for generating cumulative and comparable evidence about implementation and related barriers across services, countries and time. The former was to enable local real-time advancement while the latter was to facilitate wider collective learning, development, and sharing of expertise.

METHODS

We conceptualised implementation of participation-focused practices as human action behaviour, and used behavioural and implementation sciences methods with attention to the four key components of effective A+F (above). First, to clearly specify the target practice, we articulated 'participation-focused service' as three observable clinician practice behaviours, and specified them for measurement using the TACT (Target, Action, Context, and Time) (Fishbein, 1963) as recommended for improving the validity and reliability of measurement in studies of human behaviour. The three behaviours were:

1. Clinician targets participation outcomes through interventions.
2. Clinician involves children and/or parents in identifying and deciding on specific participation outcomes.
3. Clinician measures participation outcomes.

These three behaviours have wide professional and organisational support as articulated by national healthcare policies and professional discourse, and we anticipated the behaviours to align with personal and organisational priorities. For all three behaviours the timeline was set as "in the past nine months", which was judged to be short enough to still constitute recent performance while being long enough to cover a full care episode (Kolehmainen, 2009). For all three behaviours, context was set as "at any situation in any point of the care process". As such, the case note data assessed spanned a 9-month period of the child's therapy process and all recorded interactions, goals, and environments within that period.

Second, we assumed that the target behaviours are, in principle, amenable to feedback to clinicians and within the responsibilities of the clinicians. Third, to further facilitate valid data collection, we developed an audit template with guidance notes to assess the presence of the target behaviours in case notes (Supplemental File). We built on a template and decision rules that had been successfully applied in two previous, large-scale, multisite projects of similar target behaviours (Kolehmainen, 2009; Kolehmainen et al., 2012), and piloted the resulting template and guidance notes. The piloting consisted of one clinician new to the data extraction (JM) and one researcher from the previous two studies (NK): independently extracting data from case notes; comparing the extracted data; discussing discrepancies; revising the guidance notes based on the discussion; and undertaking further extraction.

Cycles of 2-3 case note sets were carried out for a total 12 cases, at which point the guidance notes provided sufficient detail for the data extraction to be consistent.

In forming the guidance notes, a major focus of discussion was the classification of outcomes as 'participation'. We operationalised participation as 'involvement in life situations' using the World Health Organisation's definition (World Health Organization, 2001), while being mindful of the challenges related to disentangling participation from 'activity', 'capability', and 'skills' (Coster & Khetani, 2008). We were acutely aware that several, different well-founded proposals for ways to operationalise the concept of participation, and to differentiate it from other closely related concepts, have been made (Colver, 2009; Imms et al., 2016; Imms et al., 2017; Johnston & Dixon, 2014; McConachie, Colver, Forsyth, Jarvis, & Parkinson, 2006; Whiteneck, 2010). We were also mindful that a conclusive agreement remains still to be reached. For the present study, two key considerations were the strong messages from our stakeholders about the importance of: producing a practical audit template that would be simple to use in routine care; and ensuring the audit captures the implementation efforts already made, even if imperfect. The underlying message about the former was that a complex template would simply never be used, and about the latter that any audit perceived to overestimate (or "exaggerate") the implementation problem would be very likely to disengage the front-line teams already struggling with implementation. After much discussion, we decided that the primary focus for the present audit method should be whether there is evidence of implementation of *any* participation-focused practices, taking the broadest possible interpretation of participation assessed as leniently as possible. We accepted that this would very likely classify some activity, capacity, capability, and skills as participation, and fall short of the state-of-art operationalisations. However, in discussion with stakeholders we felt that this was a necessary compromise in order to achieve front-line feasibility. To explore the impact of this decision we also recorded verbatim examples of both included and excluded participation outcomes (see Results).

We subsequently applied the audit template with children's physical therapists, occupational therapists, and speech and language therapists in one of the largest NHS Trusts in the UK. The Trust has 1.72 million patient contacts per year, offers care across pathways from community to acute and regional specialist services, and is closely affiliated with two local universities. The audit was registered in the Trust's audit database. It collected anonymous patient data, and thus did not require a NHS Research Ethics Committee approval. Across the three groups of therapists, all qualified clinicians who worked in community or outpatients AND saw children with neurodisabilities at the time of the data collection, from 5th December 2015 to 28th January 2016, were eligible and invited into the study. From each participating clinician's caseload, up to five cases were sampled using a computer-generated random number table. Cases were eligible if the child: was 0-18 years AND had a neurodisability AND had been seen by an included clinician at least once in the previous 9 months. New cases continued to be sampled until five cases per clinician had been identified, or until the clinician had no more eligible cases, whichever came first. Neurodisability was defined using a published consensus definition, referring to a group of congenital or acquired long-term conditions that are attributed to impairment of the brain and/or neuromuscular system and create functional limitations (Morris, Janssens, Tomlinson, Williams, & Logan, 2013). According to that definition, specific diagnoses may not be identified, and conditions may vary over time, occur

alone or in combination, and include a broad range of severity and complexity. Using this definition, eligible cases included but were not limited to children with cerebral palsy, development co-ordination disorder, verbal dyspraxia, and autism. Case note data were also collected on the child's month and year of birth (to estimate age), and broad diagnostic category (see results). The case note data were extracted by an experienced community therapist (JM). It was accepted that case note recording styles differed between and even within therapists, and that relevant data could be documented in various locations within case notes. Data were thus sought throughout the notes and included in the audit regardless of where in the notes they were located or how they were recorded.

To collect data on therapists' views about barriers to and facilitators of implementation, we used the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg, Gebhardt, Crone, et al., 2014; Huijg, Gebhardt, Dusseldorp, et al., 2014). The DIBQ consists of validated item stems related to individual TDF constructs, which can be applied to elicit professionals' views about specified practices. Using selected item stems, the participating therapists rated their views about the three target practices across the TDF constructs, with response options ranging from 1 to 7, where 1=strongly disagree, 7=strongly agree. For the full DIBQ with the item stems as applied in relation to the target behaviours in the present study, please see Supplemental File. In addition to the DIBQ items, respondents also had an opportunity to add free text comments. The questionnaire was distributed to the participating therapists two weeks prior to the case note audit, and therapists completed it prior to the audit.

Both the case note and questionnaire data were summarised for aggregate scores across therapists, and reported descriptively using median and IQR, as the data were skewed. For data management, Microsoft Excel and SPSS were used. The descriptive use of data reflects common front-line audits contexts, and thus simulated the situations in which the template is intended to be used. The DIBQ barrier data were not powered to assess correlations between any reported barriers and implementation, and the study was not powered for analyses of how service, therapist, or child characteristics may influence implementation.

As the final, fourth step of the audit and feedback (as above), the results from the audit were fed back to the three service managers and the respective clinicians, alongside the key messages about the implementation facilitators and barriers from the DIBQ. Both verbal and visual feedback were used, and the managers and team members were invited to generate action plans for next implementation steps as part of the discussion.

RESULTS

The audit and feedback development steps resulted in a practical, off-the-shelf Method for using Audit and Feedback for Participation implementation (MAPi) that incorporates barrier identification. Twenty five therapists participated in the use of MAPi, including all eligible physical (n=12) and occupational therapists (n=10), and a sample of speech and language therapists (n=3). The therapists had been in practice 3-38 years (median=15 years, interquartile range [IQR]=8-26), and most had worked with children for over a decade (median=11 years, IQR=7-18).

Across the 25 therapists, 122 children's case note sets were included. The children's average age was eight years (median=101 months, IQR=48-157). Nine children had no recorded medical condition; 27 had a developmental delay (including speech delay); 25 had cerebral palsy; 21 had autism, Asperger Syndrome, Tourette's Syndrome, or attention difficulties; seven had developmental co-ordination disorder or verbal dyspraxia; and 43 had another condition (e.g. spina bifida, muscular dystrophy, or a rare syndrome).

From the included cases, 16/25 therapists had targeted participation outcomes through interventions in a total of 37/122 (30.3%) cases. These outcomes covered a range of participation domains (Table 1), and varied in the extent to which they were embedded in life situations. Some outcomes were explicitly framed in the context of life situations, e.g. "maintain standing to play bubbles with sister", while for others e.g. "improve walking with K-walker" the life situation was implied elsewhere in the case notes. Outcomes classified as not participation were characterised by focus on the child's capacity in therapy settings, e.g. for the child to take "two side steps in either direction" or "to reduce sensory seeking behaviour". In classifying outcomes, it was clear that sometimes simple executions of tasks or actions *in a life situation* reflected participation, and were included. For example, a young baby turning their head towards others and smiling in everyday social interactions was meaningfully described as participation.

ADD TABLE 1 HERE.

There was evidence of 12/25 therapists involving children and/or parents in deciding participation outcomes (in a total of 16/122 cases, 13.1%), and 12/25 therapists measuring participation outcomes (in a total of 24/122, 19.7%) cases. Measuring outcomes was through informal recording of progress (13/24), the Canadian Occupational Performance Measure (7/24), and/or Goal Attainment Scaling (5/24).

The DIBQ responses (Table 2) provided key messages about facilitators and barriers related to implementation. Specifically, therapists: (a) had largely positive beliefs about the consequences of the three practices, e.g. they perceived all three target practices as having benefits for patient care, to the therapists themselves and to their employing organisation; (b) perceived the practices as being part of their professional role; (c) reported knowing what the practices meant and the departmental processes for implementing them; and (d) had high intentions to carry the practices out. Of these, (a), (b) and (d) indicated support for the first and second assumptions concerning effective audit and feedback use, i.e. that the target behaviours aligned with clinicians' and organisational priorities and the clinicians' role responsibilities. Therapists also reported: (e) a lack of practical skills to undertake the three behaviours; (f) low positive social influence (social norms, expectations, environmental support, and recognition) to carry out the three behaviours; and (g) limited behavioural regulation (use of implementation plans and self-monitoring) to translate their high intentions to actual implementation. Of these, (e) indicated that further practical skills training for clinicians may be needed to enable clinicians to change their performance of the practices. Point (f) indicated that there was scope for more practical demonstrations of the in-principle organisational/team

prioritisation of the target behaviours. Point (g) indicated that repeated audit and feedback cycles could be an appropriate implementation strategy for this clinical team as regular audit and feedback can be particularly effective in translating intentions to action.

ADD TABLE 2 HERE

The audit results were fed back to the service managers and the clinical teams, alongside the key messages about facilitators and barriers. The results were fed back verbally, alongside visual feedback (Supplemental File). Throughout, the managers and team members were invited to discuss how these results could inform the next implementation steps.

DISCUSSION

The present study developed a practical, off-the-shelf method for using A+F to (i) support the implementation of participation-focused services by the services themselves, and (ii) provide a protocol for generating cumulative evidence about levels and trends of implementation and related barriers across services, countries and time. The resulting Method for using Audit and feedback for Participation implementation, MAPi, is a combination of audit, barrier identification, and feedback. Using the MAPi audit template, we found that therapists targeted participation outcomes in less than a third of cases, these outcomes were rarely decided together with children or parents, and the progress towards these outcomes was rarely monitored. Using the MAPi questionnaire, we identified key facilitators of implementation, namely that therapists reported a generally positive orientation and intention towards participation-focused practice behaviours. We also identified barriers, namely a lack of skills, social support, and behavioural regulation to translate the positive orientation and intentions to practice. These formed clear MAPi feedback messages to inform services' further implementation plans.

The main challenge in the present study related to judgements about what should be considered 'participation'. To adopt a conservative approach to estimating implementation problems, we classified outcomes leniently as participation. The results suggest that, as anticipated, this approach classified some skills and capacity as participation, but also that in some situations capacity, skills and participation are closely intertwined and difficult to disentangle. The use of MAPi in only one organization, and a lack of formal evaluation of its usefulness, was a further limitation. To mitigate this, the therapist-sample was diverse in terms of professional backgrounds, practice contexts, and expertise; and we subsequently encouraged others to use the MAPi and provide feedback on its usefulness and feasibility (Graham, Timothy, & Williman, 2019).

MAPi provides a practical way for front-line services to audit their implementation of participation-focused practices, and to identify discrete, theory-based implementation barriers. The rates of implementation that MAPi picked up were broadly similar to the levels found among Canadian rehabilitation professionals (Anaby et al., 2017). Collectively, these two studies suggest that implementation challenges remain substantial. This supports

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our decision to assess implementation very leniently, as setting the standard too high compared to the current implementation would likely disengage services from implementation altogether (Carver & Scheier, 2001).

The present study, and MAPi, are the first time where A+F is systematically operationalised for use in implementing participation-focused practices in children's therapy services. It is also the second ever study to seek to systematically implement participation-focused practices. The other study so far was a qualitative evaluation of strategies to increase therapists' positive orientation towards, and intentions to implement, participation-focused practice (Anaby, Korner-Bitensky, Law, & Cormier, 2015). Our study indicates positive orientation and intention may not be universally relevant targets for practice change as practitioners may already have positive orientations and intentions; and that further techniques to target post-intentional factors such as skills and behavioural regulation are needed. By enabling off-the-shelf A+F, MAPi makes this post-intentional implementation interventions accessible for front-line services. Furthermore, by providing a consistent protocol that can, in principle, be used by a wider network of teams, MAPi provides a method for collaborative practice change through repeated, shared A+F cycles.

The international child health community remains committed to participation-focused practice, and collective actions to advance implementation are starting to emerge. As examples, F-words Tools (CanChild, 2019) have provided templates for parents, professionals and schools for discussing participation-oriented concepts, and the CountMeIn! grassroots network has brought together stakeholders interested in research to address implementation challenges. As collective actions advance, it will be important to evaluate the impact of different strategies on implementation. MAPi provides a protocol for collecting such information in a comparable way across services, countries and time. This enables large-scale, international evidence generation to inform implementation and further research. For example, a cumulative, large data set across organisations, countries, cultures and time would enable robust investigations of the relationships between different implementation factors across therapist-, patient-, organisational- and wider contextual-levels, and provide a platform for further evaluating the impacts of participation-focused practices on child and family outcomes, and costs and benefits.

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Table 1. Illustrative examples of participation outcomes identified and targeted by therapists, presented according to the degree to which they include a life situation

Outcome domain	Examples of included outcomes with limited description of life situations	Examples of included outcomes that mention a targeted life situation	Examples of outcomes embedded within wider life situations and life goals
Moving around life situations [n=15]	▪ Improve walking with K-walker. ▪ Walk further without pain. ▪ Walk up and down stairs independently. ▪ To have head control in sitting & prone.	▪ To walk from her class with quad sticks. ▪ To roll from back to side when playing. ▪ To be able to walk further with friends without getting tired.	▪ Move independently on floor (…) to follow siblings at home. ▪ Maintain standing to play bubbles with sister.
Education [n=12]	▪ Increase writing speed. ▪ Complete writing tasks. ▪ Express himself in writing. ▪ Improve handwriting.	▪ Position resources e.g. piece into puzzle, during table activity in school. ▪ Handwriting in school. ▪ Use spoken language in class discussions.	▪ Participate fully in PE lesson. ▪ Engage in classroom activities. ▪ To recognise self-regulatory activities that can help him engage in lessons.
Recreation and leisure [n=12] incl. play, sports, socialising	▪ Use his trike. ▪ Ride a bike. ▪ Swimming. ▪ Walk with a push along toy. ▪ To improve ability to use his games console.	▪ Dancing or doing a physical activity. ▪ Grasp a toy whilst playing. ▪ Participate in fine motor play e.g. jigsaws, lego.	▪ Start a physical exercise activity she enjoys. ▪ Sporting activities in the local area to promote general motor development ▪ To be fully included in football games with peers during breaks.
Communicate, interact and do things with other people [n=8]	▪ Use full phrases to describe pictures. ▪ Create a short spoken report to describe a picture sequence.	▪ Conversation practice with adults at home and school.	▪ See friends at external activities. ▪ Attend Jehovah's Witness meeting.
Self-care [n=13] incl. dress, eat, drink, prepare meals, shop, hygiene	▪ To tie laces independently. ▪ Wipe himself. ▪ Take increased amounts of fluid via a bottle, accept tastes. ▪ Maintain grasp of a cup with both hands when taking a drink. ▪ To make a hot drink. ▪ Using cutlery.	▪ Practice dressing skills at weekends ▪ Buying items.	▪ To brush hair in preparation to go out.

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SHORT TITLE: Audit and Feedback in Participation Implementation

ABSTRACT

Background: It is widely agreed that children's services should use participation-focused practice but that implementation is challenging. This paper describes a method for using audit and feedback, an evidence-based knowledge translation strategy, to support implementation of participation-focused practice in front-line services, to identify barriers to implementation, and to enable international benchmarking of implementation and barriers.

Method: Best-practice guidelines for using audit and feedback were followed. For audit, participation-focused practice was specified as clinicians' three observable behaviours: (i) targets participation outcomes; (ii) involves child/parent in setting participation outcomes; and (iii) measures progress towards participation outcomes. For barrier identification, the Theoretical Domains Framework Questionnaire (TDFQ) of known implementation barriers was used. A cycle of audit and barrier identification was piloted in three services (n=25 clinicians) in a large UK healthcare trust. From each clinician, up to five randomly sampled case note sets were audited (total n=122), and the clinicians were invited to complete the TDFQ. For feedback, data on the behaviours and barriers were shared visually and verbally with managers and clinicians to inform action planning.

Results: A Method for using Audit and feedback for Participation implementation (MAPi) was developed. The MAPi audit template captured clinicians' practices: clinicians targeted participation in 37/122 (30.3%) of the sampled cases; involved child/parent in 16/122 (13.1%); and measured progress in 24/122 (19.7%). Barriers identified from the TDFQ and fed back to managers and clinicians included: clinicians' skills in participation-focused behaviours [Medians 3.00-5.00 (IQRs 2.25-6.00)]; social processes [4.00 (3.00-5.00)]; and behavioural regulation [4.00-5.00 (3.00-6.00)].

Conclusions: MAPi provides a practical, off-the-shelf method for front-line services to investigate and support their implementation of participation-focused practice. Furthermore, as a shared, consistent template MAPi provides a method for generating cumulative and comparable, across-services evidence about levels and trends of implementation and about enduring barriers to implementation, to inform future implementation strategies.

KEY MESSAGES:

- Audit and feedback is an evidence-based knowledge translation strategy but its use requires adaptation to the specific practice(s) under implementation.
- The present study developed a practical method called MAPi for using audit and feedback to support the implementation of participation-focused practices.
- MAPi provides front-line services an off-the-shelf approach to audit and feedback, and to identification of implementation barriers.
- MAPi also provides a template for use in larger-scale benchmarking of participation-focused practices across services, countries, and time.

INTRODUCTION

It is widely agreed that children's services need to be participation-focused i.e. to focus on children's involvement in life situations as a core outcome (Allard et al., 2014; Department of Health, 2012, 2013; World Health Organization, 2001). The past two decades have seen a drive to develop concepts, tools, evidence, and interventions related to participation outcomes e.g. (Adair et al., 2018; Arakelyan, Maciver, Rush, O'Hare, & Forsyth, 2019; Imms et al., 2016; Imms et al., 2017; Kolehmainen et al., 2015; Reedman, Boyd, & Sakzewski, 2017). However, anecdotal evidence and research reports suggest that front-line services find implementation of participation-focused practices challenging (Anaby et al., 2017). Further work is needed to support the implementation of participation-focused practices in everyday service delivery.

Audit and feedback (A+F) is an evidence-based implementation strategy shown to be effective at changing practice. A Cochrane review of 140 randomised controlled trials across many clinical conditions and settings around the world found that A+F can have large, positive effects on practice (Ivers et al., 2012). The review, and subsequent international consensus work (Ivers et al., 2014), concluded that to achieve such effects requires for A+F to be applied appropriately, with attention to its underlying principles. As such, while A+F is an evidence-based, generic implementation strategy, it is not an off-the-shelf template that can be readily picked up by front-line services. Its use requires decisions about how to practically apply it in relation to the target practice, and knowledge about the principles underpinning its effectiveness.

Effective A+F consists of four components (Ivers et al., 2014). First, specification of the target practice so that it is clearly articulated and aligned with personal and organizational priorities. Second, ensuring that the target practice is amenable to feedback, and the people receiving the A+F are capable and responsible for making changes to the target practice. Third, the audit requires valid data on recent performance by the people being audited, with new data collected over time. Fourth, the feedback needs to be multi-modal (e.g. text and talking, or text and graphics); presented to the people whose practice is desired to change; come from a trusted source; and include comparison data with others.

Use of A+F benefits from further plans to address discrepancies between the target practice and actual practice. 'Barrier identification', i.e. identification of barriers and facilitators to implementation, enables this (Colquhoun, Squires, Kolehmainen, Fraser, & Grimshaw, 2017). Several frameworks and checklists of barriers to and facilitators of implementation have been published, varying in focus, length, complexity and extent of use (Flottorp et al., 2013). One of the most commonly used is the Theoretical Domains Framework (TDF) (Cane, O'Connor, & Michie, 2012; Francis, Michie, Johnston, Hardeman, & Eccles, 2005), an established consensus framework of conceptually defined, theory-based, modifiable explanatory variables ('constructs') which have been shown to explain healthcare professionals' practice across settings. The TDF has an accompanying questionnaire, the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg, Gebhardt, Crone, Dusseldorp, & Presseau, 2014; Huijg, Gebhardt, Dusseldorp, et al., 2014), which consists of item stems that can be adapted to

measure people's views about specific target behaviours (see methods). Overall, the TDF provides a scientifically sound and practical tool to inform barriers identification in a healthcare context.

The present study aimed to develop a practical, off-the-shelf method of A+F, and complementary barrier identification, to (i) support the implementation of participation-focused practices by front-line services, and (ii) provide a protocol for generating cumulative and comparable evidence about implementation and related barriers across services, countries and time. The former was to enable local real-time advancement while the latter was to facilitate wider collective learning, development, and sharing of expertise.

METHODS

We conceptualised implementation of participation-focused practices as human action behaviour, and used behavioural and implementation sciences methods with attention to the four key components of effective A+F (above). First, to clearly specify the target practice, we articulated 'participation-focused service' as three observable clinician practice behaviours, and specified them for measurement using the TACT (Target, Action, Context, and Time) (Fishbein, 1963) as recommended for improving the validity and reliability of measurement in studies of human behaviour. The three behaviours were:

1. Clinician targets participation outcomes through interventions.
2. Clinician involves children and/or parents in identifying and deciding on specific participation outcomes.
3. Clinician measures participation outcomes.

These three behaviours have wide professional and organisational support as articulated by national healthcare policies and professional discourse, and we anticipated the behaviours to align with personal and organisational priorities. For all three behaviours the timeline was set as "in the past nine months", which was judged to be short enough to still constitute recent performance while being long enough to cover a full care episode (Kolehmainen, 2009). For all three behaviours, context was set as "at any situation in any point of the care process". As such, the case note data assessed spanned a 9-month period of the child's therapy process and all recorded interactions, goals, and environments within that period.

Second, we assumed that the target behaviours are, in principle, amenable to feedback to clinicians and within the responsibilities of the clinicians. Third, to further facilitate valid data collection, we developed an audit template with guidance notes to assess the presence of the target behaviours in case notes (Supplemental File). We built on a template and decision rules that had been successfully applied in two previous, large-scale, multisite projects of similar target behaviours (Kolehmainen, 2009; Kolehmainen et al., 2012), and piloted the resulting template and guidance notes. The piloting consisted of one clinician new to the data extraction (JM) and one researcher from the previous two studies (NK): independently extracting data from case notes; comparing the extracted data; discussing discrepancies; revising the guidance notes based on the discussion; and undertaking further extraction.

Cycles of 2-3 case note sets were carried out for a total 12 cases, at which point the guidance notes provided sufficient detail for the data extraction to be consistent.

In forming the guidance notes, a major focus of discussion was the classification of outcomes as 'participation'. We operationalised participation as 'involvement in life situations' using the World Health Organisation's definition (World Health Organization, 2001), while being mindful of the challenges related to disentangling participation from 'activity', 'capability', and 'skills' (Coster & Khetani, 2008). We were acutely aware that several, different well-founded proposals for ways to operationalise the concept of participation, and to differentiate it from other closely related concepts, have been made (Colver, 2009; Imms et al., 2016; Imms et al., 2017; Johnston & Dixon, 2014; McConachie, Colver, Forsyth, Jarvis, & Parkinson, 2006; Whiteneck, 2010). We were also mindful that a conclusive agreement remains still to be reached. For the present study, two key considerations were the strong messages from our stakeholders about the importance of: producing a practical audit template that would be simple to use in routine care; and ensuring the audit captures the implementation efforts already made, even if imperfect. The underlying message about the former was that a complex template would simply never be used, and about the latter that any audit perceived to overestimate (or "exaggerate") the implementation problem would be very likely to disengage the front-line teams already struggling with implementation. After much discussion, we decided that the primary focus for the present audit method should be whether there is evidence of implementation of *any* participation-focused practices, taking the broadest possible interpretation of participation assessed as leniently as possible. We accepted that this would very likely classify some activity, capacity, capability, and skills as participation, and fall short of the state-of-art operationalisations. However, in discussion with stakeholders we felt that this was a necessary compromise in order to achieve front-line feasibility. To explore the impact of this decision we also recorded verbatim examples of both included and excluded participation outcomes (see Results).

We subsequently applied the audit template with children's physical therapists, occupational therapists, and speech and language therapists in one of the largest NHS Trusts in the UK. The Trust has 1.72 million patient contacts per year, offers care across pathways from community to acute and regional specialist services, and is closely affiliated with two local universities. The audit was registered in the Trust's audit database. It collected anonymous patient data, and thus did not require a NHS Research Ethics Committee approval. Across the three groups of therapists, all qualified clinicians who worked in community or outpatients AND saw children with neurodisabilities at the time of the data collection, from 5th December 2015 to 28th January 2016, were eligible and invited into the study. From each participating clinician's caseload, up to five cases were sampled using a computer-generated random number table. Cases were eligible if the child: was 0-18 years AND had a neurodisability AND had been seen by an included clinician at least once in the previous 9 months. New cases continued to be sampled until five cases per clinician had been identified, or until the clinician had no more eligible cases, whichever came first. Neurodisability was defined using a published consensus definition, referring to a group of congenital or acquired long-term conditions that are attributed to impairment of the brain and/or neuromuscular system and create functional limitations (Morris, Janssens, Tomlinson, Williams, & Logan, 2013). According to that definition, specific diagnoses may not be identified, and conditions may vary over time, occur

alone or in combination, and include a broad range of severity and complexity. Using this definition, eligible cases included but were not limited to children with cerebral palsy, development co-ordination disorder, verbal dyspraxia, and autism. Case note data were also collected on the child's month and year of birth (to estimate age), and broad diagnostic category (see results). The case note data were extracted by an experienced community therapist (JM). It was accepted that case note recording styles differed between and even within therapists, and that relevant data could be documented in various locations within case notes. Data were thus sought throughout the notes and included in the audit regardless of where in the notes they were located or how they were recorded.

To collect data on therapists' views about barriers to and facilitators of implementation, we used the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg, Gebhardt, Crone, et al., 2014; Huijg, Gebhardt, Dusseldorp, et al., 2014). The DIBQ consists of validated item stems related to individual TDF constructs, which can be applied to elicit professionals' views about specified practices. Using selected item stems, the participating therapists rated their views about the three target practices across the TDF constructs, with response options ranging from 1 to 7, where 1=strongly disagree, 7=strongly agree. For the full DIBQ with the item stems as applied in relation to the target behaviours in the present study, please see Supplemental File. In addition to the DIBQ items, respondents also had an opportunity to add free text comments. The questionnaire was distributed to the participating therapists two weeks prior to the case note audit, and therapists completed it prior to the audit.

Both the case note and questionnaire data were summarised for aggregate scores across therapists, and reported descriptively using median and IQR, as the data were skewed. For data management, Microsoft Excel and SPSS were used. The descriptive use of data reflects common front-line audits contexts, and thus simulated the situations in which the template is intended to be used. The DIBQ barrier data were not powered to assess correlations between any reported barriers and implementation, and the study was not powered for analyses of how service, therapist, or child characteristics may influence implementation.

As the final, fourth step of the audit and feedback (as above), the results from the audit were fed back to the three service managers and the respective clinicians, alongside the key messages about the implementation facilitators and barriers from the DIBQ. Both verbal and visual feedback were used, and the managers and team members were invited to generate action plans for next implementation steps as part of the discussion.

RESULTS

The audit and feedback development steps resulted in a practical, off-the-shelf Method for using Audit and Feedback for Participation implementation (MAPi) that incorporates barrier identification. Twenty five therapists participated in the use of MAPi, including all eligible physical (n=12) and occupational therapists (n=10), and a sample of speech and language therapists (n=3). The therapists had been in practice 3-38 years (median=15 years, interquartile range [IQR]=8-26), and most had worked with children for over a decade (median=11 years, IQR=7-18).

Across the 25 therapists, 122 children's case note sets were included. The children's average age was eight years (median=101 months, IQR=48-157). Nine children had no recorded medical condition; 27 had a developmental delay (including speech delay); 25 had cerebral palsy; 21 had autism, Asperger Syndrome, Tourette's Syndrome, or attention difficulties; seven had developmental co-ordination disorder or verbal dyspraxia; and 43 had another condition (e.g. spina bifida, muscular dystrophy, or a rare syndrome).

From the included cases, 16/25 therapists had targeted participation outcomes through interventions in a total of 37/122 (30.3%) cases. These outcomes covered a range of participation domains (Table 1), and varied in the extent to which they were embedded in life situations. Some outcomes were explicitly framed in the context of life situations, e.g. "maintain standing to play bubbles with sister", while for others e.g. "improve walking with K-walker" the life situation was implied elsewhere in the case notes. Outcomes classified as not participation were characterised by focus on the child's capacity in therapy settings, e.g. for the child to take "two side steps in either direction" or "to reduce sensory seeking behaviour". In classifying outcomes, it was clear that sometimes simple executions of tasks or actions *in a life situation* reflected participation, and were included. For example, a young baby turning their head towards others and smiling in everyday social interactions was meaningfully described as participation.

ADD TABLE 1 HERE.

There was evidence of 12/25 therapists involving children and/or parents in deciding participation outcomes (in a total of 16/122 cases, 13.1%), and 12/25 therapists measuring participation outcomes (in a total of 24/122, 19.7%) cases. Measuring outcomes was through informal recording of progress (13/24), the Canadian Occupational Performance Measure (7/24), and/or Goal Attainment Scaling (5/24).

The DIBQ responses (Table 2) provided key messages about facilitators and barriers related to implementation. Specifically, therapists: (a) had largely positive beliefs about the consequences of the three practices, e.g. they perceived all three target practices as having benefits for patient care, to the therapists themselves and to their employing organisation; (b) perceived the practices as being part of their professional role; (c) reported knowing what the practices meant and the departmental processes for implementing them; and (d) had high intentions to carry the practices out. Of these, (a), (b) and (d) indicated support for the first and second assumptions concerning effective audit and feedback use, i.e. that the target behaviours aligned with clinicians' and organisational priorities and the clinicians' role responsibilities. Therapists also reported: (e) a lack of practical skills to undertake the three behaviours; (f) low positive social influence (social norms, expectations, environmental support, and recognition) to carry out the three behaviours; and (g) limited behavioural regulation (use of implementation plans and self-monitoring) to translate their high intentions to actual implementation. Of these, (e) indicated that further practical skills training for clinicians may be needed to enable clinicians to change their performance of the practices. Point (f) indicated that there was scope for more practical demonstrations of the in-principle organisational/team

prioritisation of the target behaviours. Point (g) indicated that repeated audit and feedback cycles could be an appropriate implementation strategy for this clinical team as regular audit and feedback can be particularly effective in translating intentions to action.

ADD TABLE 2 HERE

The audit results were fed back to the service managers and the clinical teams, alongside the key messages about facilitators and barriers. The results were fed back verbally, alongside visual feedback (Supplemental File). Throughout, the managers and team members were invited to discuss how these results could inform the next implementation steps.

DISCUSSION

The present study developed a practical, off-the-shelf method for using A+F to (i) support the implementation of participation-focused services by the services themselves, and (ii) provide a protocol for generating cumulative evidence about levels and trends of implementation and related barriers across services, countries and time. The resulting Method for using Audit and feedback for Participation implementation, MAPi, is a combination of audit, barrier identification, and feedback. Using the MAPi audit template, we found that therapists targeted participation outcomes in less than a third of cases, these outcomes were rarely decided together with children or parents, and the progress towards these outcomes was rarely monitored. Using the MAPi questionnaire, we identified key facilitators of implementation, namely that therapists reported a generally positive orientation and intention towards participation-focused practice behaviours. We also identified barriers, namely a lack of skills, social support, and behavioural regulation to translate the positive orientation and intentions to practice. These formed clear MAPi feedback messages to inform services' further implementation plans.

The main challenge in the present study related to judgements about what should be considered 'participation'. To adopt a conservative approach to estimating implementation problems, we classified outcomes leniently as participation. The results suggest that, as anticipated, this approach classified some skills and capacity as participation, but also that in some situations capacity, skills and participation are closely intertwined and difficult to disentangle. The use of MAPi in only one organization, and a lack of formal evaluation of its usefulness, was a further limitation. To mitigate this, the therapist-sample was diverse in terms of professional backgrounds, practice contexts, and expertise; and we subsequently encouraged others to use the MAPi and provide feedback on its usefulness and feasibility (Graham, Timothy, & Williman, 2019).

MAPi provides a practical way for front-line services to audit their implementation of participation-focused practices, and to identify discrete, theory-based implementation barriers. The rates of implementation that MAPi picked up were broadly similar to the levels found among Canadian rehabilitation professionals (Anaby et al., 2017). Collectively, these two studies suggest that implementation challenges remain substantial. This supports

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our decision to assess implementation very leniently, as setting the standard too high compared to the current implementation would likely disengage services from implementation altogether (Carver & Scheier, 2001).

The present study, and MAPi, are the first time where A+F is systematically operationalised for use in implementing participation-focused practices in children's therapy services. It is also the second ever study to seek to systematically implement participation-focused practices. The other study so far was a qualitative evaluation of strategies to increase therapists' positive orientation towards, and intentions to implement, participation-focused practice (Anaby, Korner-Bitensky, Law, & Cormier, 2015). Our study indicates positive orientation and intention may not be universally relevant targets for practice change as practitioners may already have positive orientations and intentions; and that further techniques to target post-intentional factors such as skills and behavioural regulation are needed. By enabling off-the-shelf A+F, MAPi makes this post-intentional implementation interventions accessible for front-line services. Furthermore, by providing a consistent protocol that can, in principle, be used by a wider network of teams, MAPi provides a method for collaborative practice change through repeated, shared A+F cycles.

The international child health community remains committed to participation-focused practice, and collective actions to advance implementation are starting to emerge. As examples, F-words Tools (CanChild, 2019) have provided templates for parents, professionals and schools for discussing participation-oriented concepts, and the CountMeIn! grassroots network has brought together stakeholders interested in research to address implementation challenges. As collective actions advance, it will be important to evaluate the impact of different strategies on implementation. MAPi provides a protocol for collecting such information in a comparable way across services, countries and time. This enables large-scale, international evidence generation to inform implementation and further research. For example, a cumulative, large data set across organisations, countries, cultures and time would enable robust investigations of the relationships between different implementation factors across therapist-, patient-, organisational- and wider contextual-levels, and provide a platform for further evaluating the impacts of participation-focused practices on child and family outcomes, and costs and benefits.

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TABLES

Table 1. Illustrative examples of participation outcomes identified and targeted by therapists, presented according to the degree to which they include a life situation

Outcome domain	Examples of included outcomes with limited description of life situations	Examples of included outcomes that mention a targeted life situation	Examples of outcomes embedded within wider life situations and life goals
Moving around life situations [n=15]	▪ Improve walking with K-walker. ▪ Walk further without pain. ▪ Walk up and down stairs independently. ▪ To have head control in sitting & prone.	▪ To walk from her class with quad sticks. ▪ To roll from back to side when playing. ▪ To be able to walk further with friends without getting tired.	▪ Move independently on floor (…) to follow siblings at home. ▪ Maintain standing to play bubbles with sister.
Education [n=12]	▪ Increase writing speed. ▪ Complete writing tasks. ▪ Express himself in writing. ▪ Improve handwriting.	▪ Position resources e.g. piece into puzzle, during table activity in school. ▪ Handwriting in school. ▪ Use spoken language in class discussions.	▪ Participate fully in PE lesson. ▪ Engage in classroom activities. ▪ To recognise self-regulatory activities that can help him engage in lessons.
Recreation and leisure [n=12] incl. play, sports, socialising	▪ Use his trike. ▪ Ride a bike. ▪ Swimming. ▪ Walk with a push along toy. ▪ To improve ability to use his games console.	▪ Dancing or doing a physical activity. ▪ Grasp a toy whilst playing. ▪ Participate in fine motor play e.g. jigsaws, lego.	▪ Start a physical exercise activity she enjoys. ▪ Sporting activities in the local area to promote general motor development ▪ To be fully included in football games with peers during breaks.
Communicate, interact and do things with other people [n=8]	▪ Use full phrases to describe pictures. ▪ Create a short spoken report to describe a picture sequence.	▪ Conversation practice with adults at home and school.	▪ See friends at external activities. ▪ Attend Jehovah's Witness meeting.
Self-care [n=13] incl. dress, eat, drink, prepare meals, shop, hygiene	▪ To tie laces independently. ▪ Wipe himself. ▪ Take increased amounts of fluid via a bottle, accept tastes. ▪ Maintain grasp of a cup with both hands when taking a drink. ▪ To make a hot drink. ▪ Using cutlery.	▪ Practice dressing skills at weekends ▪ Buying items.	▪ To brush hair in preparation to go out.

TITLE: Implementing participation-focused services: a study to develop the Method for using Audit and Feedback in Participation Implementation (MAPi)

SHORT TITLE: Audit and Feedback in Participation Implementation

ABSTRACT

Background: It is widely agreed that children's services should use participation-focused practice but that implementation is challenging. This paper describes a method for using audit and feedback, an evidence-based knowledge translation strategy, to support implementation of participation-focused practice in front-line services, to identify barriers to implementation, and to enable international benchmarking of implementation and barriers.

Method: Best-practice guidelines for using audit and feedback were followed. For audit, participation-focused practice was specified as clinicians' three observable behaviours: (i) targets participation outcomes; (ii) involves child/parent in setting participation outcomes; and (iii) measures progress towards participation outcomes. For barrier identification, the Theoretical Domains Framework Questionnaire (TDFQ) of known implementation barriers was used. A cycle of audit and barrier identification was piloted in three services (n=25 clinicians) in a large UK healthcare trust. From each clinician, up to five randomly sampled case note sets were audited (total n=122), and the clinicians were invited to complete the TDFQ. For feedback, data on the behaviours and barriers were shared visually and verbally with managers and clinicians to inform action planning.

Results: A Method for using Audit and feedback for Participation implementation (MAPi) was developed. The MAPi audit template captured clinicians' practices: clinicians targeted participation in 37/122 (30.3%) of the sampled cases; involved child/parent in 16/122 (13.1%); and measured progress in 24/122 (19.7%). Barriers identified from the TDFQ and fed back to managers and clinicians included: clinicians' skills in participation-focused behaviours [Medians 3.00-5.00 (IQRs 2.25-6.00)]; social processes [4.00 (3.00-5.00)]; and behavioural regulation [4.00-5.00 (3.00-6.00)].

Conclusions: MAPi provides a practical, off-the-shelf method for front-line services to investigate and support their implementation of participation-focused practice. Furthermore, as a shared, consistent template MAPi provides a method for generating cumulative and comparable, across-services evidence about levels and trends of implementation and about enduring barriers to implementation, to inform future implementation strategies.

KEY MESSAGES:

- Audit and feedback is an evidence-based knowledge translation strategy but its use requires adaptation to the specific practice(s) under implementation.
- The present study developed a practical method called MAPi for using audit and feedback to support the implementation of participation-focused practices.
- MAPi provides front-line services an off-the-shelf approach to audit and feedback, and to identification of implementation barriers.
- MAPi also provides a template for use in larger-scale benchmarking of participation-focused practices across services, countries, and time.

INTRODUCTION

It is widely agreed that children's services need to be participation-focused i.e. to focus on children's involvement in life situations as a core outcome (Allard et al., 2014; Department of Health, 2012, 2013; World Health Organization, 2001). The past two decades have seen a drive to develop concepts, tools, evidence, and interventions related to participation outcomes e.g. (Adair et al., 2018; Arakelyan, Maciver, Rush, O'Hare, & Forsyth, 2019; Imms et al., 2016; Imms et al., 2017; Kolehmainen et al., 2015; Reedman, Boyd, & Sakzewski, 2017). However, anecdotal evidence and research reports suggest that front-line services find implementation of participation-focused practices challenging (Anaby et al., 2017). Further work is needed to support the implementation of participation-focused practices in everyday service delivery.

Audit and feedback (A+F) is an evidence-based implementation strategy shown to be effective at changing practice. A Cochrane review of 140 randomised controlled trials across many clinical conditions and settings around the world found that A+F can have large, positive effects on practice (Ivers et al., 2012). The review, and subsequent international consensus work (Ivers et al., 2014), concluded that to achieve such effects requires for A+F to be applied appropriately, with attention to its underlying principles. As such, while A+F is an evidence-based, generic implementation strategy, it is not an off-the-shelf template that can be readily picked up by front-line services. Its use requires decisions about how to practically apply it in relation to the target practice, and knowledge about the principles underpinning its effectiveness.

Effective A+F consists of four components (Ivers et al., 2014). First, specification of the target practice so that it is clearly articulated and aligned with personal and organizational priorities. Second, ensuring that the target practice is amenable to feedback, and the people receiving the A+F are capable and responsible for making changes to the target practice. Third, the audit requires valid data on recent performance by the people being audited, with new data collected over time. Fourth, the feedback needs to be multi-modal (e.g. text and talking, or text and graphics); presented to the people whose practice is desired to change; come from a trusted source; and include comparison data with others.

Use of A+F benefits from further plans to address discrepancies between the target practice and actual practice. 'Barrier identification', i.e. identification of barriers and facilitators to implementation, enables this (Colquhoun, Squires, Kolehmainen, Fraser, & Grimshaw, 2017). Several frameworks and checklists of barriers to and facilitators of implementation have been published, varying in focus, length, complexity and extent of use (Flottorp et al., 2013). One of the most commonly used is the Theoretical Domains Framework (TDF) (Cane, O'Connor, & Michie, 2012; Francis, Michie, Johnston, Hardeman, & Eccles, 2005), an established consensus framework of conceptually defined, theory-based, modifiable explanatory variables ('constructs') which have been shown to explain healthcare professionals' practice across settings. The TDF has an accompanying questionnaire, the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg, Gebhardt, Crone, Dusseldorp, & Presseau, 2014; Huijg, Gebhardt, Dusseldorp, et al., 2014), which consists of item stems that can be adapted to

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measure people's views about specific target behaviours (see methods). Overall, the TDF provides a scientifically sound and practical tool to inform barriers identification in a healthcare context.

The present study aimed to develop a practical, off-the-shelf method of A+F, and complementary barrier identification, to (i) support the implementation of participation-focused practices by front-line services, and (ii) provide a protocol for generating cumulative and comparable evidence about implementation and related barriers across services, countries and time. The former was to enable local real-time advancement while the latter was to facilitate wider collective learning, development, and sharing of expertise.

METHODS

We conceptualised implementation of participation-focused practices as human action behaviour, and used behavioural and implementation sciences methods with attention to the four key components of effective A+F (above). First, to clearly specify the target practice, we articulated 'participation-focused service' as three observable clinician practice behaviours, and specified them for measurement using the TACT (Target, Action, Context, and Time) (Fishbein, 1963) as recommended for improving the validity and reliability of measurement in studies of human behaviour. The three behaviours were:

1. Clinician targets participation outcomes through interventions.
2. Clinician involves children and/or parents in identifying and deciding on specific participation outcomes.
3. Clinician measures participation outcomes.

These three behaviours have wide professional and organisational support as articulated by national healthcare policies and professional discourse, and we anticipated the behaviours to align with personal and organisational priorities. For all three behaviours the timeline was set as "in the past nine months", which was judged to be short enough to still constitute recent performance while being long enough to cover a full care episode (Kolehmainen, 2009). For all three behaviours, context was set as "at any situation in any point of the care process". As such, the case note data assessed spanned a 9-month period of the child's therapy process and all recorded interactions, goals, and environments within that period.

Second, we assumed that the target behaviours are, in principle, amenable to feedback to clinicians and within the responsibilities of the clinicians. Third, to further facilitate valid data collection, we developed an audit template with guidance notes to assess the presence of the target behaviours in case notes (Supplemental File). We built on a template and decision rules that had been successfully applied in two previous, large-scale, multisite projects of similar target behaviours (Kolehmainen, 2009; Kolehmainen et al., 2012), and piloted the resulting template and guidance notes. The piloting consisted of one clinician new to the data extraction (JM) and one researcher from the previous two studies (NK): independently extracting data from case notes; comparing the extracted data; discussing discrepancies; revising the guidance notes based on the discussion; and undertaking further extraction.

Cycles of 2-3 case note sets were carried out for a total 12 cases, at which point the guidance notes provided sufficient detail for the data extraction to be consistent.

In forming the guidance notes, a major focus of discussion was the classification of outcomes as 'participation'. We operationalised participation as 'involvement in life situations' using the World Health Organisation's definition (World Health Organization, 2001), while being mindful of the challenges related to disentangling participation from 'activity', 'capability', and 'skills' (Coster & Khetani, 2008). We were acutely aware that several, different well-founded proposals for ways to operationalise the concept of participation, and to differentiate it from other closely related concepts, have been made (Colver, 2009; Imms et al., 2016; Imms et al., 2017; Johnston & Dixon, 2014; McConachie, Colver, Forsyth, Jarvis, & Parkinson, 2006; Whiteneck, 2010). We were also mindful that a conclusive agreement remains still to be reached. For the present study, two key considerations were the strong messages from our stakeholders about the importance of: producing a practical audit template that would be simple to use in routine care; and ensuring the audit captures the implementation efforts already made, even if imperfect. The underlying message about the former was that a complex template would simply never be used, and about the latter that any audit perceived to overestimate (or "exaggerate") the implementation problem would be very likely to disengage the front-line teams already struggling with implementation. After much discussion, we decided that the primary focus for the present audit method should be whether there is evidence of implementation of *any* participation-focused practices, taking the broadest possible interpretation of participation assessed as leniently as possible. We accepted that this would very likely classify some activity, capacity, capability, and skills as participation, and fall short of the state-of-art operationalisations. However, in discussion with stakeholders we felt that this was a necessary compromise in order to achieve front-line feasibility. To explore the impact of this decision we also recorded verbatim examples of both included and excluded participation outcomes (see Results).

We subsequently applied the audit template with children's physical therapists, occupational therapists, and speech and language therapists in one of the largest NHS Trusts in the UK. The Trust has 1.72 million patient contacts per year, offers care across pathways from community to acute and regional specialist services, and is closely affiliated with two local universities. The audit was registered in the Trust's audit database. It collected anonymous patient data, and thus did not require a NHS Research Ethics Committee approval. Across the three groups of therapists, all qualified clinicians who worked in community or outpatients AND saw children with neurodisabilities at the time of the data collection, from 5th December 2015 to 28th January 2016, were eligible and invited into the study. From each participating clinician's caseload, up to five cases were sampled using a computer-generated random number table. Cases were eligible if the child: was 0-18 years AND had a neurodisability AND had been seen by an included clinician at least once in the previous 9 months. New cases continued to be sampled until five cases per clinician had been identified, or until the clinician had no more eligible cases, whichever came first. Neurodisability was defined using a published consensus definition, referring to a group of congenital or acquired long-term conditions that are attributed to impairment of the brain and/or neuromuscular system and create functional limitations (Morris, Janssens, Tomlinson, Williams, & Logan, 2013). According to that definition, specific diagnoses may not be identified, and conditions may vary over time, occur

alone or in combination, and include a broad range of severity and complexity. Using this definition, eligible cases included but were not limited to children with cerebral palsy, development co-ordination disorder, verbal dyspraxia, and autism. Case note data were also collected on the child's month and year of birth (to estimate age), and broad diagnostic category (see results). The case note data were extracted by an experienced community therapist (JM). It was accepted that case note recording styles differed between and even within therapists, and that relevant data could be documented in various locations within case notes. Data were thus sought throughout the notes and included in the audit regardless of where in the notes they were located or how they were recorded.

To collect data on therapists' views about barriers to and facilitators of implementation, we used the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg, Gebhardt, Crone, et al., 2014; Huijg, Gebhardt, Dusseldorp, et al., 2014). The DIBQ consists of validated item stems related to individual TDF constructs, which can be applied to elicit professionals' views about specified practices. Using selected item stems, the participating therapists rated their views about the three target practices across the TDF constructs, with response options ranging from 1 to 7, where 1=strongly disagree, 7=strongly agree. For the full DIBQ with the item stems as applied in relation to the target behaviours in the present study, please see Supplemental File. In addition to the DIBQ items, respondents also had an opportunity to add free text comments. The questionnaire was distributed to the participating therapists two weeks prior to the case note audit, and therapists completed it prior to the audit.

Both the case note and questionnaire data were summarised for aggregate scores across therapists, and reported descriptively using median and IQR, as the data were skewed. For data management, Microsoft Excel and SPSS were used. The descriptive use of data reflects common front-line audits contexts, and thus simulated the situations in which the template is intended to be used. The DIBQ barrier data were not powered to assess correlations between any reported barriers and implementation, and the study was not powered for analyses of how service, therapist, or child characteristics may influence implementation.

As the final, fourth step of the audit and feedback (as above), the results from the audit were fed back to the three service managers and the respective clinicians, alongside the key messages about the implementation facilitators and barriers from the DIBQ. Both verbal and visual feedback were used, and the managers and team members were invited to generate action plans for next implementation steps as part of the discussion.

RESULTS

The audit and feedback development steps resulted in a practical, off-the-shelf Method for using Audit and Feedback for Participation implementation (MAPi) that incorporates barrier identification. Twenty five therapists participated in the use of MAPi, including all eligible physical (n=12) and occupational therapists (n=10), and a sample of speech and language therapists (n=3). The therapists had been in practice 3-38 years (median=15 years, interquartile range [IQR]=8-26), and most had worked with children for over a decade (median=11 years, IQR=7-18).

Across the 25 therapists, 122 children's case note sets were included. The children's average age was eight years (median=101 months, IQR=48-157). Nine children had no recorded medical condition; 27 had a developmental delay (including speech delay); 25 had cerebral palsy; 21 had autism, Asperger Syndrome, Tourette's Syndrome, or attention difficulties; seven had developmental co-ordination disorder or verbal dyspraxia; and 43 had another condition (e.g. spina bifida, muscular dystrophy, or a rare syndrome).

From the included cases, 16/25 therapists had targeted participation outcomes through interventions in a total of 37/122 (30.3%) cases. These outcomes covered a range of participation domains (Table 1), and varied in the extent to which they were embedded in life situations. Some outcomes were explicitly framed in the context of life situations, e.g. "maintain standing to play bubbles with sister", while for others e.g. "improve walking with K-walker" the life situation was implied elsewhere in the case notes. Outcomes classified as not participation were characterised by focus on the child's capacity in therapy settings, e.g. for the child to take "two side steps in either direction" or "to reduce sensory seeking behaviour". In classifying outcomes, it was clear that sometimes simple executions of tasks or actions *in a life situation* reflected participation, and were included. For example, a young baby turning their head towards others and smiling in everyday social interactions was meaningfully described as participation.

ADD TABLE 1 HERE.

There was evidence of 12/25 therapists involving children and/or parents in deciding participation outcomes (in a total of 16/122 cases, 13.1%), and 12/25 therapists measuring participation outcomes (in a total of 24/122, 19.7%) cases. Measuring outcomes was through informal recording of progress (13/24), the Canadian Occupational Performance Measure (7/24), and/or Goal Attainment Scaling (5/24).

The DIBQ responses (Table 2) provided key messages about facilitators and barriers related to implementation. Specifically, therapists: (a) had largely positive beliefs about the consequences of the three practices, e.g. they perceived all three target practices as having benefits for patient care, to the therapists themselves and to their employing organisation; (b) perceived the practices as being part of their professional role; (c) reported knowing what the practices meant and the departmental processes for implementing them; and (d) had high intentions to carry the practices out. Of these, (a), (b) and (d) indicated support for the first and second assumptions concerning effective audit and feedback use, i.e. that the target behaviours aligned with clinicians' and organisational priorities and the clinicians' role responsibilities. Therapists also reported: (e) a lack of practical skills to undertake the three behaviours; (f) low positive social influence (social norms, expectations, environmental support, and recognition) to carry out the three behaviours; and (g) limited behavioural regulation (use of implementation plans and self-monitoring) to translate their high intentions to actual implementation. Of these, (e) indicated that further practical skills training for clinicians may be needed to enable clinicians to change their performance of the practices. Point (f) indicated that there was scope for more practical demonstrations of the in-principle organisational/team

prioritisation of the target behaviours. Point (g) indicated that repeated audit and feedback cycles could be an appropriate implementation strategy for this clinical team as regular audit and feedback can be particularly effective in translating intentions to action.

ADD TABLE 2 HERE

The audit results were fed back to the service managers and the clinical teams, alongside the key messages about facilitators and barriers. The results were fed back verbally, alongside visual feedback (Supplemental File). Throughout, the managers and team members were invited to discuss how these results could inform the next implementation steps.

DISCUSSION

The present study developed a practical, off-the-shelf method for using A+F to (i) support the implementation of participation-focused services by the services themselves, and (ii) provide a protocol for generating cumulative evidence about levels and trends of implementation and related barriers across services, countries and time. The resulting Method for using Audit and feedback for Participation implementation, MAPi, is a combination of audit, barrier identification, and feedback. Using the MAPi audit template, we found that therapists targeted participation outcomes in less than a third of cases, these outcomes were rarely decided together with children or parents, and the progress towards these outcomes was rarely monitored. Using the MAPi questionnaire, we identified key facilitators of implementation, namely that therapists reported a generally positive orientation and intention towards participation-focused practice behaviours. We also identified barriers, namely a lack of skills, social support, and behavioural regulation to translate the positive orientation and intentions to practice. These formed clear MAPi feedback messages to inform services' further implementation plans.

The main challenge in the present study related to judgements about what should be considered 'participation'. To adopt a conservative approach to estimating implementation problems, we classified outcomes leniently as participation. The results suggest that, as anticipated, this approach classified some skills and capacity as participation, but also that in some situations capacity, skills and participation are closely intertwined and difficult to disentangle. The use of MAPi in only one organization, and a lack of formal evaluation of its usefulness, was a further limitation. To mitigate this, the therapist-sample was diverse in terms of professional backgrounds, practice contexts, and expertise; and we subsequently encouraged others to use the MAPi and provide feedback on its usefulness and feasibility (Graham, Timothy, & Williman, 2019).

MAPi provides a practical way for front-line services to audit their implementation of participation-focused practices, and to identify discrete, theory-based implementation barriers. The rates of implementation that MAPi picked up were broadly similar to the levels found among Canadian rehabilitation professionals (Anaby et al., 2017). Collectively, these two studies suggest that implementation challenges remain substantial. This supports

our decision to assess implementation very leniently, as setting the standard too high compared to the current implementation would likely disengage services from implementation altogether (Carver & Scheier, 2001).

The present study, and MAPi, are the first time where A+F is systematically operationalised for use in implementing participation-focused practices in children's therapy services. It is also the second ever study to seek to systematically implement participation-focused practices. The other study so far was a qualitative evaluation of strategies to increase therapists' positive orientation towards, and intentions to implement, participation-focused practice (Anaby, Korner-Bitensky, Law, & Cormier, 2015). Our study indicates positive orientation and intention may not be universally relevant targets for practice change as practitioners may already have positive orientations and intentions; and that further techniques to target post-intentional factors such as skills and behavioural regulation are needed. By enabling off-the-shelf A+F, MAPi makes this post-intentional implementation interventions accessible for front-line services. Furthermore, by providing a consistent protocol that can, in principle, be used by a wider network of teams, MAPi provides a method for collaborative practice change through repeated, shared A+F cycles.

The international child health community remains committed to participation-focused practice, and collective actions to advance implementation are starting to emerge. As examples, F-words Tools (CanChild, 2019) have provided templates for parents, professionals and schools for discussing participation-oriented concepts, and the CountMeIn! grassroots network has brought together stakeholders interested in research to address implementation challenges. As collective actions advance, it will be important to evaluate the impact of different strategies on implementation. MAPi provides a protocol for collecting such information in a comparable way across services, countries and time. This enables large-scale, international evidence generation to inform implementation and further research. For example, a cumulative, large data set across organisations, countries, cultures and time would enable robust investigations of the relationships between different implementation factors across therapist-, patient-, organisational- and wider contextual-levels, and provide a platform for further evaluating the impacts of participation-focused practices on child and family outcomes, and costs and benefits.

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TABLES

Table 1. Illustrative examples of participation outcomes identified and targeted by therapists, presented according to the degree to which they include a life situation

Outcome domain	Examples of included outcomes with limited description of life situations	Examples of included outcomes that mention a targeted life situation	Examples of outcomes embedded within wider life situations and life goals
Moving around life situations [n=15]	▪ Improve walking with K-walker. ▪ Walk further without pain. ▪ Walk up and down stairs independently. ▪ To have head control in sitting & prone.	▪ To walk from her class with quad sticks. ▪ To roll from back to side when playing. ▪ To be able to walk further with friends without getting tired.	▪ Move independently on floor (…) to follow siblings at home. ▪ Maintain standing to play bubbles with sister.
Education [n=12]	▪ Increase writing speed. ▪ Complete writing tasks. ▪ Express himself in writing. ▪ Improve handwriting.	▪ Position resources e.g. piece into puzzle, during table activity in school. ▪ Handwriting in school. ▪ Use spoken language in class discussions.	▪ Participate fully in PE lesson. ▪ Engage in classroom activities. ▪ To recognise self-regulatory activities that can help him engage in lessons.
Recreation and leisure [n=12] incl. play, sports, socialising	▪ Use his trike. ▪ Ride a bike. ▪ Swimming. ▪ Walk with a push along toy. ▪ To improve ability to use his games console.	▪ Dancing or doing a physical activity. ▪ Grasp a toy whilst playing. ▪ Participate in fine motor play e.g. jigsaws, lego.	▪ Start a physical exercise activity she enjoys. ▪ Sporting activities in the local area to promote general motor development. ▪ To be fully included in football games with peers during breaks.
Communicate, interact and do things with other people [n=8]	▪ Use full phrases to describe pictures. ▪ Create a short spoken report to describe a picture sequence.	▪ Conversation practice with adults at home and school.	▪ See friends at external activities. ▪ Attend Jehovah's Witness meeting.
Self-care [n=13] incl. dress, eat, drink, prepare meals, shop, hygiene	▪ To tie laces independently. ▪ Wipe himself. ▪ Take increased amounts of fluid via a bottle, accept tastes. ▪ Maintain grasp of a cup with both hands when taking a drink. ▪ To make a hot drink. ▪ Using cutlery.	▪ Practice dressing skills at weekends ▪ Buying items.	▪ To brush hair in preparation to go out.