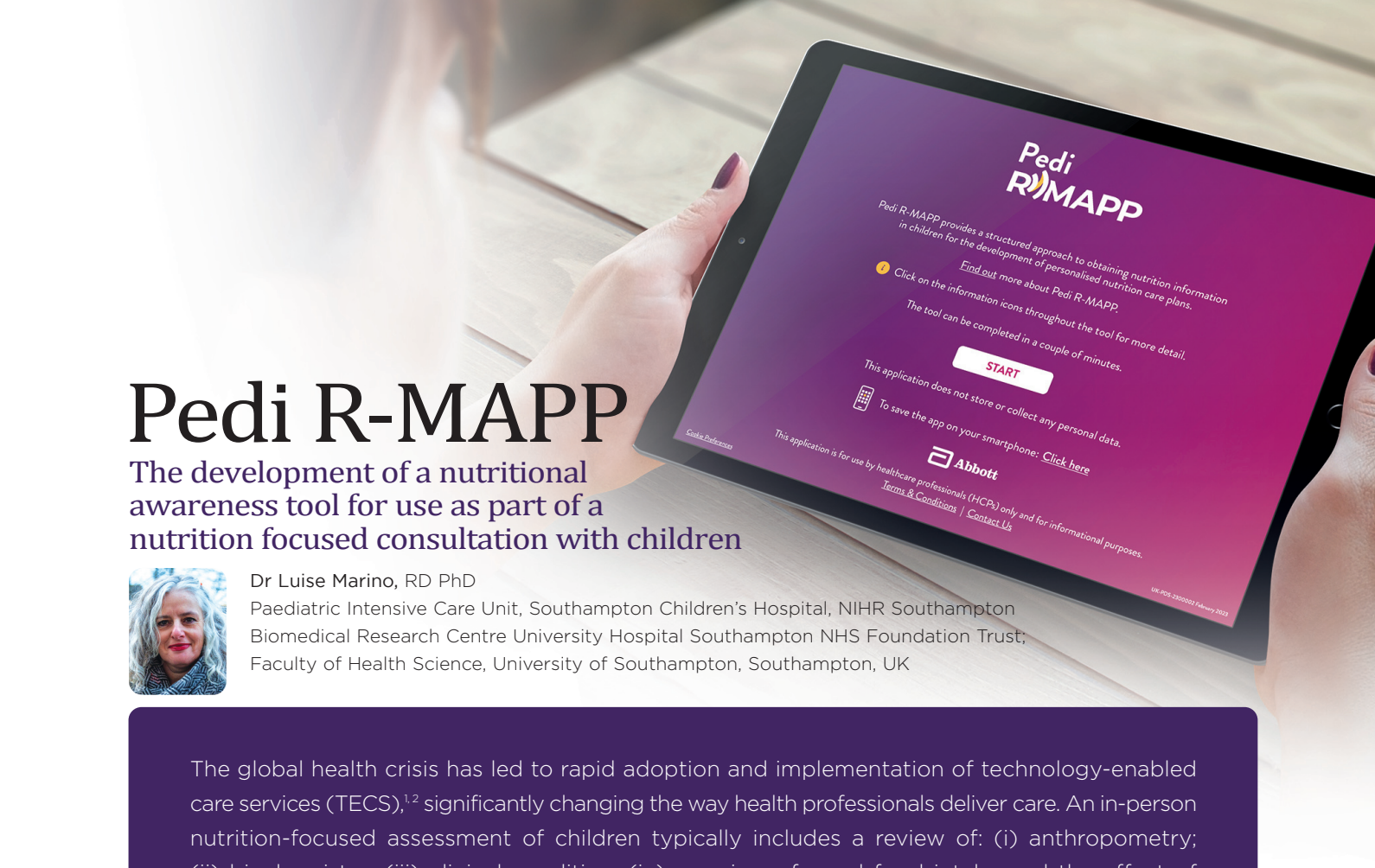

Pedi R-MAPP

The development of a nutritional awareness tool for use as part of a nutrition focused consultation with children

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The global health crisis has led to rapid adoption and implementation of technology-enabled care services (TECS),[1,2] significantly changing the way health professionals deliver care. An in-person nutrition-focused assessment of children typically includes a review of: (i) anthropometry; (ii) biochemistry; (iii) clinical condition; (iv) a review of usual food intake and the effect of nutritional interventions; (vi) goal setting with caregivers, and a plan for follow-up as appropriate.[3] Prior to the pandemic, it was reported that 45% of dietitians had no formal training in conducting remote counselling,[4] and 24% reported that inability to perform growth monitoring and nutrition assessment was a barrier to using TECS,[5] and less experienced dietitians reported lower satisfaction with performing a TECS assessment.[4] Recommendations from the literature suggested developing tools to support remote performance of nutrition-specific assessments could improve the confidence and support of healthcare professionals (HCPs).[4, 6]

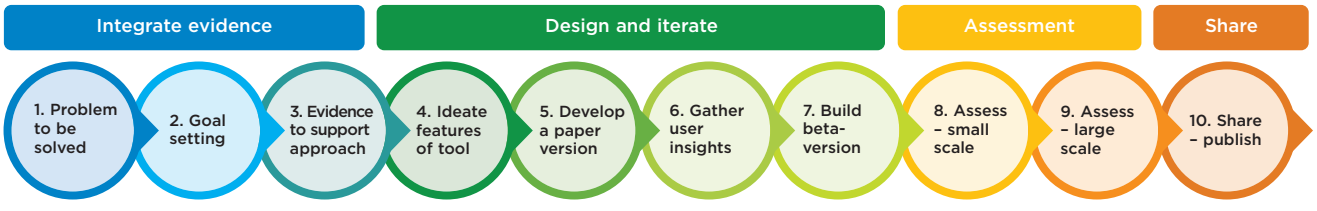
Why was Pedi R-MAPP developed?

In March 2020, to help support rapid upskilling of dietitians to complete TECs assessments, the British Dietetic Association (BDA) Paediatric Specialist Group developed guidance on how to complete remote dietetic consultations for HCPs working in paediatric primary healthcare.[1] However, it became clear from the number of surveys completed a digital tool may be easier to use, making it more accessible for dietitians to use in a clinical setting.[2] As such, the goal of this research project was to translate the adult tool, R-MAPP,[3] into a version suitable for children and young people. The focus was to provide a structured approach to completing a nutrition focused assessment as part of a face-to-face outpatient appointment or as part of a TECS consultation, rather than develop a new malnutrition risk or screening tool.[4]

How was Pedi R-MAPP developed?

The Pedi R-MAPP tool has been created over the last 30 months using the Integrate, Design, Assess, and Share (IDEAS) framework as a scientific basis to guide the development of the tool.[5] The framework has ten steps which fall into 4 broad groups of: i) integrate ideas from HCPs & evidence; ii) design iteratively and rapidly following HCP feedback; iii) assess rigorously; and iv) share (**Figure 1**).

Figure 1: IDEAS framework for the development of the Pedi R-MAPP



Translating R-MAPP into Pedi R-MAPP

Step 1–3: Developing Pedi R-MAPP using a Delphi consensus

A multi-stage process (**Figure 2**) was used to translate R-MAPP into a version for children. Firstly, an international survey among 463 healthcare professionals was completed to better understand how nutrition practice has changed as a result of the COVID-19 pandemic. In addition to the survey, a systematic search of the literature was completed, using more than 70 articles to develop the Pedi R-MAPP framework. Eighteen international nutrition experts were involved in a Delphi consensus to finalise a paper version of the Pedi R-MAPP tool.[6]

Design and iterate

Steps 4–7: Design iteratively and build a paper version of the tool

At the end of the Delphi consensus the paper version of Pedi R-MAPP comprised of eight short sections including: i) general information on the child; ii) does the child have a long-term condition; iii) assess recent changes in growth; iv) assess what and how much a child eats and drinks; v) is there enough food at home; vi) have there been changes in physical activity; vii) are there are any clinical concerns that suggest a medical review is required; and viii) summary statement regarding the recommended frequency of review and recommended actions. The summary statements are colour coded into: green (discharge), amber (review 1–3 months), red (review 1–2 weeks) and purple (review 3–6 months). The tool does not retain or store any data and no identifiable data is collected, such as date of birth.

HCPs based in Europe, UK, South Africa, and North America were invited to attend a series of think aloud workshops, where the paper version of the digital tool was considered. HCPs were asked to provide specific focus on the process, look and feel of the tool, and initial impressions which were collected using surveys. A thematic analysis was completed on the qualitative comments from the surveys and workshops formed two overarching themes of: i) user interface/user experience; and ii) nutrition advice. The feedback provided the justification to make eight iterative changes to the design of the tool before wider testing.

Assess vigorously

Step 8–9: Assessment – small- and large-scale testing

Small- and large-scale testing was completed to determine the level of agreement by paediatric dietitians with the summary advice.

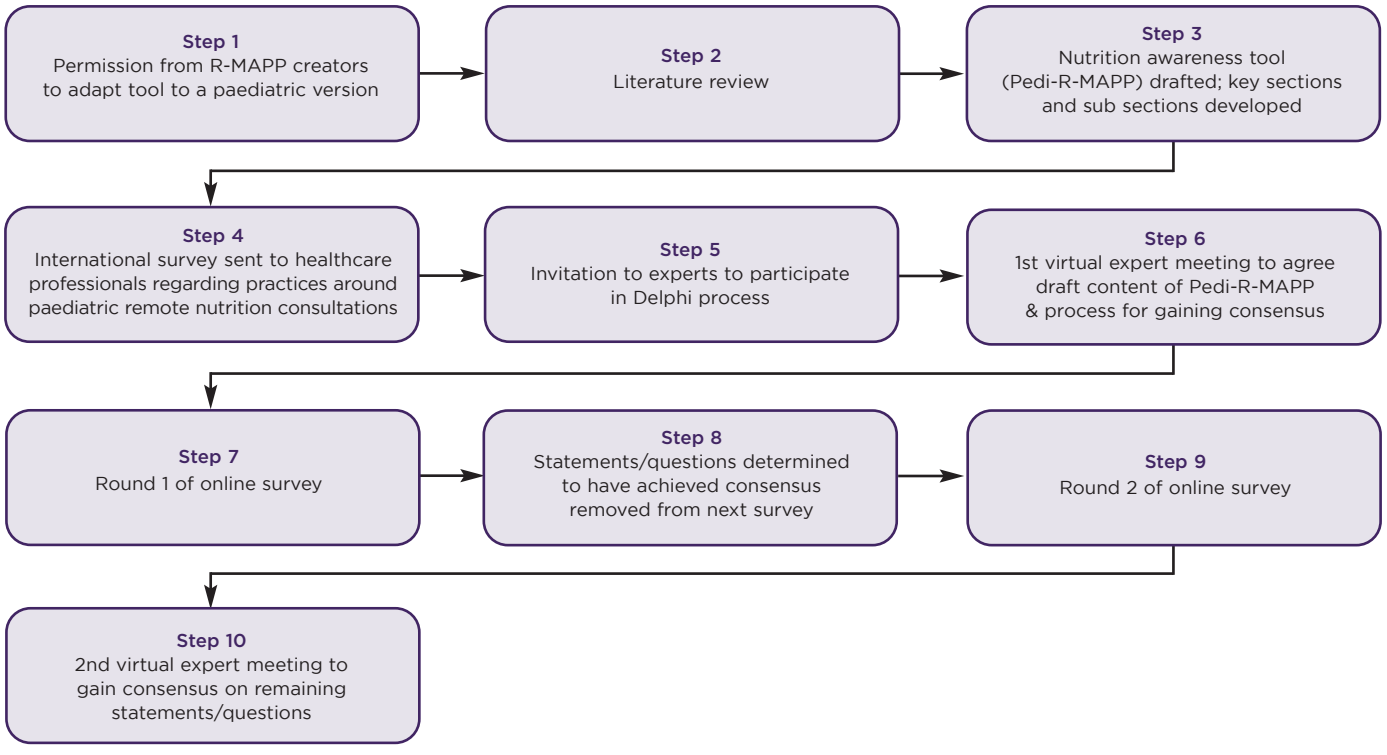
Small-scale testing – was undertaken first

Using a revised version of the tool, small-scale testing was completed by a single researcher, using the tool retrospectively on 80 children with congenital heart disease (CHD), whose nutrition risk had been classified using the nutrition pathway for improving growth in infants with CHD before surgery.[7, 8] After each testing process, further iterations were made to the following: section 1: general conditions, section 2: clinical conditions and section 4: changes in growth. At the end of the testing period the level of agreement with the summary advice rose from 60% (n=48/80) to 88% (n=70/80), after three rounds of testing.

Large-scale testing

Fifiteen specialist paediatric dietitians agreed to participate in widescale testing. They used a beta-version of the tool as part of a TECS consultation, or on a caseload of children they knew well enough to be able to answer all of the questions. At the end of each consultation or test, dietitians recorded on an anonymised excel sheet whether they agree or disagree with the summary advice at the end of the tool, using (yes/no) answer for each test case. If they do not agree with the summary advice they will be asked to record a brief reason as to why. The tool was used on n=745 cases, across a wide range of acute and chronic disease conditions, with ten broad groups including: CHD 30.7% (n=229/745), allergy 13.6% (n=101/745), cystic fibrosis 13.8% (n=103/745), gastroenterology 8.6% (n=65/745), neurological disorders 8.2% (n=61/745), inherited metabolic disease/ketogenic 4.6% (n=34/745), neonatology (including premature infants) 2.1% (n=16/745), primacy ciliary dyskinesia (PCD) 6% (n=45/745) and endocrine 5.8% (n=43/745).

Figure 2: 10-step process to develop the Pedi R-MAPP consensus (adapted with permission)[4]



After the first testing period, the level of agreement with summary advice by specialist paediatric dietitian was an 85.9% (n=640) agreement, with 14.1% (n=105) disagreement (**Table 1**). A thematic analysis was completed on the annotated reasons for disagreement. There were 105 comments grouped into four over-arching themes: i) receiving nutritional support and/or restricted diet 16.2% (n=17/105); ii) child has chronic condition so requires ongoing review 20.0% (n=21/105); iii) growth/recent changes in growth; condition specific growth chart 6.7% (n=7/105); and iv) different review time advised by dietitian (within which there were two sub-themes of less urgent review and more urgent review) 57.1% (n=60).

Following the iterative changes and re-testing, the level of agreement with the summary advice improve from 86% (n=640/745) to 98% (n=730/745) post-iteration (p=<0.0001). The cases where there was ongoing disagreement (n=15) with the summary advice was around the use of condition-specific growth charts, i.e. trisomy-21 and an alternative review time period favoured. A total of sixteen iterative changes were made to the tool over the development and testing period (18 months). As part of wide-scale testing, paediatric dietitians reported Pedi R-MAPP was user-friendly in an outpatient setting, taking an average of 1-2 minutes to complete per consultation.

Share

Step 10: Publish & launch tool

Pedi R-MAPP is a freely accessible digital tool for use by dietitians and HCPs to support a nutrition-focused consultation, either completed virtually or in-person.

Discussion

The BDA uses a model and process for integration of professional knowledge using a step wise process to develop appropriate nutrition interventions.[9] The Pedi R-MAPP tool draws on this and other models to provide HCPs with a structured framework to complete a nutrition-focused assessment with summary advice around recommended frequency of review with; urgent (face to face review), red (1–2 weeks), amber (1–3 months), purple (3–6 months) and green (discharge).[10] Pedi R-MAPP was developed using the IDEAS framework, which provides a step-by-step process to guide the development and evaluation of digital interventions using four-broad concepts including an evidence-based approach, with design thinking, iterative evaluation, and dissemination.[5] Testing of the tool was undertaken by specialist paediatric dietitians involving children within ten broad groups of acute and chronic clinical conditions. The results of this study suggest specialist dietitians agree with the summary advice recommendations of the Pedi R-MAPP tool. Dietitians also felt the tool was quick and easy to use in a clinical setting.

The Pedi R-MAAP tool has a number of limitations including testing by primary care dietitians. Although there were high levels of agreement with the summary advice by the specialist paediatric dietitians, this may have been influenced by local standards of nutrition practice and as such may not represent the opinion of a wider group of HCPs. However, as the results from all phases of the development would suggest, there was a high level of agreement from those who have tested the tool. But further testing in the future will be required. A training package and information is available to support the use and implementation of Pedi R-MAPP into clinical practice.

Conclusion

The Pedi-R-MAPP tool has been developed using a step-by-step process of design-thinking to lead the development, iteration, evaluation, and dissemination of digital interventions. Pedi R-MAPP tool can act as an aide memoire to guide dietitians and HCPs completing a nutrition focused assessment, with the goal of reducing variation in practice, providing guidance as to the frequency of review including urgent in person medical review.

Table 1: Paediatric dietetic agreement with summary advice in Pedi R-MAAP tool

Summary advice	Proportion of children in each summary advice group	Paediatric Dietetic level of agreement with the summary advice
Green (discharge)	30.2% (n=225/745)	81.8% (n=184/225)
Amber (review 1–2 months)	41.5% (n=309/745)	87.1% (n=269/309)
Red (review 1–2 weeks)	2.4% (n=18/745)	83.3% (n=15/18)
Purple (review 3–6 months)	12.5% (n=93/745)	94.6% (n=88/93)

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