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# **The Paediatric Physiotherapy curricula landscape: a survey of United Kingdom entry-level programs**

## **Abstract**

**Background and Purpose:** To identify the paediatric curriculum content covered in entry-level physiotherapy programs within the United Kingdom (UK), and report faculties perceived importance. Strengths, weaknesses, barriers and facilitators, to the implementation of paediatric content were explored.

**Methods:** A cross-sectional online questionnaire captured entry-level physiotherapy program leaders' perceptions of paediatric programs.

**Results:** 55 responses were submitted, providing a 67% completion rate. Faculty perceived that students' felt the inclusion of paediatric content within the curricula was 'Important' (Mean  $3.60 \pm SD 0.74$ ). Of 30 diagnoses surveyed only two were covered 'Well' within curriculums, despite 23 rated at least 'Important' by respondents. Of the 18 assessment/examination components 13 were covered 'Well' with five 'Somewhat'. All were considered to be at least 'Important'. Perceived strengths were grouped into three main categories 1) integrated/lifespan approach, 2) links to clinical specialists and, 3) a broad/detailed curriculum. Perceived weaknesses included curriculum time pressures and paediatric placement availability.

**Discussion:** The majority of paediatric conditions were only somewhat covered by UK curriculums, despite respondents in the main believing they should be an important element of the entry-level syllabus. Some UK physiotherapy entry-level students may not be exposed to any paediatric teaching or clinical placements.

**Keywords:** Physiotherapy, paediatric, Curriculum, Entry-level, University

## **Introduction**

In the United Kingdom (UK), entry-level physiotherapy programs are accredited by the Health and Care Professions Council (HCPC) and the Chartered Society of Physiotherapy (CSP). Once qualified, chartered physiotherapists are acknowledged as autonomous professionals who can engage in patient care from a range of environments throughout the National Health Service (NHS) and Private, Independent, Voluntary Organisations (PIVO) making the achievement of core skills during education essential for patient safety (Cresswell et al., 2013). A key role of Higher Education Institutes (HEI) is to adequately prepare students with graduate ready skills (CSP, 2020; Chesterton et al., 2021), meeting the standards of proficiency relevant to the HCPC register (HCPC, 2018). Entry-level programs are required to reflect physiotherapy core values, skills and knowledge whilst encompassing an evidence-based approach relevant to contemporary practice. The CSP accreditation guidelines, through a nine key principle approach, aims to ensure entry-level programs prepare students for flexible working across a range of contexts and subdisciplines (CSP, 2020).

Whilst entry-level students are not required to develop specialist skills, they should achieve a theoretical understanding of human sciences and fundamental therapeutic techniques to meet the needs of services users across their lifespan (CSP, 2020). Currently, no standardized approach to the content required to cover the field of paediatric physiotherapy in the UK, despite global competencies published of the inclusion of general content, school based practice, early intervention and neonatal intensive care (Chiarello et al., 2006; Effgen et al., 2007; Sweeney et al., 2009; Rapport et al., 2014). A statement from the World Confederation for Physical Therapy outlines both essential and recommended content areas for a paediatric curriculum, which is relevant to all global entry-level programs (Cech et al., 2019). Whilst

the guidelines provide a minimum standard for inclusion in entry-level programs the UK accreditation system does not enforce its implementation.

Paediatric physiotherapists are involved with the care of infants, children, adolescents and in some circumstances young adults. Paediatric physiotherapists obtain specialist skills of child development and knowledge of childhood conditions following a family-centered approach to care (ACPC, 2021; NICE 2022). Entry-level graduates must have developed underpinning knowledge of child development and awareness of paediatric conditions (Kenyon et al., 2013), particularly if they work in the PIVO sectors upon graduation. It is reasonable to consider such knowledge would be a minimum requirement to ensure patient and/or client safety, whilst ensuring the provision of effective and efficient healthcare. Developing students' knowledge of patient and family-centered care across all subdisciplines of physiotherapy is required in a broad context for HEI's to achieve CSP accreditation, evidencing that future graduates are prepared for specialized roles across this broad spectrum (CSP, 2020).

Throughout their entry-level program UK physiotherapy students are required to complete clinical placements which are considered as important as on campus academic learning and teaching (CSP, 2020; HCPC, 2018). All students will generally access clinical placements in an adult care environment covering three core areas (musculoskeletal, cardiorespiratory and neurology), however the skills developed in these areas are not always directly transferrable to a paediatric context (Turner, 1993). Some students may complete training without accessing a paediatric placement and therefore do not undertake external assessment of paediatric service users across the entirety of their program. Potentially students may not be formally assessed regarding their safety, competence and confidence to provide appropriate

assessment and effective treatment of children and young people, unless it is explicit within their taught curriculum. A disparity of taught paediatric education across the globe exists and has previously been reported throughout the past two decades within curricula in the United States of America (Kenton et al., 2013; Cochrane et al., 1990; Cherry & Knutson, 1993; Schreiber et al., 2011; Golub-Victor & Dumas, 2015). Mistry et al. (2019) surveyed Australian universities to identify paediatric program content, reporting key barriers to implementing paediatric content within the curriculum including a crowded syllabus, lack of specialist staff, lack of prioritisation and inadequate paediatric placement availability.

The publication of the UK KNOWBEST project indicated that a greater awareness/knowledge of all specialities including paediatrics was required within the UK curriculums (Lowe et al., 2022). The project highlighted the broad and holistic nature of assessment and treatment strategies requiring specialist paediatric knowledge (Lowe et al., 2022). HEI's in the UK are able to design their own specific curricula independently of each other, and due to the lack of standardisation of content expected or published by governing bodies, there is a need to understand the variety of paediatric curriculums UK students are exposed to (Anderson et al., 2019). Therefore, as per Mistry et al (2019) the aim of this study was to 1) identify the paediatric curriculum content covered in UK entry-level physiotherapy programs; 2) understand the perceived importance of paediatric content by teaching faculty, 3) identify the mode of delivery and assessment in entry-level programs and 4) identify strengths, weaknesses, barriers and facilitators, to the implementation of paediatric content in entry-level programs.

## **Methods**

### ***Design***

A cross-sectional questionnaire of UK HEI program leaders of entry-level physiotherapy programs was conducted between May 2022 and June 2022. The \*\*\*\*\* approved the study in accordance with the Helsinki Declaration (ID9279). This report is conducted with recommendations from CHERRIES (The Checklist for Reporting Results of Internet E-Surveys) and STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) (Eysenbach, 2004; Von Elm et al., 2007).

### ***Participants***

All UK HEI program leaders of entry-level physiotherapy programs were eligible to take part. The survey was sent to program leaders but invited the recipient to identify an appropriate member of staff to complete if they were unable to do so. We requested that only one member of the teaching team complete the survey on behalf of the program to prevent duplication of responses.

The lead author, as a member of the CSP the UK's professional, educational and trade union body, reviewed the 'Find a Physiotherapy Programme' information page (<https://www.csp.org.uk/careers-jobs/career-physiotherapy/physiotherapy-degrees>) as a means of capturing UK entry-level programs. A total of 59 institutions were identified as providing entry-level physiotherapy curriculums. From here each higher educational institutional provider webpage was searched for the 'Program Leader' of the entry-level physiotherapy degree. A total of 82 pre-entry programs were identified from providers (44 Bachelor of Science [BSc], 1 BSc Apprenticeship, 34 Master of Science [MSc], 1 MSc Physiotherapy Leadership, 1 MSc Physiotherapy Leadership (Apprenticeship), 1 Master in Science). Names and contact details of program leaders were obtained from the publicly accessible HEI websites. For institutional webpages which did not provide contact details

either the department leads were identified and contacted, or the University was sent an email via its general enquiries address requesting program leader information. Department leads were requested to forward the survey invitation request to the relevant staff member(s).

### ***Measures (Instrumentation)***

The survey was based upon the work of Mistry et al. (2019) who have performed a similar study of Australian entry-level paediatric curricula. A pilot group of five UK physiotherapy academics reviewed the initial questionnaire for content validity (Stoszkowski & Collins, 2016). The survey was independently assessed with comments on the format, content, wording, technical functionality and overall ease of completion requested to ensure transferability to the UK target population. Following pilot testing the order of questions were altered with qualitative questions moved earlier in the sequence. The final online survey was hosted at Onlinesurveys.ac.uk and consisted of 29 main questions across 10 pages (Supplementary Material 1). The survey was split into four sections; 1) participant details, 2) curricula perceptions, 3) curricula delivery, and 4) knowledge and importance of a range of paediatric content within the curriculum. All questions were required to be completed prior to submission of the survey. Respondents were able to review and change their answers by selecting the 'back' option on the surveys hosting platform. To maintain participant anonymity no identifiable personal data, including the HEI respondents were employed by, was collected.

### ***Procedure***

The chief investigator sent a total of 77 email invitations to all identified program leaders (n=71) and department contacts (n=6). All universities with an entry-level physiotherapy

programme were contacted. A reminder email was sent to the appropriate contact approximately four weeks later.

Respondents were requested to complete the questionnaire only once and not submit multiple entries, however, this was not monitored or controlled by the online platform (i.e., via cookies, IP checks, registration). Respondents were instructed regarding the aims of the study, the length of time required for completion and the storage of anonymised data (Chesterton et al., 2022a). Participation was voluntary with respondents informed of their right to withdraw at any point prior to submitting the final answers. Respondents were instructed that by completing and submitting the survey they were consenting to take part (Chesterton et al., 2022a). No incentives were provided for survey completion.

### ***Data Analysis***

Following survey closure the data were extracted from onlinesurveys.ac.uk into Microsoft Excel (Microsoft Corp, Redmond, WA), using the analyse function. All questions were required to be completed before submission and therefore all submitted surveys were included within the analysis. As the survey was not designed to test for differences between respondents no such analysis was performed. Likert scale questions were treated as numeric variables with mean and standard deviations (SD) calculated for combined responses across each potential answer (Hopkins, 2010). Likert scales questions asking respondents to rate the detail of content covered were scored as; 1 = Not at all; 2 = Not very well; 3 = Somewhat; 4 = Well; 5 = Very Well. Questions requesting respondents perceived importance of topic area utilised the following scale; 1 = Not important at all; 2 = Low importance; 3 = Neutral; 4 = Important; 5 = Very important. Data from both the dichotomous and multiple-choice questions were converted into proportions with lower and upper limits of the 95% confidence



interval, presenting the uncertainty around the estimates, calculated using the Wilson procedure (Newcombe, 1998; Greenland et al., 2016).

For qualitative responses, two investigators (PC and JC) analysed the data separately, as part of an investigator triangulation process to reduce the risk of observer and other experimenter biases (Guion et al., 2011). Open coding identified themes for strength and weakness of the curriculum (Mistry et al., 2019) with both investigators generating a set of sub and main themes from their analysis. Hermeneutic revisiting of the data reduced researcher prejudices which may have de-valued theme generation (Chesterton et al., 2022a). Following individual analysis, a de-briefing session was held with findings discussed and redefined. The triangulation process highlighted the similarity of both researchers' conclusions, increasing the credibility, validity, and trustworthiness of the findings (Carter et al., 2014).

## **Results**

### ***Participant Demographics***

55 responses were submitted, providing a completion rate of 67%. The number of visitors to the survey site or those who failed to complete after starting was not captured. Of the total respondents 35 (67%) identified as female and 20 (38%) male (ratio 1.75:1). Ages ranged from 32 to 64 (Mean  $45.5 \pm$  SD 8.8) with mean years post qualification  $21.7 (\pm$  SD 8.4, range 6-42). A total of 16 (29%) respondents were paediatric physiotherapists. Of these physiotherapists the range of time within the paediatric discipline was 4-24 years (Mean  $15 \pm$  SD 6.9), with the average length of time teaching being eight years ( $\pm$  SD 4.4, range 3-16). Of all the respondents the majority were in a Senior Lecturer position (n=36, 65%) followed by Lecturer (n=10, 18%). Remaining respondents were employed as Associate Professors (n=5, 9%), Assistant Professors (n=3, 5%) or Principal Lecturer (n=1, 2%). In total 80% of respondents completed the survey in their capacity of program leader (BSc: n=26, 47%; MSc:

n=18, 33%) compared to 11 completing on behalf of their program leader (BSc: n=9, 16%; MSc: n=2, 4%). A total of five programs (9%) did not include any paediatric content within their current pre-registration provision.

### ***Paediatric Curriculum Content and Perceived Importance***

Faculty within the study perceived that students' felt the inclusion of paediatric content within the curriculum was 'important' (Mean  $3.60 \pm$  SD 0.74). In relation to typical development, Table 1 outlines respondents' rates of the content covered within their curriculum and its perceived importance.

\*\*\*INSERT TABLE 1\*\*\*

Figures 1, 2 and 3 display the mean and SD responses for both content covered in curriculums and it's perceived importance by faculty across a range of specific diagnoses (Musculoskeletal, Neurological, Cardiovascular Respiratory and Other). Means and SD presented in table format can be found in Supplementary Material 2. In total, respondents were asked to cross reference 30 diagnoses against the curricula delivered. Only two were covered within the syllabus 'Well' (Cerebral Palsy; Cystic Fibrosis) with two 'Not at all' (Brachial Plexus Birth Injuries; Immune Deficiency). Thirteen were either 'Somewhat' covered or 'Not Very Well' covered. In contrast, respondents considered it was 'Important' to include 22 of the 30 diagnoses, with seven determined 'Neutral'. Only, Cerebral Palsy was 'Very Important' to include within the curricula.

\*\*\*INSERT FIGURES 1/2/3\*\*\*

Figures 4 and 5 also display the means and SD for the curriculum content covered and its perceived importance for both paediatric assessment and intervention techniques. Means and SD presented in table format can be found in Supplementary Material 3. Of the 18 assessment/examination components 13 were covered 'Well' with five 'Somewhat'. All were considered to be at least 'Important' to include within the curriculum with four rated as 'Very Important'. In relation to paediatric interventions five of the 11 components were 'Well' and 'Somewhat' covered. Only prescription and application of equipment was deemed to be 'Not Very Well' included. All interventions were considered at least 'Important' with family/patient centered care and therapeutic exercises judged 'Very Important'.

\*\*\*INSERT FIGURES 4/5\*\*\*

### ***Paediatric Delivery and Assessment***

The majority (n=37, 67%, CI 95% 54 to 78) of curricula taught the paediatric syllabus across modules (a topical unit within a program) spanning different academic years as a lifespan approach. Ten institutions (18%, CI 95% 10 to 30) also taught the syllabus across modules, but within the same academic year assessing students at the same level. Only eight (15%, CI 95% 8 to 26) had a standalone paediatric module within the curriculum. Of the 35 BSc entry-level programs represented in this survey paediatric content was delivered to students in year one (n=18, 52%), year two (n=15, 44%) and year three (n=13, 36%). Within the 20 MSc programs seven (36%) introduced paediatric content within year one and six (32%) in year two. Table 2 displays the methods of teaching adopted by faculty who primarily assessed students via practical examinations (n=20, 36%, CI 95% 25 to 50) or written assessments (n=17, 30%, CI 95% 20 to 44). However, respondents acknowledged that paediatric

competencies were either assessed in an integrated way with other module content (n=10, 18%, CI 95%10 to 30) or not specifically assessed at all (n=22, 40%, CI 95% 28 to 53).

\*\*\*INSERT TABLE 2 ABOUT HERE\*\*\*

### ***Strengths, Weaknesses, Barriers and Facilitators to the Paediatric Curriculum***

The perceived strengths and weaknesses of current paediatric curriculums by respondents are reported in Tables 3 and 4. Perceived strengths were grouped into three main categories 1) integrated/lifespan approach, 2) links to clinical specialists and, 3) a broad/detailed curriculum. Two main themes were generated for perceived weaknesses which include curriculum time pressures and paediatric placement availability.

\*\*\*INSERT TABLES 3 and 4\*\*\*

Respondents were asked which paediatric content/skills are not currently covered by the entry-level programme that should be covered to adequately prepare a student for practice. Themes generated suggested neurodevelopment aspects, specialised equipment, mental health and practical handling skills were areas for further curricula development.

Potential barriers to the implementation and development of the paediatric physiotherapy curriculum within their institution are reported in Table 5.

\*\*\*INSERT TABLE 5\*\*\*

In addition to the questions posed in Table 5, respondents identified under resourced academic staff teams in the area of paediatrics, as a particular barrier to curriculum implementation and development. A lack of expertise within the academic team was

highlighted despite faculty's actively aiming to employ paediatric lecturers. Key facilitators to the implementation and development of paediatric curriculums included 1) additional specialised staff, 2) greater links with paediatric service providers, 3) content guidance from governing bodies in relation to key priorities and, 4) prioritisation of space within curriculum design.

## **Discussion**

This is the first study to identify paediatric curriculum content covered in UK entry-level physiotherapy programs. The study also aimed to understand the perceived importance of paediatric content from teaching faculty whilst identifying delivery and assessment modes. Finally, faculty were asked to identify strengths, weaknesses, barriers and facilitators, to the implementation of paediatric coursework curriculum in entry-level programs. Novel findings suggest the majority of paediatric related conditions were only somewhat covered by HEI curriculums, despite respondents in the main believing they should be an important element of the entry-level syllabus. Paediatric assessment and interventions were largely covered well which is associated with the importance placed upon these skills by respondents. The often-implemented integrated lifespan approach to paediatric education, linked to clinical specialists, across a broad syllabus were identified as curriculum strengths. Several weakness and barriers were identified including curriculum time pressures and specific paediatric placement availability. Importantly, five HEI's did not include any paediatric content with the curricula and a further 22 failed to assess student competency in the area.

### ***Paediatric Curriculum Content and Perceived Importance***

Faculty perceived that the inclusion of paediatric content within entry-level curriculums was important to students and their development. Findings of this study suggest UK entry-level

physiotherapy curricula do not cover musculoskeletal, cardiorespiratory and neurological conditions 'Well'. Overall, paediatric assessment and examination techniques were broadly covered 'Well' as were treatment and management interventions. The perceived importance of content coverage was in the main greater for most topics compared to the level of actual coverage within the curriculum. A similar trend was reported by Mistry et al. (2019) in their survey of Australian entry-level physiotherapy curriculums. Whilst the CSP publish programme accreditation guidelines which include quality assurance processes, no mention of specific paediatric based curriculum content is published (CSP, 2020). Rather the guidance aims to ensure that accredited programs prepare graduates for emerging physiotherapy roles which meet the demands of the UK health service (CSP, 2020). The 'Physiotherapy Framework' (CSP, 2020) document, published in 2011 but updated in 2020, defines and describes the behaviours, knowledge and skills required for on-going contemporary physiotherapy practice. It could be argued that some of these principles around the implementation of physiotherapy knowledge and practice skills are difficult for new graduates who have received little exposure to core paediatric curriculum teaching throughout their degree programme. Despite this, the value placed on the importance of these concepts within the curriculum were noted by respondents in this survey. For example, brachial plexus birth injuries were suggested to be covered 'Not at all' by respondents but perceived to be 'Important' to a paediatric curriculum. A lack of guidance for faculty in relation to the depth of content and the level of skill acquisition required upon graduation for this sub-discipline of physiotherapy exists. The limited content across several areas suggests that potentially, as in other international curriculums, students develop a taste of the subject without the time, support and feedback to develop initial competencies (Mistry et al., 2019).

The KNOWBEST report (Lowe et al., 2022) discovered that out of 34 role descriptors for newly qualified physiotherapists across a representative range of roles, paediatrics was one of five commonly stated specialities listed. The challenge is to increase the awareness and knowledge of all physiotherapy specialists including paediatrics in an overcrowded curriculum (Lowe et al., 2022). Program leaders represent 80% of the respondents to this survey, and clearly identified the importance of including a range of paediatric diagnoses, assessment and interventions to support students towards competence upon graduation.

### ***Paediatric Delivery and Assessment***

A lifespan approach to teaching the curriculum was often employed by UK institutions, with only 8% having a standalone paediatric taught module. Definitive evidence to support the need for a designated amount of time dedicated to paediatrics teaching does not exist, however, a range of active experimental learning experiences are most likely to support student-level competence (Rapport et al., 2014). A myriad of experiences including practical, face-to-face experience with children and their family support community, which includes differing disabilities, will optimally support student learning in paediatrics (Rapport et al., 2014). This plethora of experiences were reported by several institutions as part of their learning and teaching strategies, however lectures were the most common method to provide paediatric content. The quality of care delivered to children has previously been reported as suboptimal, (Quinonez et al., 2013) and therefore alongside medical colleagues, it is seminal that physiotherapy graduates are able to promote high quality evidenced based care. In a survey of UK new graduate physiotherapists, students revealed that practice placements were the preferred teaching method most applicable to practice (Chesterton et al., 2021). Our study found that only 41% of institutions offered paediatric placements to students, and furthermore not all students were able to access these placements due to capacity.

Assessment is a complex construct which can be viewed through multiple lens' within the sphere of higher education. Often assessment criteria define what is important to the student, how they plan and navigate their way through their learning but also provides educators with a formalised method to gauge student competence and progression. Whilst a range of assessment strategies were employed, notably through practical or written assessment, interestingly over half (58%) of programs either integrated paediatric competency assessment with other module content or did not assess these at all. Undoubtedly, this leaves a number of students, who have not had a specialised paediatric placement without any formal assessment of their skill level or competency prior to graduation. Stoikov and colleagues (2022) reported that new graduates felt unprepared for independent clinical practice and managing expectations of themselves. It is reasonable to conclude that this would be magnified in students not experiencing a defined paediatric curriculum. No 'gold standard' model of physiotherapy education or assessment exists, however feedback has been acknowledged as the single most powerful influence on students' achievement (Hattie, 2008). Currently, the opportunities for students to be exposed to feedback to influence future learning and practice is variable in relation to the UK paediatric curriculum.

### ***Strengths, Weaknesses, Barriers and Facilitators to the Paediatric Curriculum***

The lifespan approach to curriculum delivery was considered a strength by participants. Other key strengths included the links and associations of programs with clinical specialists, either within the academic teaching team or through external guest lecture networks and placement opportunities. A lifespan approach allowed the emphasis on knowledge development, ensuring constructive alignment throughout the curriculum, allowing students to develop clinically relevant skills. Constructive alignment, based on the twin principles of



constructivism in learning and alignment in teaching, facilitates deep learning and is critical to student success and therefore an essential element in curriculum design (Biggs, 1996; Ali, 2018). Providing students with a broad curriculum enriched by links to clinical specialists were perceived as strengths across institutions. This holistic approach also allowed the development of a range of theoretical content which importantly participants felt built confidence and competence in a range of transferable skills. Such a strategy also reflects the continuing evolving and emerging clinical environment new graduates are exposed too. The access to external lectures and clinical specialists provides students with opportunities to learn from currently practising therapists with an acute awareness of contemporary physiotherapy.

Overwhelmingly, time pressures to include paediatric content and additional placement availability were considered the two main weaknesses of UK curriculums. Such time pressures and a lack of prioritisation of curriculum space for paediatric content were identified as key barriers to the development of the curriculum. Limited time allocation to paediatric content was also considered the greatest weakness of Australian taught physiotherapy programs, despite no current best-practice benchmark existing (Mistry et al., 2019)]. Whilst a substantial amount of time of physiotherapy entry-level programs are given to clinical skill development, UK students have identified a range of skills including exercise prescription, psychosocial understanding and patient management, as requiring further focus which currently do not prepare graduates for practice (Chesterton et al., 2021; O'Donoghue et al., 2011). Such research highlights the competing interests from all stakeholders to ensure that content is contemporary and prepares students for modern-day healthcare practice. Data from our study suggests the wider UK paediatric curriculum is limited as a consequence of competing educational priorities. The difficulty for education providers is to deliver a

curricula which safeguards the assessment and management of paediatric patients' which students manage upon graduation. A minimum set of standards of paediatric proficiencies would guide and support curricula designers to ensure student competency in this specialised area.

Additionally, a lack of placement capacity, meant that some providers could not offer all students a paediatric placement. This was also identified as a key barrier to the development of the curriculum. Through the NHS Long-term plan, Health Education England have mandated a 50% increase in placement funding to meet the UK's capacity obligation for training health care students (NHS, 2019). The demand for clinical placements against the background of increasing HEI cohorts provides a real conundrum for educational providers. A collaborative approach to seek new ways to provide students with the placement opportunities is on-going despite the reluctance for some to move away from the traditional 1:1 supervision model (CSP, 2018). For instance, group placement models and online placement activity provides proactive and innovative means of increasing placement capacity (Moseley et al., 2022). Different ratios of educator to student (1:1; 1:2) placement models have been positively evaluated by stakeholders in Ireland (Barrett et al., 2021). Digital placements have been suggested as ways to increase provision; however, UK students have reported that online learning negatively impacts their discipline understanding and presents an overall disadvantage compared to face-to-face traditional teaching (Chesterton et al., 2022b). Authentic placement experiences in specialist educational settings (e.g., school-based physiotherapy) and interprofessional opportunities, can provide students with valuable multidisciplinary insights into the management of children, adolescents and young adults with complex needs. Interweaving clinical exposure in diverse paediatric settings improves student confidence, interprofessional communication and enables the clinical application of

family-centred care principles learned within the classroom (Tovin et al., 2017). Further research is welcomed to specifically evaluate current and innovative models of paediatric placements, providing an evidence-based pedagogy for students linked to competency outcomes.

Curriculum facilitators included employing greater numbers of specialised paediatric staff within the program team. This would develop greater links with paediatric service providers across the sector including hospital/clinics, private practice, school and community-based organisations. A step in the right direction would be to ensure all educational providers have paediatric specialist experience within their academic teaching teams, as is generally the case for other subdisciplines of physiotherapy including musculoskeletal and cardiovascular respiratory.

### ***Call to Action***

Due to the inconsistencies found across UK paediatric curriculum's it may be appropriate to develop a minimum set of standards for students in relation to their knowledge, skills and attributes required upon graduating. Some UK physiotherapy entry-level students may not be exposed to any paediatric teaching, assessment or experience an external placement in the area. Subsequently, these graduates will lack the competencies to assess and treat children and young adults in their care safely and effectively. Ensuring that minimum educational standards, rather than explicit syllabus mandates, are in place and that all students are exposed to paediatric education are the first steps to developing a competent future workforce. Further innovation in paediatric placement development would assist in providing a greater number of UK physiotherapy students with first-hand clinical experience. Whilst it was beyond the scope of the study to investigate how physiotherapy curriculums can increase

paediatric knowledge and skills, simulation (Lowe et al., 2022) and interprofessional learning (Andrea et al., 2022) show promise and provide future research opportunities.

### ***Limitations***

Despite the response rate of 67%, participants who completed the survey may not be representative of the entire target population. Due to responder/non-response bias we acknowledge this survey does not represent the views of all UK HEI physiotherapy program leaders (Chesterton et al., 2020). Due to the anonymous nature of the survey, protecting both respondents and HEI program identity, it was not possible to ensure only one staff member per program completed the questionnaire despite the explicit instruction. This UK study may also not reflect the nuances of international institutions who operate in a different educational context (Chesterton et al., 2022b). Whilst this study provides an overview of paediatric entry-level education in the UK, further research to understand how weaknesses and barriers identified can be addressed through a multi-stakeholder approach is warranted, to continually develop and improve the curriculum for the graduates of the future.

### ***Implications on Physiotherapy Practice***

An overcrowded entry-level curriculum and limited placement availability are two acute challenges faced by UK HEI's in providing a comprehensive and stimulating paediatric curriculum. It is important to recognise that UK higher education entry-level programs have significant challenges in providing a contemporary physiotherapy education experience for their students. This study suggested respondents value the importance of paediatric content within the syllabus and also perceived students valued its inclusion. Competing interests are multiple and several barriers are highlighted in this study in relation to the provision of a paediatric curriculum. Minimal required standards set by accrediting bodies many facilitate

the introduction of a formal paediatric curriculum to ensure parity across the many institutions who offer entry-level physiotherapy in the UK.

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**Table 1 - Content covered and perceived importance reported for the knowledge of typical development**

	Content Covered					Perceived Importance				
	Mean (SD)	Mode	Median	% of Responses for Scores, 1/2/3/4/5	Likert Scale	Mean (SD)	Mode	Mean	% of Responses for Scores, 1/2/3/4/5	Likert Scale
Develop foundation knowledge of prenatal development and birth	3.13 (0.96)	3	3	0/7/19/14/5	<b>Somewhat</b>	4.11 (0.76)	4	4	0/3/4/32/16	<b>Important</b>
Develop foundation knowledge of the theories of childhood development and learning	3.51 (0.95)	3	3	0/9/19/17/10	<b>Well</b>	4.42 (0.66)	5	4	0/1/2/25/27	<b>Important</b>
Demonstrate knowledge of developmental motor milestones	2.33 (0.98)	1	2	20/11/12/10/2	<b>Not Very Well</b>	3.42 (1.20)	2	3	0/17/13/10/15	<b>Neutral</b>
Understand the importance of therapeutic play within diverse family, cultural, community and societal context	2.55 (1.09)	1	2	12/12/22/7/2	<b>Somewhat</b>	4.04 (0.64)	4	4	0/0/10/33/12	<b>Important</b>
Understand when a child should provide consent and gaining parent/ carer consent	2.93 (1.32)	3	3	11/9/15/13/7	<b>Somewhat</b>	4.24 (0.72)	4	4	0/0/9/24/22	<b>Important</b>
Demonstrate knowledge of developmental milestones in the social-emotional, speech and language domains	3.69 (0.94)	4	4	0/7/14/23/11	<b>Well</b>	4.89 (0.31)	5	5	0/0/0/6/49	<b>Very Important</b>

**KEY:** Likert Scale – 1 – Not at all; 2 – Not very well; 3- Somewhat; 4- Well; 5 – Very Well; SD – Standard Deviation

**Table 2 – Teaching methods utilised by institutions**

<b>Teaching method</b>	<b>n, %, (95% CI)</b>
Lectures	53, 96 (88 to 99)
Clinical placement	41, 75 (62 to 84)
Problem based learning classes	40, 73 (60 to 83)
Independent study	36, 65 (52 to 77)
Tutorials	24, 44 (31 to 57)
Workshops	14, 25 (16 to 38)
Online modules	10, 18 (10 to 30)
Flipped classes	8, 15 (8 to 26)
Other	7, 13 (6 to 24)
Simulated learning – high fidelity	5, 9 (4 to 20)
Simulated learning – low fidelity	5, 9 (4 to 20)

**Table 3 – Perceived strengths of UK paediatric curriculums**

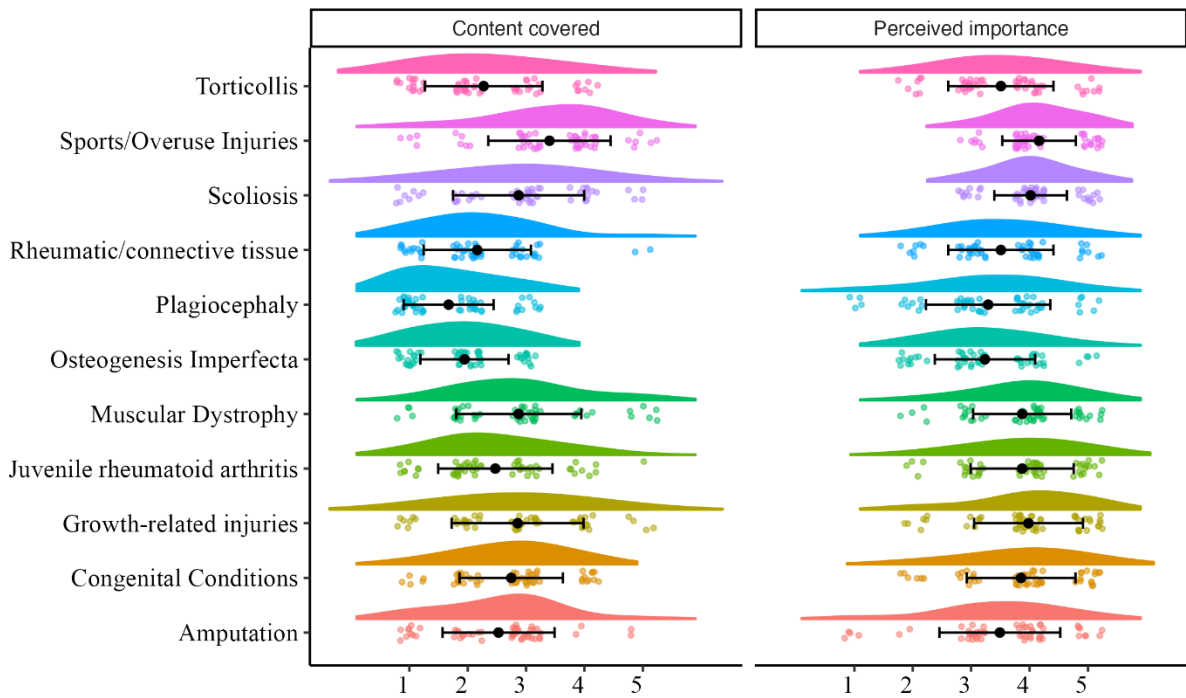
<b>Theme: Integrated/Lifespan Approach</b>	
Emphasis on knowledge development	<p>‘I’d like to think it provides a coherent framework to enable student learning and development should the individual wish to practice in the area at sometime in the future.’</p> <p>‘We aim to give students an awareness of the typical conditions that children can face/acquire and how to manage these effectively’</p>
Content throughout curriculum levels	<p>‘Paediatric content is integrated through as many modules as possible, rather than being stand alone.’</p> <p>‘Strong flow of material from year 1 to year 2, not quite equally balanced with adult content but estimate approximately 30/70 split’</p> <p>‘Linked across modules. We do not have a specific paediatric modules, but link elements of paediatric’ assessment/management across as many aspects of the curriculum as possible.’</p>
<b>Theme: Links to Clinical Specialists</b>	
Academic Faculty with Specialisms	<p>‘We have several lecturers who are from varied paediatric specialist areas who contribute’</p> <p>‘Academic staff with prior experience of working throughout the area of Paediatrics’</p>
Externals contribute to teaching	<p>‘It is delivered by experts experienced in the specialism’</p> <p>‘Students have the opportunity to be taught by Clinical Specialist Paediatric Physiotherapist from local teaching hospitals to support learning and opportunities.’</p>
Placement opportunities	<p>‘Paediatric placements available to students. Paediatric learning activities involve service users.’</p> <p>‘We aim to ensure students can apply taught skills to paediatric populations in preparation for placements’.</p>
<b>Theme: Broad/Detailed Curriculum</b>	
Range of theoretical content	<p>‘We cover a range of neurodevelopmental conditions including cerebral palsy, spina bifida and autism spectrum disorders. Also cover normal development.’</p> <p>Providing an overview of some main pathologies/conditions and how to assess and treat. Application of skills to paediatric populations and preparation for placement.</p> <p>‘A holistic approach to long-term paediatric care.’</p>
Transferable skills	<p>‘The scope of the content and how it can be integrated into adult physiotherapy’</p> <p>‘By covering a broad spectrum of conditions, we also aim to provide students with transferable skills related to all physiotherapy disciplines.’</p> <p>‘Using paediatric content as transferable skills, e.g. to underline importance of interpersonal skills and to communicate the strategies for dealing with chronic conditions’</p>

**Table 4 – Perceived weaknesses of UK paediatric curriculums**

<b>Theme: Time Pressures</b>	
Limited time to integrate into Curriculum	<p>‘curriculum squeeze - limited time’</p> <p>‘There is insufficient time available to cover aspects that would be useful pre-registration.’</p>
Lack of Depth/Superficial content	<p>‘We only deliver a handful of sessions throughout the curriculum. Some more general sessions will refer to both adult and paediatric populations but there is just not enough time to cover everything we would like to.’</p> <p>‘curriculum volume is the issue - it terms of being able to cover paediatric content in greater detail. It is impossible to include 'everything' that would provide a comprehensive address of all areas of what is a continuously evolving profession’</p>
<b>Theme: Placement Availability</b>	
Placement not available to all	<p>‘Not all students get a paediatric placement, due to limited access to placement opportunities in area.’</p> <p>‘we get very few paediatric placement offers which is reflective I suspect of service division and the challenges practice colleagues face’</p>
Limited exposure to service users	<p>‘Only some students get to experience a placement in paediatrics.’</p> <p>‘Real world engagement with service users as well as practicing clinicians is a weakness’</p> <p>‘Challenges engaging with service users due to inadequate changing facilities and reimbursement policies.’</p>

**Table 5 – Perceived institutional barriers to the implementation and development of Paediatric curriculums**

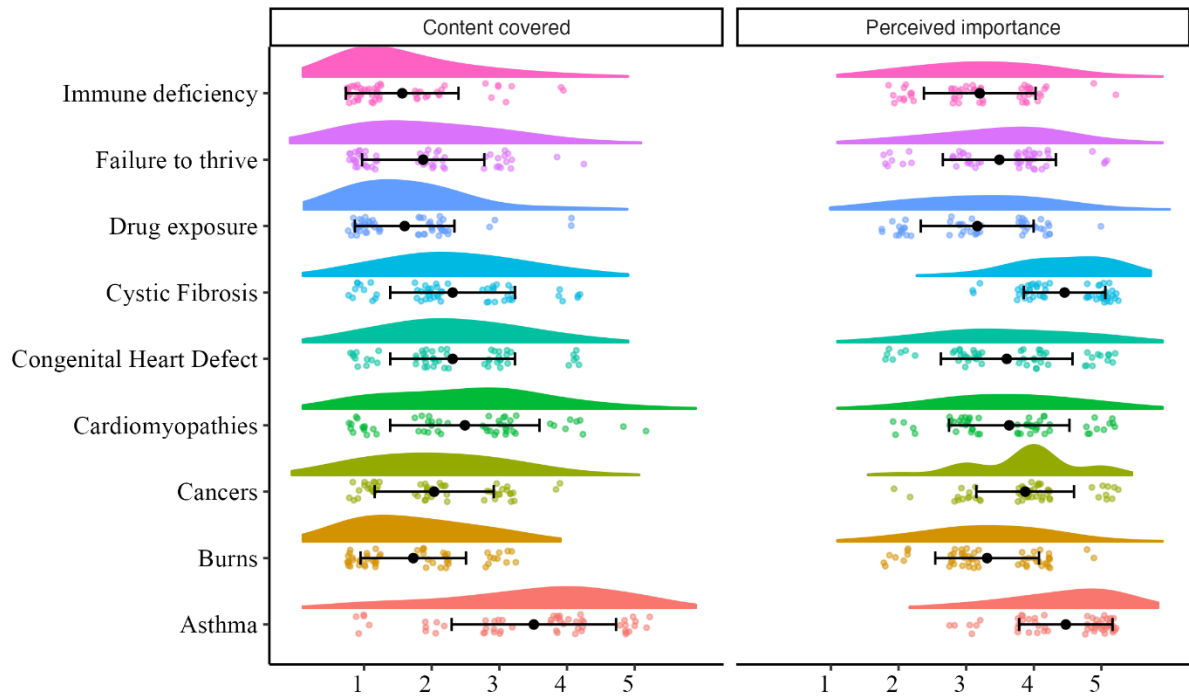
<b>Potential institutional barrier</b>	<b>Answered ‘Yes’ n, %, (95% CI)</b>
Crowded curriculum due to the requirements of the professional practice guidelines provided by the CSP to be eligible for registration	55, 91 (80 to 96)
Lack of prioritisation of curriculum space for paediatric content	39, 71 (58 to 81)
Limited number of practical or placement opportunities available in hospital/clinics, private practice, school and community-based programs with children with special needs	37, 67 (54 to 78)
Lack of qualified personnel available to teach within the educational field of paediatric physiotherapy curriculum	28, 51 (38 to 64)
Limited institutional or other financial resources	26, 47 (35 to 60)
Lack of coordination among institutions of higher education to develop a collaborative curriculum or standard of education to be taught within the curriculum	22, 40 (28 to 53)
Organisational structure of the institution of higher education	12, 22 (13 to 34)



Key: Content covered; 1 = Not at all; 2 = Not very well; 3 = Somewhat; 4 = Well; 5 = Very Well.  
 Perceived importance; 1 = Not important at all; 2 = Low importance; 3 = Neutral; 4 = Important; 5 = Very important.

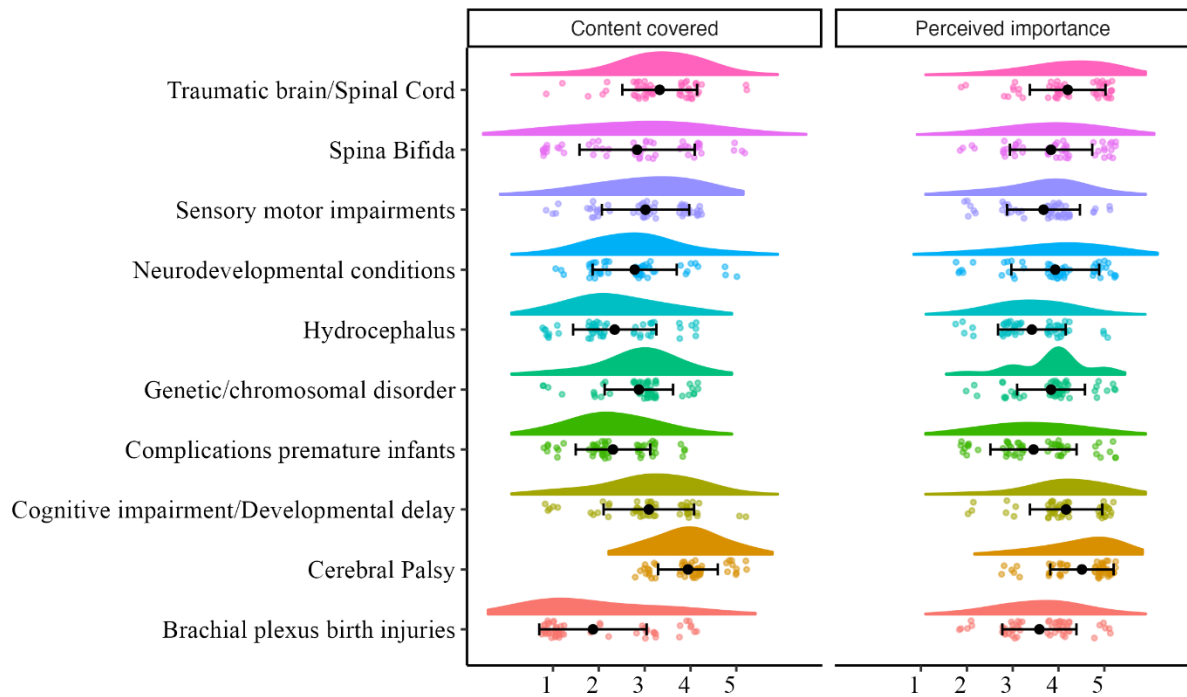
**Figure 1 – Mean, standard deviation and distribution of responses to questions about content covered and perceived importance for musculoskeletal conditions**





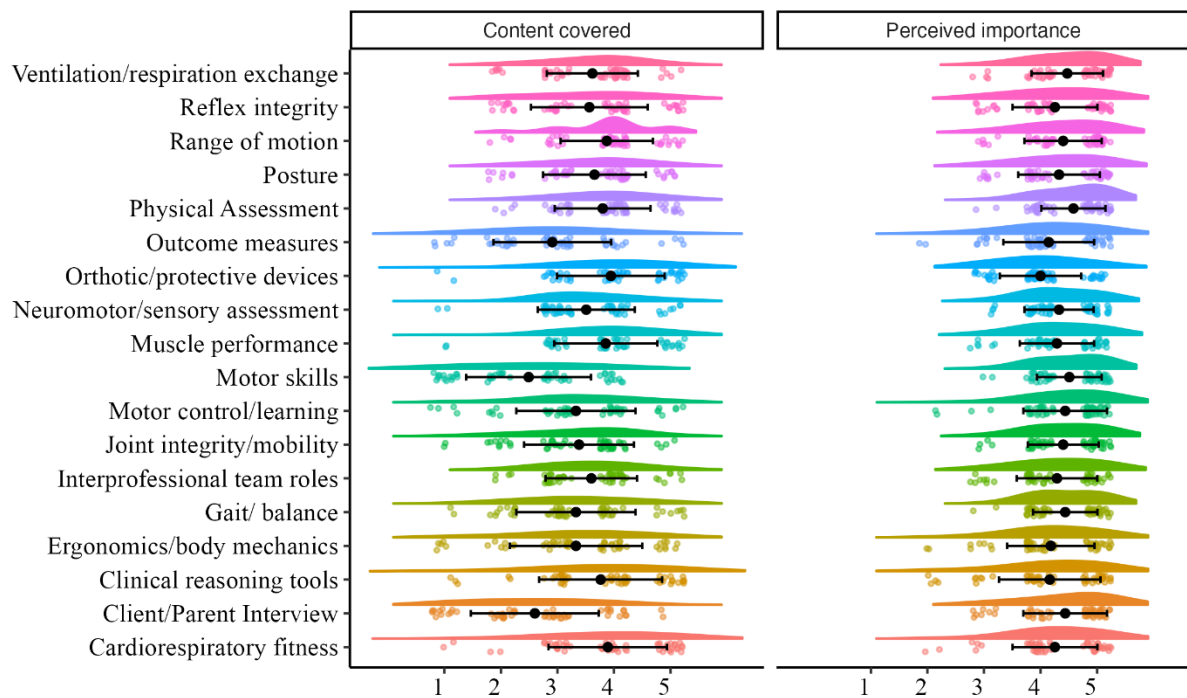
Key: Content covered; 1 = Not at all; 2 = Not very well; 3 = Somewhat; 4 = Well; 5 = Very Well.  
 Perceived importance; 1 = Not important at all; 2 = Low importance; 3 = Neutral; 4 = Important; 5 = Very important.

**Figure 2 – Mean, standard deviation and distribution of responses to questions about content covered and perceived importance for cardiorespiratory and other conditions.**



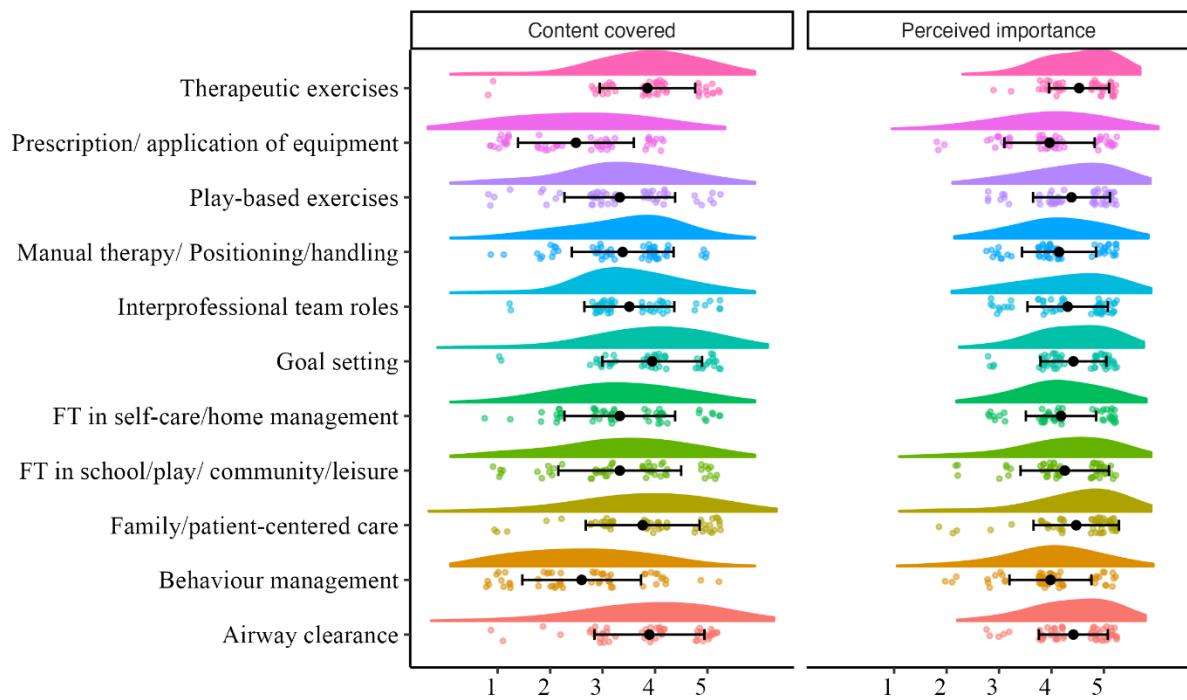
Key: Content covered; 1 = Not at all; 2 = Not very well; 3 = Somewhat; 4 = Well; 5 = Very Well.  
 Perceived importance; 1 = Not important at all; 2 = Low importance; 3 = Neutral; 4 = Important; 5 = Very important.

**Figure 3 – Mean, standard deviation and distribution of responses to questions about content covered and perceived importance for neurological conditions.**



Key: Content covered; 1 = Not at all; 2 = Not very well; 3 = Somewhat; 4 = Well; 5 = Very Well. Perceived importance; 1 = Not important at all; 2 = Low importance; 3 = Neutral; 4 = Important; 5 = Very important.

**Figure 4 – Mean, standard deviation and distribution of responses to questions about content covered and perceived importance of paediatric assessment/examination techniques.**



Key: Content covered; 1 = Not at all; 2 = Not very well; 3 = Somewhat; 4 = Well; 5 = Very Well.  
 Perceived importance; 1 = Not important at all; 2 = Low importance; 3 = Neutral; 4 = Important; 5 = Very important.

**Figure 5 – Mean, standard deviation and distribution of responses to questions about content covered and perceived importance of paediatric interventions.**