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## Designing a motor skill intervention for pre-school children in a low-income rural setting in South Africa: A Delphi study

**ABSTRACT**

**Introduction:** There is a high prevalence of motor skill impairment among pre-school children in rural low socio-economic areas. While therapy input is paramount, resources are limited. This Delphi study aimed to determine what the components would be of a feasible, cost-effective motor skill intervention for pre-school children in a rural, low socio-economic area of South Africa.

**Method:** A three-round Delphi study was conducted with experts in the field, including occupational therapists, physiotherapists, kinder kinetists and teachers. The first round investigated demographic details of participants and agreement of participants on role players, structure and content of an intervention. Subsequent rounds' questions followed up on participants' comments and areas of dissent. Agreement was calculated at 75% or mean >4.

**Results:** Outcomes suggest that a school-based, small-group programme, facilitated by the teaching team, but with clear guidelines, support and advice from therapists should be feasible in a low-income rural context. Inclusivity of intervention groups and aim-formulation proved to be controversial issues that need further investigation.

**Conclusion:** The results from this study helped develop a guide for motor skill intervention for pre-school children in low socio-economic and rural areas.

**INTRODUCTION**

Children in low- and middle-income countries (LMICs) are known to be at risk of experiencing motor skill delays or difficulties<sup>1,2</sup>, which may affect the academic, social and independence skills needed to learn and function in a school environment<sup>3-5</sup>. These findings were supported in a prevalence study conducted among pre-school children living along the West Coast of South Africa<sup>6</sup>, a region with many challenges, including high levels of unemployment and poverty, and low levels of education in the community<sup>7</sup>. Children with motor skill impairment can, however, benefit from therapeutic intervention and improve these skills<sup>8</sup>. Two recent systematic reviews<sup>9,10</sup> and two scoping reviews<sup>11,12</sup> identified a wide range of effective motor skill interventions to address motor skill delays or difficulties. Unfortunately, the challenge in LMICs is how to implement best practice with limited resources and community barriers.

Camden et al.<sup>11</sup>, in one of the scoping reviews, reported that efficient organisation of services is needed to comprehensively address the needs of children with motor skill difficulties. This is difficult in rural settings where therapy services are thinly spread, and therapy input is limited due to time, distance, space and other resource constraints<sup>13-16</sup>. Where private services are available, these are usually limited to urban areas and inaccessible to many due to costs involved and practical issues such as lack of transport<sup>17,18</sup>. Schools in rural settings, furthermore, face

many challenges. Teaching staff often need to cope with limited access to teaching aids and information, which are exacerbated by inconsistent electricity supply. Similarly, the school buildings are often dilapidated. Parents in rural areas are in many cases less educated and less able to recognise or help children with scholastic difficulty or other challenges they may experience<sup>19</sup>. The result is that many children with motor skill difficulties proceed through the grades without being recognised by teachers or parents, or receiving much needed therapy input<sup>20</sup>.

These barriers restrict children from benefitting from therapeutic and research advances in LMIC and rural regions, and many children with motor skill difficulties remain undiagnosed and untreated. This is a particular concern for children in their final year of pre-school (grade R in South Africa) as school readiness may be affected<sup>1,21</sup>.

In their scoping review, Van der Walt et al.<sup>12</sup> suggested a framework of key components to consider when developing interventions to address motor difficulties in pre-school children where therapy approaches, role players, service delivery models, venues, structures, and therapeutic activities are considered against available resources as well as location and environmental opportunities and constraints. Although this scoping review<sup>12</sup> provided evidence from rigorously conducted empirical studies for developing a programme to address motor difficulties, only two studies were from LMICs, only one study from South Africa was included. Further research was therefore needed to investigate how these findings relate to rural low socio-economic areas. Since the published research was not specific enough, the opinion and input of experts was sought<sup>22-24</sup> using a Delphi study. Experts were invited to contribute their knowledge, views, and expertise to ensure evidence-based quality intervention while also considering the needs and challenges of a specific rural community.

The aim of this Delphi study was therefore to determine the components of a motor skill intervention suitable and feasible for grade R children in a rural low socio-economic area of South Africa.

## METHODS

### Research Design

The method, as described according to the guidelines on Conducting and Reporting Delphi Studies (CREDES)<sup>25</sup> and guidelines by Day and Bobeva<sup>26</sup>, informed this Delphi process.

### Planning Phase

The planning phase involved the formulation of the study aims and objectives aligned to the programme components for motor skills intervention identified in the outcomes from the scoping review by van der Walt<sup>12</sup> to determine:

- who should participate in the programme;
- the key role players with regards to the management and

facilitation of the programme;

- the approaches and methods to be used in the programme; and
- the logistics to administer the programme.

### Participants

To be included as a Delphi panellist, experts had to comply with the following criteria: Individual participants had to have a postgraduate degree and/or have published research in a peer-reviewed journal and/or have ten or more years' experience in their field of work. The South African participants had to represent all regions in both urban and rural areas. Although the focus of the study was on LMICs, international authors, from high income countries (HICs), who had contributed to research specific to motor skill intervention among pre-school children and who reported on challenges similar to those in areas of low socio-economic status<sup>27</sup> and rural areas,<sup>15</sup> were invited to participate in the study. These experts represented various professions including occupational therapists, physiotherapists, mainstream primary school teachers (with or without physical education experience), and kinesiologists/kinderkineticists<sup>12</sup> from different fields of practice including education, research and clinical practice.

Participants were identified through collaboration between researchers, internet searches and suggestions from possible participants who were contacted via email. A total of 123 potential participants were contacted for the first round. A minimum of ten participants, including two international contacts for each named profession, were invited to participate. For each following round, only those participants who completed the survey of the current round were included.

### Research instrument

The survey platform Checkbox 6<sup>28</sup> was used to compile the initial questionnaire. Checkboxes, dropdown lists, and Likert scale grading were used to facilitate answering of these questions. Open-ended questions were also included to allow for additional comments and views. Round 2 and the next rounds were developed according to responses in the previous rounds. For each round, a summary of anonymised statements from the previous round were drafted for participants to refer to for completion of the next round. Pilot studies prior to each round were conducted to ensure readability and comprehensiveness of questions and/or statements, and to determine the time needed to complete the questionnaire.

### Data Collection

Introductory letters were drafted to explain the aims of the study, and the demographic and socio-economic characteristics of the specific area involved. A summary of the results of the scoping review from which components for the motor skills intervention programme had been identified<sup>12</sup> were also included. For each round, invitations were sent out to participants via email through the Checkbox server.

Consent was required to participate and was explained according to the guidelines of the Stellenbosch University Health Research Ethics Committee (S16/10/190).

Consensus was conceptualised using percentages for multiple choice and direct input questions, and mean values for Likert scale questions as a statistical rating scale. The cut off for consensus was 75%, indicated as the mean for consensus agreement in a systematic review of Delphi studies<sup>23</sup>, and a mean of >4 on Likert scale grading, based on similar healthcare intervention development Delphi studies<sup>24</sup>. All comments from open-ended questions were listed and categorised on a custom designed Microsoft Excel™ spreadsheet. We developed a grading system to establish the relevance of each comment to the aim of the study. The grading system ranked comments from a 5 (significantly contributes to knowledgebase of research/very relevant to outcomes of the study) to a 1 (irrelevant information). Only comments graded on a level 4 or 5 were listed in Table 1 (page 49 and 50).

We planned to conduct as many rounds as was needed to reach consensus on the essential components to be considered for developing a motor skills intervention within the constraints of a rural LMIC setting. However, for this Delphi study, the required level of consensus was reached within three rounds.

### Round 1

The first Delphi round included 34 questions in three sections. The initial nine questions of the survey collected demographic information from participants. Five checklists determined participants' field of occupation, highest qualification, work setting, publication record and their experience with different diagnoses related to motor skills impairment. The questions regarding age, years of experience and country of work required data entering by participants. Information was captured onto a custom MS Excel™ worksheet, categorised and labelled. Descriptive statistics were used to analyse demographic data. An open-ended question invited participants to add information about themselves which may be relevant to the study. The comments were listed, categorised, and graded (Table 1 page 59).

The next section collated information on role players, format and content of the intervention. The first introductory question asked participants to grade their agreement on the following question on a 5-point Likert scale: "Some form of therapeutic intervention is essential to improve the motor skills of children who have significant motor skill difficulties". The mean and percentage of agreement was calculated. The next four questions asked participants to rank named role players according to the most appropriate person as facilitator of the intervention, advisor to the facilitators, support worker or assistant to the facilitator and overall, the most important role player. The named options for role players to allocate to the different roles were occupational therapists, physiotherapists, kinesiologists, teachers with physical education (PE) experience, class teachers and teaching assistants. The percentages according to ranked place values were calculated to determine the first three highest graded role players.

Then eight dropdown lists, and checklists gave options regarding the format of the intervention. This included group vs individual treatment, treatment venue, which children to include when working in groups in a school environment, when in a school year to start an intervention, understanding of a child-centred approach, preferred therapy approaches, and activities to include. Percentages were calculated to measure levels of agreement. Four questions required direct numeric data input, where participants were asked to provide recommendations regarding group size and time length of sessions, programme duration and intervention frequency. For these, data were grouped together in intervals and percentages of agreement were calculated. Six open-ended questions allowed participants to comment on their chosen answers with a final section for any further comments or suggestions. As in the first section, comments were listed, categorised and graded, as presented in Table 1 (page 49)

### Round 2

The second round of the survey consisted of 12 questions. The outcomes of the first round were presented to the participants as an introduction to the second round in their email invitation. Three questions followed up on participants' comments or previous questions – these included a question about methods to identify children who would benefit from the programme by choosing one or more of eight options aimed at early identification of motor skill difficulties. Participants were also asked to suggest possible screening tools in an open-ended question. A question about how therapy aims should be determined was added, giving participants a choice between general developmental aims, aims specific to a group of children or aims specific to each child. The issue of group vs individual sessions was depicted further in this round within the specific context of a rural low socio-economic area.

The aspects where consensus was not reached (<75%) in round 1 were regarding **who** to include in an intervention group and the **session duration** were also included and supportive information was added where appropriate. For example, to determine the time length of a therapy session, the question was formatted as follows:

"Participants agreed on an 8- to 12-week programme (roughly 2 terms) with 2 sessions per week. Considering that the children in the group will be aged 5 – 7 years and that the sessions will take place during school hours, how long do you think each session should be? Choose one option".

These questions were formatted as checklists and calculated by percentage to determine consensus. Another three questions followed up on role-players. For these, participants were asked to rank their agreement with the following statement on a 5-point Likert scale:

"Considering the vastness of the West Coast area and limited resources, this role could be played by any one of the above-mentioned role players according to availability and experience".

**Table 1: Delphi study participants' comments according to category and frequency**

Round-section	Survey section topic	Total comments in section	Common statements by categorisation	(n) participant comments per statement
1 - 1	Any comments – end of demographics section	14	Children do not play enough	1
1 - 2	Therapy input is essential – comments	23	Early intervention promotes school readiness and school performance	9
			Therapy is essential but can take on different forms	4
			Research suggests that therapy input is essential for children with motor skill impairment	2
			Children regress without therapy input	1
			Well graded therapeutic input is important to avoid splinter skills	1
			Therapy intervention improves quality of life and decreases learning difficulties	1
1 - 3	Group or individual input – comments	24	The decision to use individual or group sessions depends on the child's diagnosis and level of difficulty	7
			It depends on available resources	4
			Individual and group treatment both have their own unique advantages	4
			It may be beneficial to start off with individual treatment and progress to group treatment	3
			Positive peer pressure and the opportunity to copy peers can be beneficial in a group setting	2
			A combination of individual and group treatment is the preferred option	1
			A small group seems preferable to address specific difficulties while being cost affective	1
			All children should be included in a group to stimulate optimal development, however, children with specific difficulties may need specialised intervention	1
			Care should be given to ensure individual children's participation in groups	1
1 - 3	Grouping of children – comments	19	All grade R children will benefit and positive peer support may be beneficial	4
			All children should be included but children with difficulties should receive extra input	2
			Singling out children with difficulties as a separated group may label them	2
			Different models may work, depending on resources and class structure	2
			In an inclusive group, children who do not have difficulties may be bored and children with difficulties will stand out more	1
			The intervention should be purely need-based	1
			Integrated groups create a sense of belonging	1
			To maximise use of resources include only those with difficulties and provide teacher training to address general motor skill development for rest of the class	1
			Children with difficulties should be grouped together so that they can perform at their own level without feeling judged	1
			All children should be grouped together, but using different strategies for those with difficulties	1

**Table 1: Delphi study participants' comments according to category and frequency**

Round-section	Survey section topic	Total comments in section	Common statements by categorisation	(n) participant comments per statement
1 - 3	Intervention aimed at improving gross motor skills or both gross and fine motor skills – comments	22	Both are interrelated and important for school readiness	11
			Skills are transferable	2
			Both should be included according to the goals of a session	1
			Gross motor skills precede fine motor skills and should be addressed first	1
			Variety between gross and fine motor tasks allow for a variety of experiences of mastery	1
			Gross motor skills precede fine motor skills, however, grade R children need fine motor skill development in preparation for grade 1	1
			Intervention should be task-specific	1
			Addressing both skill sets are essential as skills are not automatically transferred	1
			Both, but 80% gross motor and 20% fine motor	1
1 - 3	Activities to include – comments	22	Equipment and materials should be affordable, easily available, safe, non-toxic and locally appropriate	3
			Activities that promote motor skills can also form part of the daily general activities at school	3
			A variety of activities will keep children motivated and excited	3
			There should be sufficient equipment available to promote physical activity	2
			Specialised therapy equipment is not necessary	2
			Activities should be meaningful to the child	1
			Activities should offer a range of sensory and motor experience that extends and challenges their existing performance	1
			Activities should be perceived as fun	1
1 - 3	Any further comments or suggestions – end of round one	9	There needs to be more collaboration between the public sectors especially education and health to employ therapists to assist with early intervention programmes like these	1
			Accessibility for all children in the community is essential with regards to the design, implementation, monitoring and evaluation of a programme	1
			Diagnosis of difficulties is important to ensure the correct focus of a programme	1
			The facilitators should receive adequate training	1
			Individual evaluation or screening is essential prior to group intervention	1
2 - 1	Individual vs group intervention in context of West Coast – comments	5	Proper individual evaluation or screening is essential prior to a group intervention	1
			Group sessions are largely cost effective and lend themselves to the inclusion of play more easily	1
2 - 1	Role players – comments	8	The role players will depend on the specific needs of the children in the group	1
			Sufficient training needs to be provided by experienced professional occupational therapists and physiotherapists	1
3 - 1	Final comments or recommendations	8	The ideal would be to include all the children in the intervention programme, but practical issues, e.g., class sizes and lack of enough professionals to work with the children, prohibit this. Second best is therefore to include only children with significant difficulties.	1
			Research supports targeted group intervention for children with similar abilities	1
			Early identification of difficulties is important	1
			Children with difficulties should be grouped together, but the other children should also be included in the programme in a separate group – is essential that “no child is left behind” or falls through the cracks	1

**Table II: Agreement on intervention roles – round 2**

Question	Percentage agreement >4 on 5-point Likert scale	Mean (SD)
The role of a facilitator could be played by any one of the above-mentioned role players according to availability and experience: Teacher with physical education experience, occupational therapist, physiotherapist	95	4.5 (0.72)
The role of an assistant could be played by any one of the above-mentioned role players according to availability and experience: Teacher with physical education experience, teaching assistant, class teacher	91	4.36 (1.02)
The role of an advisor could be played by any one of the above-mentioned role players according to availability and experience: occupational therapist, physiotherapist, kinder kineticist	82	4.18 (1.19)

**Table III: Demographic details of Delphi participants in round 1**

	Demographic category	Frequency (N = 29)	Percentage
Age	30 - 40	12	41
	41 - 50	11	38
	51 - 60	4	14
	60 +	2	7
Country of residence	South Africa	25	86
	United Kingdom	2	7
	Australia	1	3.5
	Madagascar	1	3.5
Work setting (one or more)	School	15	52
	Public health sector	3	10
	Private sector	8	28
	Community	1	3.5
	University	17	59
Qualification	Graduate	4	14
	Honours degree	4	14
	Master's degree	10	34
	PhD	11	38
Years of relevant experience	5 - 10	4	14
	11 - 25	17	58
	26 - 35	6	21
	36 - 45	1	3.5
	45+	1	3.5
Field of practice	Physiotherapy	9	31
	Occupational Therapy	7	24
	Kinder kinetics	7	24
	Teaching	6	21

For each role (facilitator, advisor and assistant), the question provided the three options with the highest score from the previous round. The mean was calculated to determine consensus and can be seen in Table II (above). Four open-ended questions gave the option for further comments or suggestions. The comments and suggestions were listed, categorised and graded.

### Round 3

The final round consisted of three questions. The results from both previous rounds were summarised as an introduction to the invitation email. Two questions were repeated from the second round as consensus was not reached, but with the following supportive information:

“The West Coast of SA is a vast area with 97 government primary schools with grade R classes. The number of grade R learners per school varies from 7 to 150. Survey participants agreed that a motor skill intervention group should consist of 5 - 8 learners”.

Questions about **who** to include in a therapy group and **how to determine therapy aims** were repeated as checklists. Percentages were calculated to determine consensus. The final question was open-ended and invited participants to contribute any further comments or suggestions. These questions were analysed as in previous rounds.

## RESULTS

### Participant Characteristics

Twenty-nine experts participated in the first round of the study. Nine participants worked in the field of physiotherapy, seven in occupational therapy, seven in education and six in kinder kinetics. Twenty-five participants (85%) had a post-graduate qualification, while eighteen (72%) had published at least one article in a peer-reviewed journal. Participants had an average of 20 years' experience (range 5 - 50). Most participants practiced in South Africa (86%) with a small percentage in United Kingdom (7%), Madagascar (3.5%) and Australia (3.5%). Six participants lived and worked on the West Coast of South Africa at the time they completed the questionnaire. Work settings varied between schools (52%), public health sector (10%), private sector (28%), community (3.5%) and university settings (59%), with some working in more than one setting (Table III adjacent). Experience with regard to diagnoses varied, but main areas of experience were with children with Attention Deficit and Hyperactivity Disorder (ADHD), dyspraxia/Developmental Coordination Disorder (DCD), autism spectrum disorders (ASD) and motor skill difficulties not specified by diagnosis.

### Role Players

In the first round, participants were asked to rank the role players in order of perceived overall importance and for the position of facilitator, assistant and advisor. The percentages of highest-ranking role players were scattered and agreement at 75% was not reached for any of the four role-player questions.

The second round focused on the three most highly ranked disciplines from round one for each role – facilitator, assistant and advisor – and requested participants to rate their agreement with three statements on a 5-point Likert

scale, while considering the vastness of the named rural area and limited resources.

The study found that the role of facilitator could be played by teachers with a PE role, occupational therapists, or physiotherapists. The role of assistant could be played by one of three of a school's teaching team. Health professionals (occupational therapists, or physiotherapists) and kinder kineticists were recommended as advisors (Table II page 51)

### Content of the Intervention

Agreement was reached in all areas concerning the content of an intervention in the first round of the study. It was agreed on that the most important factors of a child-centred approach are that the intervention should take place through means of facilitation rather than teaching (89% consensus), the activities used should be guided by the child's interests (79% consensus), there should be clear boundaries and rules (75% consensus) and that the child should assist with goal setting (75% consensus). The three most frequently chosen approaches were: an indirect approach (including training and advice to facilitators and feeding into the individual education plan of children) (82% consensus); input through physical education or normal class activity in schools (79% consensus) and a visual-perceptual motor approach (75% consensus). It was agreed on that both gross and fine motor skill activities should be included in an intervention (79% consensus). Activities most frequently chosen to include in a programme were: activities using general PE equipment (96% consensus) or general playground apparatus (96% consensus), obstacle courses (89% consensus); arts and crafts (79% consensus); fine motor games (79% consensus) and sport activities (75% consensus).

In the second round, it was agreed on that a motor skill checklist (77% consensus), with adjacent training (77% consensus), should be available for teachers. Guidance should be given as to which children should be referred for additional therapeutic intervention (91% consensus). Participants suggested several screening tools, including general developmental checklists, the Bruininks-Oseretsky Test of Motor Proficiency - 2 (short form)<sup>29</sup>, the Movement Assessment Battery for Children (MABC- 2) checklist<sup>30</sup>, University of Witwatersrand (WITS) developmental profile<sup>31</sup> and Clinical Observations of Gross Motor Items developed by the South African Institute of Sensory Integration<sup>32</sup>. Two participants suggested the Developmental Coordination Disorder Questionnaire (DCDQ)<sup>33</sup>. It was also agreed that a group intervention in schools was the most appropriate option for the West Coast area (82% consensus), with a clear referral pathway for children who need more specialised input.

### Format of the Intervention

Consensus was reached for seven of the eight format-aspects of the intervention in the first round. Participants agreed that motor skill intervention for Grade R pre-school children can be carried out as an individual or group intervention (82% consensus). For a group intervention, five to eight children per group was recommended (79% consensus). Intervention can successfully take place in a

school setting or at a therapy centre (79% consensus). The preferred time to start a motor skill intervention in a school environment is in the first quarter of a school year (100% consensus). The duration of a programme should be 8 – 12 weeks (86% consensus), with two sessions per week as the preferred frequency of sessions (89% consensus). The time length per session was agreed on as 30 – 45 minutes (93% consensus).

### Aspects without Consensus

The two, seemingly interlinked, concepts of who to include in an intervention group and how to determine group aims remained areas of dissent up to the third round. Participants were divided between choosing the option that all grade R children should be included in the intervention, but children with motor skill difficulties should be grouped separately (58% consensus); that all children in the class should be included (23% consensus) or that only children with motor skill difficulties should be included in the intervention (13% consensus). The 7% of participants, who chose the "other" option in the checklist, explained that it depended on the objectives of an intervention and resources available. In the optional open-ended comments section, where participants were asked to explain their answer, they contributed valuable information, which guided the questions in the second round (Table I page 49 and 50).

In round 2, the questions were reformatted and a summary of participants' comments was stated as an introduction to the question to help guide participants:

"Participants agreed that a group should consist of 5 - 8 children, but consensus was not reached on who to include and how to group children together. Please consider the following comments of participants in round one of this study before choosing one of the options. - Integrated groups will avoid stigmatism - Separate groups provide opportunity for practice on each child's own level - Typically developing children may be bored if included - Children with difficulties will stand out if everyone is included - Children could be grouped separately according to difficulties at first, but later be merged together as children progress - All children should be included but differentiation of strategies is important - All developing children will benefit and it is a way to identify difficulties."

In this round, results indicate that participants were equally divided between choosing the option of only including children with motor skill difficulties (36.4% consensus) and including all children, but grouping children with motor skill difficulties separately (36.4% consensus), with only slightly fewer participants choosing the option of an all-inclusive intervention group (27% consensus).

For the final round, demographic information of the area was added, related specifically to the questions, with an additional option in the checklist namely: "Only children with significant motor skill difficulties should be included for a pilot study to test the programme before considering

inclusion of the whole class.” Results were as follows: 44% of participants chose to include all children, but group those with motor skill difficulties separately; 33% chose the additional option of a pilot study to help determine the outcome; 17% felt that only children with difficulties should be included, while only 6% still felt that all children should be included.

A question in round 2, which originated from participants’ comments from the first round, asked participants to consider the formulation of aims for the intervention programme. Forty-six percent of participants agreed that group aims should be generalised according to developmental milestones; 32% chose the option of group aims, but for the specific children in an intervention group; 18% felt that aims should be individual for each child, while 5% chose the option “other”.

The survey was terminated after round 3 because sufficient areas of consensus were reached to develop a programme. Nevertheless, the items of dissent were not disregarded and valuable comments from participants helped to guide the researchers to incorporate the different views into decision-making and further planning. Two comments made by participants can be highlighted as particularly valuable, as they summarise views across all rounds of the study:

“The ideal would be to include all the children in the intervention programme, but practical issues, e.g., class sizes and lack of enough professionals to work with the children, prohibit this. Second best is therefore to include only children with significant difficulties.” Table I (3 – 1)

and

“Children with difficulties should be grouped together, but the other children should also be included in the programme in a separate group – it is essential that “no child is left behind” or falls through the cracks.” Table I(3 – 1)

## DISCUSSION

The results of this Delphi study provide intervention guidelines for a rural, low socio-economic area as agreed by expert participants. Results suggest that a school-based, small-group programme, facilitated by the teaching team, but with clear guidelines, support and advice from therapists should be feasible in a low-income rural context.

All participants in the study are considered to be experts in their fields with an even spread between disciplines, varied experience, fields of practice/work and geographical locations. The wide representation strengthens the depth and scope of shared knowledge as well as the validity of consensus reached. With most participants (83%) living and working in South Africa, of whom six were specifically in rural areas, participants were able to draw from their own first-hand experience and knowledge, while international participants contributed their own experiences, linked to different contexts, to the study. A limitation to the study was the scope of expertise – experts were selected according to limited criteria based on the results of a scoping

review<sup>12</sup> – however, valuable information might have been missed from the wider multidisciplinary team, e.g., speech, hearing and language therapists, dieticians, paediatricians, educational psychologists, etc.

This Delphi study suggests professional therapist involvement, but also includes teachers and kinder kineticists as role players in a motor skill intervention in schools. It supports current practices that, through close collaboration with teachers, some of the roles of therapists can be transferred to the teaching team through indirect interventions such as an advisory approach<sup>12,34,35</sup>.

While the main providers of motor skill assessment and intervention are occupational therapists and physiotherapists<sup>36</sup>, kinder kineticists, as trained professionals in the field of motor skill development, also provide direct intervention through perceptual-motor programmes<sup>37</sup>, advice and school-based interventions<sup>21</sup>. A study by Bremer and Lloyd describes a school-based fundamental movement skills (FMS) programme for children with autism-like characteristics, working closely with teachers, resulting in an increased readiness of teachers to teach FMS<sup>35</sup>. Foundation phase teachers (grade R to 3) are educated in life skills, which include physical education<sup>38</sup>, while Human Movement Studies is an elective subject area for intermediate teacher training<sup>39</sup>. This study area equips teachers with a basic knowledge of movement development, while they are also well equipped to deliver educational programmes to groups of children.

The interchangeability of the three highest ranked role players per role provides opportunity to use existing resources and reduce costs. It promotes community involvement and opens opportunity for task-shifting. This is the process in which non-specialists with little or no prior training or experience provide treatment under supervision<sup>40</sup>. The process of task-shifting is well-known as an alternative approach to provide care in rural communities for people living with human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS)<sup>41</sup>. It has also been extended, for example to mental healthcare for children in rural communities: Dorsey et al.<sup>42</sup> investigated the perceptions of health workers and teachers in a task-shifting mental health intervention for children in Kenya. It was found that both health workers and teachers, as lay counsellors, endorsed acceptability, feasibility and appropriateness of delivering the structured Trauma-focused cognitive behavioural therapy (TF-CBT) programme in their communities. Task-shifting was dependent on existing government supported systems – for children these may include health and education, with delivery by individuals who are already part of this system<sup>42</sup>.

Consensus on components regarding the format of an intervention created a clear structure appropriate for grade R pre-school children in a rural area. A programme that commences in the first term of the school year, thus promotes early identification of possible motor skill difficulties. Early identification is of particular importance in South Africa where school readiness is a concern, especially for disadvantaged children<sup>43</sup>. Although children in South Africa are only compelled to attend school from ages



seven to 15, starting from Grade 1<sup>44</sup>, a bill to make the two years prior to Grade 1 compulsory was announced in early 2020<sup>45</sup>. A motor skill intervention with early identification of difficulties within these two years prior to formal schooling may improve school readiness<sup>21,43</sup>.

A key feature of the programme is a valid and reliable tool to screen and identify children with motor skill impairment. Of the screening tools suggested by participants, the Developmental Coordination Disorder Questionnaire (DCDQ)<sup>33</sup> is the only suggested tool that is affordable and reliable and can be administered by parents or teachers<sup>33</sup>. The DCDQ has been standardised as a reliable screening tool for motor coordination difficulties among Canadian children aged 5 – 15 years<sup>46</sup>. It has been translated into eight other languages and cross-cultural adaptations are supported and have been tested in Japan, India and Italy<sup>47-49</sup>. The DCDQ may be a viable possibility for use as a screening tool; however, further research on the reliability and validity within the South African population is needed.

The suggested 8 – 12 weeks (approximately two terms) time span of a programme provides adequate time for re-testing and the possibility of further treatment within the grade R school year where required. The four weeks variation provides room for flexibility within individual schools' programmes and should also include training for group facilitators. A small group size as recommended (5 – 8 children maximum) in a group is associated with positive outcomes in motor skill interventions<sup>36</sup>. The uncertainty around who to include in such a group intervention and how to group children together was underpinned by important issues raised by participants. These included issues around inclusion, benefit for all, labelling, equal access and opportunity vs a targeted approach, prioritising in view of limited resources and self-esteem problems among children with difficulties when comparing themselves to their peers. There is evidence to support all-inclusive groups. A study by Valentini and Rudisill<sup>50</sup> among Brazilian children investigated the effect of an intervention with a specific task-orientated approach, by setting individual aims for each participating child (with or without motor skill impairment)<sup>50</sup>. The opposing comments in our Delphi study opens research opportunities in a country such as South Africa where inclusion is part of educational policy<sup>44</sup>, to further establish the advantages and disadvantages of inclusive groups.

The approaches agreed on are feasible as part of a school-based programme – a perceptual motor approach can be used to devise a programme to fit in to a school's existing PE programme (gross motor skills) and classroom schedule (fine motor skills). The therapist in the advisory role will assist by providing training, giving advice and feeding into the individual education plans of children. The programme should be accessible to all and should not be affected by socio-economic circumstances. General PE and playground equipment could be incorporated – this may mean that there would be a minimum requirement for equipment prior to initiating the programme. There are many schools in rural areas of South Africa with very minimal or no playground equipment, which has a signi-

ficant effect on the development of fine motor skills<sup>6</sup>. The implementation of basic playground equipment through community involvement could be a long-term asset for schools and for children's motor skill development and could be done through community involvement. A positive example is a project run by the occupational therapy department at the University of Free State in collaboration with local companies, engineering departments and the education department. They developed a project named "Back to Urth playgrounds"<sup>51</sup>, where recycled materials were used to create cost effective and sustainable playgrounds for children. Their experimental study showed improvements in the motor skills and school readiness of children who had access to such a playground when compared to children who did not<sup>52</sup>. Other possible activities to include in a programme were obstacle courses, arts and crafts, fine motor games and sport activities, which are all practical to include in a cost-effective programme.

## CONCLUSION

This Delphi study provides clear guidelines regarding role players, format and content for a motor skill intervention programme for grade R children with motor skill difficulties attending a school in a rural, low-income setting. In addition, the study also provides considerations for developing intervention programmes in other areas.

Two controversial matters concerning individual vs group programme aims and inclusivity of therapy groups are yet to be determined. Further investigation into an appropriate standardised screening tool, valid for use by teachers in South African schools is also necessary.

## CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare that are relevant to the content of this article.

## AUTHOR CONTRIBUTIONS

Janke van der Walt conceptualised and designed the study, collected data, and carried out the initial analyses, drafted the initial manuscript and reviewed and revised the manuscript.

Nicola A. Plastow and Marianne Unger, coordinated and supervised the study including conceptualisation and data collection and interpretation and critically reviewed the manuscript for important intellectual content and reviewed and revised the manuscript. All authors approved the final manuscript submitted and agreed to be accountable for all aspects of the work.

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