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# BMJ Open

## Bridging the knowledge-to-practice gap in rehabilitation professionals working with at-risk infants in the public health sector in South Africa: A Study Proposal

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3 **Bridging the knowledge-to-practice gap in rehabilitation professionals working**  
4 **with at-risk infants in the public health sector in South Africa: A Study**  
5 **Proposal**  
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## ABSTRACT

**Introduction:** Early childhood is a critical time when the benefits of early interventions are intensified and the negative effects of risk can be reduced. For optimal provision of early intervention, professionals in the field are required to have specialised knowledge and skills in implementation of these programmes. In the context of South Africa there is evidence to suggest that therapists are ill-prepared to handle the unique challenges posed in neonatal intensive care units and wards with at-risk infants in the first few weeks of life. This is attributed to a number of reasons, however irrespective of the causative factors, the need to bridge this knowledge-to-practice gap remains essential. **Methods and Analysis:** This study includes a stakeholder-driven strategy that is positioned to assist therapists in bridging the gap in knowledge and practice, by the design, implementation and evaluation of an integrated knowledge translation intervention that is geared towards this specific population. Therapists such as occupational therapists (OT) and physiotherapists (PT) currently working in the public health sector will be recruited for participation. A multi-method study with use of a scoping review followed by an appreciative inquiry and Delphi process will aid in the development and implementation of the intervention within the knowledge-to-action framework. **Ethics and Dissemination:** The study has received full ethical approval from a Biomedical Ethics Committee. The results will be published in peer-reviewed academic journals and disseminated to the relevant stakeholders within this study.

## KEY WORDS

Knowledge translation, neonatal care, therapists, appreciative inquiry, knowledge-to-action framework

## ARTICLE SUMMARY

### Strengths and Limitations

- With the continued high burden of disease in resource-constrained environments of LMICs, KT interventions at a micro-level may be useful in effective positive changes in day to day practice.
- This novel study is designed systematically with use of multiple methods such as a scoping review, appreciative inquiry process, and a Delphi process within a knowledge-to-action framework.

- Opportunity for exploration of context-specific needs that can be driven by the stakeholders themselves is possible as well as direct benefits to participants such as the knowledge interventions proposed in this study.
- Limitations in lieu of the current COVID-19 pandemic may exist, in terms of lockdown and social distancing requirements, but the study remains feasible with use of virtual and other forms of telecommunication that does not deviate from achieving the study objectives.

## INTRODUCTION

In low and middle-income countries (LMICs), an estimated 250 million children (43%) under five will fail to meet their developmental potential because of extreme poverty and deprivation (1). This burden appears to be under-estimated as the risks to health and well-being are related to other additional contextual factors. In LMICs, these include poor health and nutritional status and inadequate learning that may result in perpetuating the current socio-economic milieu. Only in the past, few years have the development and health communities recognised that early childhood development is a solid foundation for human capital development (2). Nurturing care, by the provision of early intervention programmes in the early years is therefore essential in ensuring that individuals and societies thrive. Scientific evidence indicates that early childhood is not only a period of special sensitivity to risk factors, but also a critical time when the benefits of early interventions are intensified and the negative effects of risk can be reduced. Early diagnosis is essential in allowing for early medical responses and intervention, which is indicated in improving neurodevelopmental outcome of high-risk infants (3). In order for early intervention to be optimally provided, professionals in the field are required to have specialised knowledge and skills in implementation of these programmes. Currently therapists have indicated that they are ill-prepared to handle the unique challenges posed in neonatal intensive care units and wards with at-risk infants in the first few weeks of life (4). Bridging this knowledge-to-practice gap is therefore essential. There has been increasingly growing evidence around knowledge translation (KT) in the last decade, with most communities having extensive agreement around the need to transfer knowledge into action. In a scoping review, KT strategies that achieve beneficial outcomes were found to still be unknown (5) with limited empirical research on how to undertake integrated KT (6). Moreover, KT strategies that influence professional practice behaviours in rehabilitation disciplines remain principally unknown (7). With an increasing role in inter-professional primary health-care teams, the scope of rehabilitation practice is expanding and should include KT that represents knowledge brokerage. Consolidation of KT activities remains limited despite the

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3 expressed need for KT strategies to be espoused within rehabilitation practice (7). This study  
4 therefore relies on KT in the care of at-risk infants in high burdened settings as that of the  
5 South African public health system.  
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8 This study thus aims to develop, implement and evaluate an integrated knowledge-to-practice  
9 intervention, for rehabilitation therapists in South Africa, targeted at at-risk infants in burdened  
10 settings such as that of the South African public sector.  
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13 The specific objectives include the following: (i) to review and appraise the available literature  
14 on knowledge translation interventions for rehabilitation professionals targeted at at-risk  
15 infants in burdened settings such as that of the SA Public Sector, via a scoping review, (ii) to  
16 develop a knowledge-to-practice intervention via a stakeholder driven appreciative inquiry  
17 process (iii) to refine the knowledge-to-practice intervention via a Delphi process for  
18 consensus by a group of experts in the field, (iv) to implement the knowledge-to-practice  
19 intervention with rehabilitation professionals working with at-risk infants in the SA public health  
20 sector, and (v) to evaluate the knowledge-to-practice intervention with rehabilitation  
21 professionals working with at-risk infants in the SA public health sector.  
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## 30 **METHODS AND ANALYSIS**

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32 This multi-method study is structured within three study phases.  
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### 34 **Phase 1: Systematic Scoping Review**

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37 *Design:* A systematic scoping review of peer reviewed and grey literature on available KT  
38 interventions within the fields of OT and PT that cover infant health towards improved  
39 neurodevelopmental trajectories in at risk babies will be considered. This review will be guided  
40 by Arksey and O Malley's (8) scoping review framework and the Joanna Briggs Institute (JBI)  
41 guidelines for scoping reviews (9).  
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46 *Steps in the Process:* The steps would include identification of the research question,  
47 identification of relevant studies, study selection, charting of the data and collation,  
48 summarising and reporting of the results. Additionally a quality assessment as recommended  
49 by Levac et al (10) and Tricco et al (11) will be conducted.  
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53 *Eligibility Criteria:* The study will use the population, concept and context (PCC) model to  
54 determine eligibility of the research question (9).  
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58 *Procedure:* The first step would involve a search of relevant databases with search strings and  
59 limits (as per the Scoping Review Protocol). This will be followed by study selection (title and  
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3 abstract screening followed by full text screening used pre-defined eligibility criteria) by two  
4 reviewers and a third person at hand for disputes. The primary reviewer, the principal  
5 investigator (PI), will conduct a comprehensive search and screening of the study titles from  
6 the above-mentioned databases. All citations after the searches will be exported to the  
7 EndNote library, and all duplicates will be removed before embarking on abstract and full  
8 article screening. Two reviewers will conduct abstract followed by full article screening of the  
9 selected studies independently with guidance from the eligibility criteria. The screening results  
10 will be reported by the use of the Preferred Reporting Items for Systematic reviews and Meta-  
11 Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (12). Charting of the  
12 evidence will occur by the development of a data-charting tool guided by the research  
13 question. A narrative account of the extracted data will be analysed using thematic analysis.

21  
22 *Quality Appraisal:* The quality of the included studies will be appraised using the Mixed Method  
23 Appraisal Tool (MMAT) version 2011 (13, 14). For qualitative studies, section one of the MMAT  
24 will be used; for a quantitative study, section two for randomised controlled, section three for  
25 non-randomised, and section four for descriptive studies. For a mixed methods study, section  
26 one for appraising the qualitative component will be used and the appropriate section for the  
27 quantitative component (Sections two, three or four) and section five for the mixed methods  
28 component. The tool will be used to examine the appropriateness of the study aims, the  
29 context relevance, and theoretical inferences to answer research questions, author's  
30 discussions and conclusions. The overall quality for each of the studies selected will be  
31 calculated following the MMAT guidelines (score = number of criteria met divided by four) and  
32 then presented using one of four descriptors, namely, (i) Low quality (1–25%), where minimal  
33 criteria are met, (ii) average (26–50%); (iii) above average (51–75%) and (iv) high quality  
34 (876–100%), where all criteria are met. For mixed methods studies, the principle is that the  
35 overall quality of a combination cannot be more than the quality of its weakest component (13,  
36 14). As a result, the overall quality score will be the lowest score of the study components  
37 (qualitative or quantitative).

## 48 **Phase 2: Discovery, Dream and Initial Design: Generating Content for the KT** 49 **intervention via Stakeholder input**

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52 *Design:* Appreciative Inquiry (AI). AI offers a positive way to explore, discover possibilities,  
53 and transform systems and teams (15) towards a shared vision of identified strategic  
54 intervention. It therefore plays an important part in supporting change (16).  
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3 *Sample:* Therapists involved in the care of at risk infants at district, regional and tertiary  
4 hospitals in KZN, practising in the field of occupational therapy and physiotherapy will be  
5 invited to participate (approximately n= 100 therapists).  
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9 *Stages:* The first two stages of the AI process will be implemented. In stage one, the discovery  
10 stage, themes on positive steps taken towards ensuring early intervention for at risk infants  
11 will be identified and shared. In stage two, the dream stage, themes from desires and wishes  
12 from all stakeholders will be shared. Stage 3 of the design stage, themes around appropriate  
13 KT content will be explored and ideas generated.  
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18 *Data Collection Process:* A workshop format will be followed for the AI process with materials  
19 available for expression of ideas followed by a discussion and collation of common themes  
20 and ideas. Participants will be accommodated in a comfortable setting with a maximum of  
21 three hours allocated for the data collection.  
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26 *Data Analysis:* Data will be analysed thematically using inductive reasoning and with reference  
27 to analytical memos that would be noted by a moderator present in the AI Workshop.  
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### 30 **Phase 3: Design Stage 1: Consensus on the KT intervention Content (Expert Input)**

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33 *Design:* A hybrid two to three round Delphi Process will be conducted.  
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36 *Recruitment and Selection of Sample:* A systematic process will be followed for the  
37 identification identifying experts (panelists) in this study. Opinion leaders (gathered by their  
38 contributions at one national paediatric conference in 2020) and clinical researchers in  
39 paediatrics; determined via the training Universities in South Africa as well as by professional  
40 society's database (OTASA and SASP). Non-probability purposive sampling will be used.  
41 Individuals will not be selected in an attempt to represent the general population, but rather in  
42 their ability to expertly contribute to the research questions.  
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48 *Data Collection:* Expertise will be documented in a self-report biographical questionnaire. In  
49 order to use the Delphi technique maximally, findings of the scoping review will be combined  
50 with the data from the "discovery, dream and design phase" to inform the round one  
51 questionnaire. Polar responses and ranking items will form part of the survey. Results of round  
52 one will be collated and assist in the development of the round two survey. Prior to round one,  
53 experts will be sent an information package, a description of Delphi technique and a consent  
54 letter.  
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3 *Data Analysis:* Following round one, results will be pooled and feedback provided to the panel  
4 with the round two questionnaires, electronically. Membership of the panel will not be  
5 disclosed to the participants (quasi-anonymity). Communication within rounds will occur via  
6 electronic means. Items on which agreement has not been settled will be highlighted and  
7 panelists will be encouraged to re-consider their stance on those items that consensus was  
8 not reached on and to re-rate items. Data will be analysed using relevant software packages.  
9 The extent with which each participant agrees with the stated issue (numerical/categorical  
10 scale) and the level of agreement between each other (descriptive statistics) will be  
11 determined. Cronbach's alpha/ Krippendorff's alpha will be utilised as a measure of internal  
12 consistency of the group. For example; where Cronbach's  $\alpha$  is close to 1.0, it can be argued  
13 that there is consistency in the responses of the panel. An a priori consensus threshold of 70%  
14 ( $\pm 5\%$ ) will be selected, because of the small number of panelists anticipated.

#### 23 **Phase 4: Design Stage 2: Design and Refinement of the KT intervention**

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26 The Knowledge-to-Action (KTA) framework (17-20), the diffusion of innovation theory (21), and  
27 Levac et al's (22) best practice guidelines for developing educational resources will be used  
28 to inform the development process. Data from the preceding (design stage 1) will be collated.  
29 More specifically, the KTA framework (17) will provide the "big picture" and be used as the  
30 overarching guide for the KT process. Levac et al's (22) best practice guidelines will assist  
31 with specific details and steps needed to design the knowledge intervention. The diffusion of  
32 Innovation theory will inform the design and implementation through consideration of the  
33 characteristics of the innovation that support adoption (i.e., relative advantage, complexity,  
34 compatibility, trialability, and observability), as well as the key factors that influence innovation  
35 dissemination (i.e., time, social networks, and communication channels) (21). The structure  
36 including duration, mechanism of delivery and content of the intervention will be determined  
37 at this stage.

#### 46 **Phase 5: Destiny Stage: Implementation of the Intervention**

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49 *Sample:* Therapists working in high burdened settings in KZN public health sector via non-  
50 probability purposive sampling (approximately n=100).

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53 *Data Collection:* Implementation of the intervention will occur as per the AI (Destiny Stage)(8)  
54 and will follow the structure determined in the preceding phase (content, duration and  
55 mechanism of delivery). Therapists will additionally be required to document their initial  
56 experiences in a developmental blog/journal.  
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3 *Data Analysis:* Blog/Journal entries will be exposed to a thematic analysis at the end of the  
4 intervention using inductive reasoning. This together with a post-intervention focus group with  
5 volunteers who had undergone the KT intervention will form part of the evaluation process of  
6 the KT intervention.  
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## 10 **ETHICS AND DISSEMINATION**

### 11 **Ethical Approval**

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17 The study has received ethical clearance from the Biomedical Research Ethics Committee,  
18 University of KwaZulu-Natal. The committee is registered with the South African National  
19 Health Research Ethics Council (REC-290408-009). Informed consent will be obtained from  
20 all participants prior to any form or part of data collection. There are no anticipated risks to  
21 participants who volunteer to participation in the study.  
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### 26 **Dissemination and Implication for the Public Health Sector**

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29 The need for more explicitly articulated evidence-based strategies for health professionals  
30 who are expected to function in challenging environments are required in the country. These  
31 include the increased burden of care, limited resources and a general lack of knowledge and  
32 skill to handle the demands placed in contexts that requires a professional to be fit for practice  
33 in diverse settings. With this, appropriate KT interventions may prove essential in ensuring  
34 that health practitioners are able to meet the demands in these contexts. Expected outputs  
35 from the study include the design of an integrated knowledge resource for therapists working  
36 in the field of neonatal care, charting of key aspects that will potentially inform a standard of  
37 care for at risk infants in high burdened settings and training on how to design and implement  
38 KT interventions. The knowledge gained from this study is transferable to other KT initiatives  
39 involving families/caregivers by the participants of this particular study. Given that this study  
40 is positioned within the ambit of implementation science, the translated study findings will not  
41 only be available in peer-reviewed articles but will also be disseminated to appropriate  
42 audiences at relevant conferences. The intervention is this study also translates and  
43 disseminates information to a targeted audience, thereby contributing to service delivery in  
44 the public health sector of the country.  
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## **AUTHOR CONTRIBUTIONS**

PG was responsible for the conceptualisation and design of the study including drafting of the manuscript and is the principal investigator on the study.

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## COMPETING INTERESTS

The author declares no competing interests.

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# BMJ Open

## A multi-method study protocol to identify and bridge the knowledge-to-practice gaps in rehabilitation professionals working with at-risk infants in the public health sector of South Africa

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## ABSTRACT

**Introduction:** Early childhood is a critical time when the benefits of early interventions are intensified and the adverse effects of risk can be reduced. For the optimal provision of early intervention, professionals in the field are required to have specialised knowledge and skills in the implementation of these programmes. In the context of South Africa there is evidence to suggest that therapists are ill-prepared to handle the unique challenges posed in neonatal intensive care units and wards with at-risk infants in the first few weeks of life. This is attributed to a number of reasons; however irrespective of the causative factors, the need to bridge this knowledge-to-practice gap remains essential. **Methods and Analysis:** This study is a multi-method stakeholder-driven study with the use of a scoping review followed by an appreciative inquiry and Delphi process that will aid in the development, implementation and evaluation of a knowledge translation intervention, to bridge knowledge-gaps in occupational and physiotherapists working in the field. Therapists currently working in the public health sector will be recruited for participation in the various stages of the study. The analysis will occur via thematic analysis for qualitative data and percentages and frequencies for descriptive quantitative data. Issues around trustworthiness and rigour, as well as reliability and validity, will be ensured within each of the phases, by use of a content validity index, and inter-rater reliability for the Delphi survey; thick descriptions, peer debriefing, member checking and an audit trail for the qualitative data. **Ethics and Dissemination:** The study has received full ethical approval from the Health Research and Knowledge Management Directorate of the Department of Health as well as the Biomedical Research Ethics Committee of the University of KwaZulu-Natal. The results will be published in peer-reviewed academic journals and disseminated to the relevant stakeholders within this study.

## KEYWORDS

Knowledge translation, neonatal care, therapists, appreciative inquiry, knowledge-to-action framework

## ARTICLE SUMMARY

### Strengths and Limitations

- With the continued high burden of disease in resource-constrained environments of LMICs, KT interventions at a micro-level may be useful in effecting positive changes within the day to day practice.
- This novel study is designed systematically with the use of multiple methods such as a scoping review, appreciative inquiry process, and a Delphi process within a knowledge-to-action framework. Having participatory methods embedded within this study allows for both propositional and non-propositional knowledge to be implemented within the study, to ensure a genuinely stakeholder-driven strategy that may have greater uptake in day-to-day practice.
- A limitation may exist in the use of virtual platforms which may serve as a barrier to greater networking and in establishing rapport, as is intended with the face-to-face sessions. Group sharing and good online facilitation may assist in developing group cohesion in a virtual platform, which has become the mainstay globally in light of the COVID-19 pandemic.
- The study offers an opportunity for exploration of context-specific needs that can be driven by stakeholders themselves as well as direct benefits to participants, as offered by the knowledge interventions that will be developed, implemented and evaluated within this study.
- Limitations in lieu of COVID-19 pandemic may exist, in terms of lockdown and social distancing requirements, but the study remains feasible with the use of virtual and other forms of telecommunication that does not deviate from achieving the study objectives. These alternatives are proposed in the methods section of this paper.

## INTRODUCTION

Currently, worldwide emphasis is placed on not only reducing child mortality but in improving the quality of care for neonates (1, 2). We are aware that during the neonatal period, an increase in the rate of mortality in children under the age of five years old arises (3). Neonatal mortality rates per 1000 live births stand at 28% in Sub Saharan Africa, 16% in Northern Africa, 25% in Central and Southern Asia and 3% in Europe and Northern America (4). In South Africa (SA), an estimated 12% of neonates die per 1000 live births annually during the perinatal and first weeks of life (5), with 23% of infants (over the age of 28 days) per 1000 live births die annually in South Africa (6). Whilst there has been an overall significant decline in child mortality rates over the past 20 years, child morbidity also requires emphasis.

In low and middle-income countries (LMICs), an estimated 250 million children (43%) under five will fail to meet their developmental potential because of extreme poverty and deprivation (7). This burden appears to be under-estimated as the risks to health and well-being are related to other additional contextual factors. In LMICs, these include poor health and nutritional status and inadequate learning that may result in perpetuating the current socio-economic milieu.

Only in the past, few years have the development and health communities recognised that early childhood development is a solid foundation for human capital development (8). Nurturing care, by the provision of early intervention programmes in the early years is therefore essential in ensuring that individuals and societies thrive. Scientific evidence indicates that early childhood is not only a period of particular sensitivity to risk factors but also a critical time when the benefits of early interventions are intensified and the adverse effects of risk can be reduced. Early diagnosis is essential in allowing for initial medical responses and intervention, which is indicated in improving neurodevelopmental outcome of high-risk infants (9).

In SA, the ministry of Health's strategy to enhance the provision of essential health care interventions for mothers and children in some of the country's poorest districts was noted as a step in the right direction (10). However, the policy framework and strategy for disability and rehabilitation services in SA, has not strongly articulated the role of the rehabilitation team in neonatal care although the roles of the members of the rehabilitation team are defined as covering the lifespan (11). Currently, there is a substantial unmet need for rehabilitation in many LMICs with large under-prioritisation of rehabilitation by ministries of health. The World Health Organisation's launch of the Rehabilitation 2030 initiative, emphasised the need for health system strengthening (12). Part of this responsibility inevitably then requires competent and skilled health care workers for the care of both mother and newborn infant (WHO, 2020).

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3 For early intervention to be optimally provided, professionals in the field are required to have  
4 specialised knowledge and skills in the implementation of these programmes. Currently,  
5 therapists have indicated that they are ill-prepared to handle the unique challenges posed in  
6 neonatal intensive care units and wards with at-risk infants in the first few weeks of life (13).  
7 Bridging this knowledge-to-practice gap is therefore essential.  
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11 There has been increasingly growing evidence around knowledge translation (KT) in the last  
12 decade, with most communities having extensive agreement around the need to transfer  
13 knowledge into action. In a scoping review, KT strategies that achieve beneficial outcomes  
14 were found to still be unknown (14) with limited empirical research on how to undertake  
15 integrated KT (15). Consolidation of KT activities remains limited despite the expressed need  
16 for KT strategies to be espoused within rehabilitation practice (16). With an increasing role in  
17 inter-professional primary health-care teams, the scope of rehabilitation practice is expanding  
18 and should include KT that represents knowledge brokerage. This study, therefore, relies on  
19 KT in the care of at-risk infants in high burdened settings as that of the South African public  
20 health system.  
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24 This study thus aims to develop, implement and evaluate an integrated knowledge-to-practice  
25 intervention, for rehabilitation therapists in South Africa, targeted at at-risk infants in burdened  
26 settings such as that of the South African public sector.  
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30 The specific objectives include the following: (i) to review and appraise the available literature  
31 on knowledge translation interventions for rehabilitation professionals targeted at at-risk  
32 infants in burdened settings such as that of the SA Public Sector, via a scoping review, (ii) to  
33 develop and refine a knowledge-to-practice intervention via a stakeholder-driven appreciative  
34 inquiry process and Delphi process for consensus by a group of experts in the field, (iii) to  
35 implement and evaluate the knowledge-to-practice intervention with rehabilitation  
36 professionals working with at-risk infants in the SA public health sector.  
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## 47 **METHODS AND ANALYSIS**

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49 This multi-method study is structured within three study phases. The study is anticipated to  
50 commence in the latter period of 2020 and will be completed by the end of 2021.  
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### 53 **Phase 1: Systematic Scoping Review**

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55 *Design:* A systematic scoping review of peer-reviewed and grey literature on available KT  
56 interventions within the field of rehabilitation that cover infant health towards improved  
57 neurodevelopmental trajectories in at-risk infants will be considered. This review will be guided  
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3 by Arksey and O Malley's (17) scoping review framework and the Joanna Briggs Institute (JBI)  
4 guidelines for scoping reviews (18).  
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7 *Steps in the Process:* The steps would include identification of the research question,  
8 identification of relevant studies, study selection, charting of the data and collation,  
9 summarising and reporting of the results. Additionally a quality assessment as recommended  
10 by Levac et al (19) and Tricco et al (20) will be conducted.  
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15 *Eligibility Criteria:* The study will use the population, concept and context (PCC) model to  
16 determine the eligibility of the research question (18).  
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20 *Procedure:* The first step would involve a search of relevant databases with search strings and  
21 limits (as per the scoping review protocol). This will be followed by study selection (title and  
22 abstract screening followed by full text screening used pre-defined eligibility criteria) by two  
23 reviewers and a third person at hand for disputes. The primary reviewer, the principal  
24 investigator (PI), will conduct a comprehensive search and screening of the study titles from  
25 the selected databases. All citations from the searches will be exported to an EndNote library,  
26 and all duplicates will be removed before embarking on abstract and full article screening. Two  
27 reviewers will be responsible for conducting the abstract screening followed by full article  
28 screening of the selected studies independently, and aligned to the eligibility criteria. The  
29 screening results will be reported by the use of the Preferred Reporting Items for Systematic  
30 reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (21).  
31 Charting of the evidence will occur by the development of a data-charting tool guided by the  
32 research question. A narrative account of the extracted data will be analysed using thematic  
33 analysis.  
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43 *Quality Appraisal:* The quality of the included studies will be appraised using the Mixed Method  
44 Appraisal Tool (MMAT) version 2011 (22, 23). For qualitative studies, section one of the MMAT  
45 will be used; for a quantitative study, section two for randomised controlled, section three for  
46 non-randomised, and section four for descriptive studies. For a mixed-methods study, section  
47 one for appraising the qualitative component will be used and the appropriate section for the  
48 quantitative component (Sections two, three or four) and section five for the mixed methods  
49 component. The tool will be used to critically appraise the quality of the methods of the  
50 included studies, and will seek to examine the appropriateness of the study aims, the context  
51 relevance, and theoretical inferences to answer research questions, author's discussions and  
52 conclusions. The overall quality for each of the studies selected will be calculated following  
53 the MMAT guidelines (score = number of criteria met divided by four) and then presented  
54 using one of four descriptors, namely, (i) Low quality (1–25%), where minimal criteria are met,  
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3 (ii) average (26–50%); (iii) above average (51–75%) and (iv) high quality (87%–100%), where  
4 all criteria are met. For mixed methods studies, the principle is that the overall quality of a  
5 combination cannot be more than the quality of its weakest component (22, 23). As a result,  
6 the overall quality score will be the lowest score of the study components (qualitative or  
7 quantitative).

## 11 12 **Phase 2: Discovery, Dream and Initial Design: Generating Content for the KT** 13 **intervention via Stakeholder input**

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16 *Design:* Appreciative Inquiry (AI). AI offers a positive way to explore, discover possibilities,  
17 and transform systems and teams (24) towards a shared vision of identified strategic  
18 intervention. It therefore plays an integral part in supporting change (25).

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21 *Recruitment and Selection of Sample:* Therapists involved in the care of at-risk infants at  
22 district, regional and tertiary hospitals in KZN, practising in the field of occupational therapy  
23 and physiotherapy will be invited to participate. There are currently approximately 623 OTs in  
24 KZN, of which 194 work in the public health sector (26). The head of child health within the  
25 ministry of health in KZN, the neonatal co-ordinator for the province as well as the KZN forum  
26 for OT were accessed to determine the number of eligible participants (n=46). Currently, there  
27 are approximately 1101 physiotherapists in KZN (27); however, the actual number of  
28 therapists working in the public sector could not be ascertained. A purposive sample will  
29 therefore be drawn from this total number of therapists within the province, based on those  
30 that are currently working within/or have rotations in neonatal ICUs within their institutions.

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33 *Stages:* The first two stages of the AI process will be implemented. In stage one, the discovery  
34 stage, themes on positive steps taken towards ensuring early intervention for at risk infants  
35 will be identified and shared. In stage two, the dream stage, themes from desires and wishes  
36 from all stakeholders will be shared. Stage 3 of the design stage, themes around appropriate  
37 KT content will be explored and ideas generated.

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48 *Data Collection Process:* A workshop format will be followed for the AI process with materials  
49 available for expression of ideas followed by a discussion and collation of common themes  
50 and ideas (should face to face contact be allowed). Session times will be negotiated with  
51 participants given their work schedules and availability. Participants will be accommodated in  
52 a comfortable setting with a maximum of three hours allocated for the data collection. This will  
53 allow for a “meet and greet” to establish rapport and network with others in the field over  
54 refreshments, as well as for the actual discussion group (which will not span more than 90-  
55 100 minutes). In lieu of COVID-19, the option of virtual platforms such as Zoom will be explored  
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3 for the discussion groups. The ZOOM Pro-plan subscription will be used to ensure that there  
4 are more than 40 minutes allocated to each of the online sessions. This would then entail  
5 multiple groups (with a maximum of 10-12 participants) proceeding through the same process  
6 of data collection to facilitate more robust discussion as opposed to a larger group on a virtual  
7 platform. The session will not span more than 90-100 minutes. Prior consent will be solicited  
8 from participants together with details on the most convenient time to host a virtual session as  
9 well as network and other requirements that may be required for the virtual session.  
10 Participants will be offered reimbursement for data use for the session/s. The session/s  
11 (irrespective of whether it occurs face-to-face or virtually) will be audio-recorded.  
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18 *Data Analysis:* Data will be analysed thematically using inductive reasoning and with reference  
19 to analytical memos that would be noted by a moderator present in the AI Workshop. Should  
20 the workshop session be held virtually, permission to video-record the session will be  
21 requested and these will be reviewed as part of the analysis process.  
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26 *Trustworthiness:* In ensuring rigour within this phase of the study, thick descriptions will  
27 accompany the narrative reported with verbatim quotes, peer debriefing will occur during the  
28 analysis process, member checking and respondent validation will occur following analysis of  
29 the data and an audit trail will be maintained for all decisions and processes.  
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### 33 **Phase 3: Design Stage 1: Consensus on the KT intervention Content (Expert Input)**

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36 *Design:* A hybrid two to three round Delphi Process will be conducted.  
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39 *Recruitment and Selection of Sample:* A systematic process will be followed for the  
40 identification of experts (panelists) in this study. This will include the recruitment of opinion  
41 leaders, based on contributions to national conferences, clinical researchers in paediatrics;  
42 determined via the training Universities in South Africa as well as by the relevant professional  
43 society's databases (OTASA and SASP) as well SA authors working in the field as identified  
44 by the phase one scoping review. Non-probability purposive sampling will be used in the  
45 recruitment, and snowball sampling initiated should other potential participants be identified  
46 by the originally recruited sample. Individuals will not be selected in an attempt to represent  
47 the general population, but rather in their ability to expertly contribute to the research  
48 questions. The anticipated sample size is 50 participants (to account for potential attrition)  
49 through the subsequent Delphi rounds.  
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57 *Data Collection:* Expertise will be documented in a self-report biographical questionnaire. In  
58 order to use the Delphi technique maximally, findings of the scoping review will be combined  
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3 with the data from the “discovery, dream and design phase” to inform the round one  
4 questionnaire. Polar responses (yes/no) and unipolar responses (likert scales) will form part  
5 of the survey. A pilot of the developed survey will be initiated and a content validity index  
6 computed during this phase to establish relevancy and clarity of included items. Results of  
7 round one will be collated and assist in the development of the round two survey. Prior to  
8 round one, experts will be sent an information package, a description of Delphi technique and  
9 a consent letter.  
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15 *Data Analysis:* Following round one, results will be pooled and feedback provided to the panel  
16 with the round two questionnaires, electronically. Membership of the panel will not be  
17 disclosed to the participants (quasi-anonymity). Communication within rounds will occur via  
18 electronic means. Items on which agreement has not been settled will be highlighted and  
19 panellists will be encouraged to reconsider their stance on those items that consensus was  
20 not reached on and to re-rate items. Data will be analysed using relevant software packages.  
21 The extent with which each participant agrees with the stated issue (numerical/categorical  
22 scale) and the level of agreement between each other (descriptive statistics) will be  
23 determined. Cronbach’s alpha/ Krippendorff’s alpha will be utilised as a measure of internal  
24 consistency of the group. For example, where Cronbach’s  $\alpha$  is close to 1.0, it can be argued  
25 that there is consistency in the responses of the panel. An *a priori* consensus threshold of 70%  
26 ( $\pm 5\%$ ) will be selected, because of the small number of panellists anticipated.  
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#### 36 **Phase 4: Design Stage 2: Design and Refinement of the KT intervention**

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38 The Knowledge-to-Action (KTA) framework (28-31), the diffusion of innovation theory (32), and  
39 Levac et al’s (33) best practice guidelines for developing educational resources will be used  
40 to inform the development process. Data from the preceding (design stage 1) will be collated.  
41 More specifically, the KTA framework (28) will provide the “big picture” and be used as the  
42 overarching guide for the KT process. Levac et al’s (33) best practice guidelines will assist  
43 with specific details and steps needed to design the knowledge intervention. The diffusion of  
44 innovation theory will inform the design and implementation through consideration of the  
45 characteristics of the innovation that support adoption (i.e., relative advantage, complexity,  
46 compatibility, trialability, and observability), as well as the key factors that influence innovation  
47 dissemination (i.e., time, social networks, and communication channels) (32). The structure,  
48 including duration, mechanism of delivery and content of the intervention will be determined  
49 at this stage.  
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## Phase 5: Destiny Stage: Implementation of the Intervention

*Sample:* Therapists working in high burdened settings in KZN public health sector via non-probability purposive sampling. Sampling and recruitment will be implemented as for phase 2.

*Data Collection:* Implementation of the intervention will occur as per the AI (Destiny Stage)(17) and will follow the structure determined in the preceding phase (content, duration and mechanism of delivery). Therapists will additionally be required to document their initial experiences in a developmental blog/journal.

*Data Analysis:* Blog/Journal entries will be exposed to a thematic analysis at the end of the intervention using inductive reasoning. This, together with a post-intervention focus group with volunteers who had undergone the KT intervention will form part of the evaluation process of the KT intervention.

## ETHICS AND DISSEMINATION

### Ethical Approval

The study received full ethical approval from the Health Research and Knowledge Management Directorate of the Department of Health (NHRD Ref: KZ\_202008\_066) as well as from the Biomedical Research Ethics Committee, University of KwaZulu-Natal (Ref: BREC/00001886/2020). The committee is registered with the South African National Health Research Ethics Council (REC-290408-009). Informed consent will be obtained from all participants prior to any data collection. There are no anticipated risks to participants who volunteer to participation in the study.

### Dissemination and Implication for the Public Health Sector

The need for more explicitly articulated evidence-based strategies for health professionals who are expected to function in challenging environments are required in the country. These include the increased burden of care, limited resources and a general lack of knowledge and skill to handle the demands placed in contexts that requires a professional to be fit for practice in diverse settings. With this, appropriate KT interventions may prove essential in ensuring that health practitioners are able to meet the demands in these contexts. Expected outputs from the study include the design of an integrated knowledge resource for therapists working in the field of neonatal care, charting of key aspects that will potentially inform a standard of care for at-risk infants in high burdened settings and training on how to design and implement KT interventions. The knowledge gained from this study is transferable to other KT initiatives involving families/caregivers by the participants of this particular study. Given that this study

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3 is positioned within the ambit of implementation science, the translated study findings will not  
4 only be available in peer-reviewed articles but will also be disseminated to appropriate  
5 audiences at relevant conferences. The intervention is this study also translates and  
6 disseminates information to a targeted audience, thereby contributing to service delivery in the  
7 public health sector of the country.  
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### 11 **Patient and Public Involvement**

12 There is no patient involvement in this study.  
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### 16 **Contributorship Statement**

17 PG was responsible for the conceptualisation of the study and drafting of the manuscript.  
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### 21 **Competing interests**

22 The author declares no competing interest.  
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28 Grant for Y-rated Researchers (Grant Number 120400).  
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## 20 **AUTHOR CONTRIBUTIONS**

21  
22 PG is the principal investigator and was responsible for the conceptualisation and design of  
23 the study including drafting of the manuscript..  
24  
25

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## 35 **COMPETING INTERESTS**

36  
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38 The author declares no competing interests.  
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# BMJ Open

## A multi-method study protocol to identify and bridge the knowledge-to-practice gaps in rehabilitation professionals working with at-risk infants in the public health sector of South Africa

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5 **public health sector of South Africa**  
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## ABSTRACT

**Introduction:** Early childhood is a critical time when the benefits of early interventions are intensified, and the adverse effects of risk can be reduced. For the optimal provision of early intervention, professionals in the field are required to have specialised knowledge and skills in implementing these programmes. In the context of South Africa, there is evidence to suggest that therapists are ill-prepared to handle the unique challenges posed in neonatal intensive care units and wards with at-risk infants in the first few weeks of life. This is attributed to several reasons; however, irrespective of the causative factors, the need to bridge this knowledge-to-practice gap remains essential. **Methods and Analysis:** This study is a multi-method stakeholder-driven study using a scoping review followed by an appreciative inquiry and Delphi process that will aid in the development, implementation and evaluation of a knowledge translation intervention to bridge knowledge-gaps in occupational and physiotherapists working in the field. Therapists currently working in the public health sector will be recruited for participation in the various stages of the study. The analysis will occur via thematic analysis for qualitative data and percentages and frequencies for descriptive quantitative data. Issues around trustworthiness and rigour, and reliability and validity, will be ensured within each of the phases, by use of a content validity index and inter-rater reliability for the Delphi survey; thick descriptions, peer debriefing, member checking and an audit trail for the qualitative data. **Ethics and Dissemination:** The study has received full ethical approval from the Health Research and Knowledge Management Directorate of the Department of Health and a Biomedical Research Ethics Committee. The results will be published in peer-reviewed academic journals and disseminated to the relevant stakeholders within this study.

## KEYWORDS

Knowledge translation, neonatal care, therapists, appreciative inquiry, knowledge-to-action framework

## ARTICLE SUMMARY

### Strengths and Limitations

- With the continued high burden of disease in resource-constrained environments of LMICs, KT interventions at a micro-level may be helpful in effecting positive changes within the day to day practice.
- This novel study is designed systematically with the use of multiple methods such as a scoping review, appreciative inquiry process, and a Delphi process within a knowledge-to-action framework. Having participatory methods embedded within this study allows for propositional and non-propositional knowledge to be implemented within the study to ensure a genuinely stakeholder-driven strategy that may have greater uptake in day-to-day practice.
- A limitation may exist in the use of virtual platforms, which may serve as a barrier to greater networking and in establishing rapport, as is intended with the face-to-face sessions. Group sharing and good online facilitation may assist in developing group cohesion in a virtual platform, which has become the mainstay globally in light of the COVID-19 pandemic.
- The study offers an opportunity to explore context-specific needs that can be driven by stakeholders themselves and direct benefits to participants, as provided by the knowledge interventions that will be developed, implemented and evaluated within this study.
- Limitations in lieu of the COVID-19 pandemic may exist, in terms of lockdown and social distancing requirements, but the study remains feasible using virtual and other forms of telecommunication that do not deviate from achieving the study objectives. These alternatives are proposed in the methods section of this paper.

## INTRODUCTION

Currently, worldwide emphasis is placed on not only reducing child mortality but in improving the quality of care for neonates (1, 2). We are aware that during the neonatal period, an increase in the rate of mortality in children under the age of five years old arises (3). Neonatal mortality rates per 1000 live births stand at 28% in Sub Saharan Africa, 16% in Northern Africa, 25% in Central and Southern Asia and 3% in Europe and Northern America (4). In South Africa (SA), an estimated 12% of neonates die per 1000 live births annually during the perinatal and first weeks of life (5), with 23% of infants (over the age of 28 days) per 1000 live births die annually in South Africa (6). Whilst there has been an overall significant decline in child mortality rates over the past 20 years, child morbidity also requires emphasis.

In low and middle-income countries (LMICs), an estimated 250 million children (43%) under five will fail to meet their developmental potential because of extreme poverty and deprivation (7). This burden appears to be under-estimated as the risks to health and well-being are related to other additional contextual factors. In LMICs, these include poor health and nutritional status and inadequate learning that may perpetuate the current socio-economic milieu.

Only in the past few years have the development and health communities recognised that early childhood development is a solid foundation for human capital development (8). Nurturing care by the provision of early intervention programmes in the early years is therefore essential in ensuring that individuals and societies thrive. Scientific evidence indicates that early childhood is a period of particular sensitivity to risk factors and a critical time when the benefits of early interventions are intensified, and the adverse effects of risk can be reduced. Early diagnosis is essential in allowing for initial medical responses and intervention, which is indicated in improving the neurodevelopmental outcome of high-risk infants (9).

In SA, the ministry of Health's strategy to enhance the provision of essential health care interventions for mothers and children in some of the country's poorest districts was noted as a step in the right direction (10). However, the policy framework and strategy for disability and rehabilitation services in SA, has not strongly articulated the role of the rehabilitation team in neonatal care, although the roles of the members of the rehabilitation team are defined as covering the lifespan (11). Currently, there is a substantial unmet need for rehabilitation in many LMICs with a large under-prioritisation of rehabilitation by ministries of health. The World Health Organisation's launch of the Rehabilitation 2030 initiative emphasised the need for health system strengthening (12). Part of this responsibility inevitably then requires competent and skilled health care workers for the care of both mother and newborn infant (12).

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3 For early intervention to be optimal, professionals in the field are required to have specialised  
4 knowledge and skills in the implementation of these programmes. Currently, therapists have  
5 indicated that they are ill-prepared to handle the unique challenges posed in neonatal intensive  
6 care units and wards with at-risk infants in the first few weeks of life (13). Bridging this  
7 knowledge-to-practice gap is therefore essential.  
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11 There has been increasingly growing evidence around knowledge translation (KT) in the last  
12 decade, with most communities having extensive agreement around the need to transfer  
13 knowledge into action. In a scoping review, KT strategies that achieve beneficial outcomes  
14 were still unknown (14) with limited empirical research on how to undertake integrated KT  
15 (15). Consolidation of KT activities remains limited despite the expressed need for KT  
16 strategies to be espoused within rehabilitation practice (16). With an increasing role in inter-  
17 professional primary health-care teams, the scope of rehabilitation practice is expanding and  
18 should include KT that represents knowledge brokerage. This study, therefore, relies on KT in  
19 the care of at-risk infants in high burdened settings as that of the South African public health  
20 system.  
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24 Thus, this study thus aims to develop, implement and evaluate an integrated knowledge-to-  
25 practice intervention for rehabilitation therapists in South Africa targeted at at-risk infants in  
26 burdened settings such as that of the South African public sector.  
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30 The specific objectives include the following: (i) to review and appraise the available literature  
31 on knowledge translation interventions for rehabilitation professionals targeted at at-risk  
32 infants in burdened settings such as that of the SA Public Sector, via a scoping review, (ii) to  
33 develop and refine a knowledge-to-practice intervention via a stakeholder-driven appreciative  
34 inquiry process and Delphi process for consensus by a group of experts in the field, (iii) to  
35 implement and evaluate the knowledge-to-practice intervention with rehabilitation  
36 professionals working with at-risk infants in the SA public health sector.  
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## 47 **METHODS AND ANALYSIS**

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49 This multi-method study is structured within three study phases. The study is anticipated to  
50 commence in the latter period of 2020 and will be completed by mid 2022.  
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### 53 **Phase 1: Systematic Scoping Review**

54  
55 *Design:* A systematic scoping review of peer-reviewed and grey literature on available KT  
56 interventions within the field of rehabilitation that cover infant health towards improved  
57 neurodevelopmental trajectories in at-risk infants will be considered. This review will be guided  
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3 by Arksey and O Malley's (17) scoping review framework and the Joanna Briggs Institute (JBI)  
4 guidelines for scoping reviews (18).  
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7 *Steps in the Process:* The steps would include identification of the research question,  
8 identification of relevant studies, study selection, charting of the data and collation,  
9 summarising and reporting of the results. Additionally, a quality assessment as recommended  
10 by Levac et al (19) and Tricco et al (20) will be conducted.  
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15 *Eligibility Criteria:* The study will use the population, concept and context (PCC) model to  
16 determine the eligibility of the research question (18).  
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20 *Procedure:* The first step would involve searching relevant databases with search strings and  
21 limits (as per the scoping review protocol). This will be followed by study selection (title and  
22 abstract screening followed by full-text screening using pre-defined eligibility criteria) by two  
23 reviewers and a third person at hand for disputes. The primary reviewer, the principal  
24 investigator (PI), will conduct a comprehensive search and screening of the study titles from  
25 the selected databases. All citations from the searches will be exported to an EndNote library,  
26 and all duplicates will be removed before embarking on abstract and full article screening. Two  
27 reviewers will be responsible for conducting the abstract screening followed by full article  
28 screening of the selected studies independently and aligned to the eligibility criteria. The  
29 screening results will be reported using the Preferred Reporting Items for Systematic reviews  
30 and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (21). Charting of  
31 the evidence will occur by the development of a data-charting tool guided by the research  
32 question. The charting tool will include the following details, namely, (i) author and year of  
33 publication (ii) title of evidence/study (iii) aims and objective/s (iv) country of the  
34 evidence/study (v) study design (vi) study participants (vii) study results (viii) findings relevant  
35 to answer the question (ix) conclusion (x) recommendations. The form will be continually  
36 updated to enable the capturing of all relevant data to answer the review question. A narrative  
37 account of the extracted data will be analysed using thematic analysis (22). Data will be  
38 imported into a relevant programme for organisation of the data and computer-assisted data  
39 analysis (e.g. NVivo, Atlas-ti). Initial codes will be derived, followed by word trees, prior to  
40 categorisation into subthemes and themes using a hybrid approach (23).  
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54 *Quality Appraisal:* The quality of the included studies will be appraised using the Mixed Method  
55 Appraisal Tool (MMAT) version 2011 (24, 25). For qualitative studies, section one of the MMAT  
56 will be used; for a quantitative study, section two for randomised controlled, section three for  
57 non-randomised, and section four for descriptive studies. For a mixed-methods study, section  
58 one for appraising the qualitative component will be used and the appropriate section for the  
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3 quantitative component (Sections two, three or four) and section five for the mixed methods  
4 component. The tool will be used to critically appraise the quality of the methods of the  
5 included studies. It will seek to examine the appropriateness of the study aims, the context  
6 relevance, and theoretical inferences to answer research questions, author's discussions and  
7 conclusions. The overall quality for each of the studies selected will be calculated following  
8 the MMAT guidelines (score = number of criteria met divided by four) and then presented  
9 using one of four descriptors, namely, (i) Low quality (1–25%), where minimal criteria are met,  
10 (ii) average (26–50%); (iii) above average (51–75%) and (iv) high quality (87%–100%), where  
11 all criteria are met. For mixed methods studies, the principle is that the overall quality cannot  
12 be more than the quality of its weakest component (24, 25). As a result, the overall quality  
13 score will be the lowest score of the study components (qualitative or quantitative).  
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## 22 **Phase 2: Discovery, Dream and Initial Design: Generating Content for the KT** 23 **intervention via Stakeholder input** 24 25

26 *Design:* Appreciative Inquiry (AI). AI offers a positive way to explore, discover possibilities,  
27 and transform systems and teams (26) towards a shared vision of identified strategic  
28 intervention. It, therefore, plays an integral part in supporting change (27).  
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31 *Recruitment and Selection of Sample:* Therapists involved in the care of at-risk infants at  
32 district, regional and tertiary hospitals in KZN practising in the field of occupational therapy  
33 and physiotherapy will be invited to participate. There are currently approximately 623 OTs in  
34 KZN, of which 194 work in the public health sector (28). The head of child health within the  
35 ministry of health in KZN, the neonatal co-ordinator for the province as well as the KZN forum  
36 for OT were accessed to determine the number of eligible participants (n=46). Currently, there  
37 are approximately 1101 physiotherapists in KZN (29); however, the actual number of  
38 therapists working in the public sector could not be ascertained. A purposive sample will  
39 therefore be drawn from this total number of therapists within the province, based on those  
40 that are currently working within/or have rotations in neonatal ICUs within their institutions.  
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48 *Stages:* The first two stages of the AI process will be implemented. In stage one, the discovery  
49 stage, themes on positive steps taken towards ensuring early intervention for at-risk infants  
50 will be identified and shared. In stage two, the dream stage, themes from desires and wishes  
51 from all stakeholders will be shared. Stage 3 of the design stage, themes around appropriate  
52 KT content will be explored, and ideas generated.  
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57 *Data Collection Process:* A workshop format will be followed for the AI process with materials  
58 available for expression of ideas followed by a discussion and collation of common themes  
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3 and ideas (should face to face contact be allowed). Session times will be negotiated with  
4 participants, given their work schedules and availability. Participants will be accommodated in  
5 a comfortable setting with a maximum of three hours allocated for the data collection. This will  
6 allow for a “meet and greet” to establish rapport and network with others in the field over  
7 refreshments, as well as for the actual discussion group (which will not span more than 90-  
8 100 minutes). In lieu of COVID-19, the option of virtual platforms such as Zoom will be explored  
9 for the discussion groups. The ZOOM Pro-plan subscription will be used to ensure that there  
10 are more than 40 minutes allocated to each of the online sessions. This would then entail  
11 multiple groups (with a maximum of 10-12 participants) proceeding through the same data  
12 collection process to facilitate more robust discussion as opposed to a larger group on a virtual  
13 platform. The session will not span more than 90-100 minutes. Prior consent will be solicited  
14 from participants together with details on the most convenient time to host a virtual session  
15 and network and other requirements that may be required for the virtual session. Participants  
16 will be offered reimbursement for data use for the session/s. The session/s (irrespective of  
17 whether it occurs face-to-face or virtually) will be audio-recorded.

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28 *Data Analysis:* Data will be analysed thematically using inductive-deductive reasoning and  
29 with reference to analytical memos that would be noted by a moderator present in the AI  
30 Workshop. Should the workshop session be held virtually, permission to video-record the  
31 session will be requested and, these will be reviewed as part of the analysis process. The  
32 transcribed data will be imported onto a software programme (NVivo, Atlas-ti) for organisation  
33 of the data. Initial coding, followed by categories and themes will ensue (22, 23). Where  
34 necessary relevant verbatim responses will be highlighted to support the findings.

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41 *Trustworthiness:* In ensuring rigour within this phase of the study, thick descriptions will  
42 accompany the narrative reported with verbatim quotes, peer debriefing will occur during the  
43 analysis process, member checking and respondent validation will occur following analysis of  
44 the data, and an audit trail will be maintained for all decisions and processes.

### 45 46 47 **Phase 3: Design Stage 1: Consensus on the KT intervention Content (Expert Input)**

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51 *Design:* A hybrid two to three round Delphi Process will be conducted.

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*Recruitment and Selection of Sample:* A systematic process will be followed for the  
identification of experts (panelists) in this study. This will include the recruitment of opinion  
leaders, based on contributions to national conferences, clinical researchers in paediatrics;  
determined via the training Universities in South Africa as well as by the relevant professional  
society’s databases (OTASA and SASP) as well SA authors working in the field as identified



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3 by the phase one scoping review. Non-probability purposive sampling will be used in the  
4 recruitment, and snowball sampling initiated should other potential participants be identified  
5 by the originally recruited sample. Individuals will not be selected to represent the general  
6 population but rather in their ability to expertly contribute to the research questions. The  
7 anticipated sample size is 50 participants (to account for potential attrition) through the  
8 subsequent Delphi rounds. This will be modelled on a previous Delphi study conducted with  
9 experts in the field of paediatrics (30).  
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15 *Data Collection:* Expertise will be documented in a self-report biographical questionnaire. In  
16 order to use the Delphi technique maximally, the findings of the scoping review will be  
17 combined with the data from the “discovery, dream and design phase” to inform the round one  
18 questionnaire. Polar responses (yes/no) and unipolar responses (likert scales) will form part  
19 of the survey. A pilot of the developed survey will be initiated and a content validity index  
20 computed during this phase to establish relevancy and clarity of included items. Results of  
21 round one will be collated and assist in the development of the round two survey. Prior to  
22 round one, experts will be sent an information package, a description of Delphi technique and  
23 a consent letter.  
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31 *Data Analysis:* Following round one, results will be pooled and feedback provided to the panel  
32 with the round two questionnaires electronically. Membership of the panel will not be disclosed  
33 to the participants (quasi-anonymity). Communication within rounds will occur via electronic  
34 means. Items on which agreement has not been settled will be highlighted, and panellists will  
35 be encouraged to reconsider their stance on those items that consensus was not reached on  
36 and to re-rate items. Data will be analysed using relevant software packages. The extent with  
37 which each participant agrees with the stated issue (numerical/categorical scale) and the level  
38 of agreement between each other (descriptive statistics) will be determined. Cronbach’s alpha  
39 will be utilised to measure internal consistency of the group. For example, where Cronbach’s  
40  $\alpha$  is close to 1.0, it can be argued that there is consistency in the responses of the panel. An  
41 *a priori* consensus threshold of 70% ( $\pm 5\%$ ) will be selected because of the small number of  
42 panellists anticipated.  
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#### 50 51 **Phase 4: Design Stage 2: Design and Refinement of the KT intervention**

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53 The Knowledge-to-Action (KTA) framework (31-34), the diffusion of innovation theory (35),  
54 and Levac et al’s (36) best practice guidelines for developing educational resources will be  
55 used to inform the development process. Data from the preceding (design stage 1) will be  
56 collated. More specifically, the KTA framework (31) will provide the “big picture” and be used  
57 as the overarching guide for the KT process. Levac et al’s (36) best practice guidelines will  
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3 assist with specific details and steps needed to design the knowledge intervention. The  
4 diffusion of innovation theory will inform the design and implementation through consideration  
5 of the characteristics of the innovation that support adoption (i.e., relative advantage,  
6 complexity, compatibility, trialability, and observability), as well as the key factors that influence  
7 innovation dissemination (i.e., time, social networks, and communication channels) (35). The  
8 structure, including duration, mechanism of delivery and content of the intervention, will be  
9 determined at this stage.  
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### 15 **Phase 5: Destiny Stage: Implementation of the Intervention**

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18 *Sample:* Therapists working in high burdened settings in KZN public health sector via non-  
19 probability purposive sampling. Sampling and recruitment will be implemented as for phase 2.  
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22 *Data Collection:* Implementation of the intervention will occur as per the AI (Destiny Stage)(17)  
23 and will follow the structure determined in the preceding phase (content, duration and  
24 mechanism of delivery). Therapists will additionally be required to document their initial  
25 experiences in a developmental blog/journal.  
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30 *Data Analysis:* Blog/Journal entries will be exposed to a thematic analysis at the end of the  
31 intervention using inductive-deductive reasoning. The analysis will follow the same processes  
32 as for Phase 2. This, together with a post-intervention focus group with volunteers who had  
33 undergone the KT intervention, will form part of the KT intervention evaluation process.  
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## 38 **ETHICS AND DISSEMINATION**

### 39 **Ethical Approval**

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41 The study received full ethical approval from the Health Research and Knowledge  
42 Management Directorate of the Department of Health (NHRD Ref: KZ\_202008\_066) and the  
43 Biomedical Research Ethics Committee, University of KwaZulu-Natal (Ref:  
44 BREC/00001886/2020). The committee is registered with the South African National Health  
45 Research Ethics Council (REC-290408-009). Informed consent will be obtained from all  
46 participants prior to any data collection. There are no anticipated risks to participants who  
47 volunteer to participate in the study.  
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### 54 **Dissemination and Implication for the Public Health Sector**

55 The need for more explicitly articulated evidence-based strategies for health professionals  
56 who are expected to function in challenging environments are required in the country. These  
57 include the increased burden of care, limited resources and a general lack of knowledge and  
58 skill to handle the demands placed in contexts that requires a professional to be fit for practice  
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3 in diverse settings. With this, appropriate KT interventions may prove essential in ensuring  
4 that health practitioners can meet the demands in these contexts. Expected outputs from the  
5 study include designing an integrated knowledge resource for therapists working in the field  
6 of neonatal care, charting of critical aspects that will potentially inform a standard of care for  
7 at-risk infants in high burdened settings and training on how to design and implement KT  
8 interventions. The knowledge gained from this study is transferable to other KT initiatives  
9 involving families/caregivers by the participants of this particular study. Given that this study  
10 is positioned within the ambit of implementation science, the translated study findings will not  
11 only be available in peer-reviewed articles but will also be disseminated to appropriate  
12 audiences at relevant conferences. The intervention in this study also translates and  
13 disseminates information to a targeted audience, thereby contributing to service delivery in  
14 the country's public health sector.  
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### 23 **Patient and Public Involvement**

24 There is no patient involvement in this study.  
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### 28 **Contributorship Statement**

29 PG was responsible for the conceptualisation of the study and drafting of the manuscript.  
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### 33 **Competing interests**

34 The author declares no competing interest.  
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## AUTHOR CONTRIBUTIONS

PG is the principal investigator and was responsible for the conceptualisation and design of the study, including drafting of the manuscript.

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### 8 9 **COMPETING INTERESTS**

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12 The author declares no competing interests.  
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