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Tailored training for physiotherapists on the use of clinical practice guidelines: A mixed methods study.

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Declarations

Ethical Approval and consent to participate

Ethical approval for the study was obtained from the Health Research Ethics Committee of Stellenbosch University (S17/05/100). Written, informed consent was obtained from all participants in the study.

Consent for publication

Not applicable.

Availability of data and materials.

The data and course material are available upon reasonable request from the corresponding author.

Competing interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Authors' contribution

All authors collaborated on the conceptualization of study. All authors were responsible for writing and revising the manuscript. All authors read and approved the final manuscript.

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Abstract

Introduction: Clinical practice guidelines (CPG) are vehicles for translating evidence into practice, but effective CPG-uptake requires targeted training. This mixed methods research project took a staged evidence-based approach to develop and test a tailored training programme (TTP) that addressed organisational and individual factors influencing CPG-uptake by South African physiotherapists treating patients with low back pain in primary healthcare settings.

Methods: This multi-stage mixed methods study reports the development, contextualisation and expert content validation of a TTP to improve CPG-uptake. Finally, the TTP was evaluated for its feasibility and acceptability in its current format.

Results: The TTP (delivered online and face-to-face) contained minimal theory, and focusing on practical activities, clinical scenarios and discussions. Pre-TTP, physiotherapists expressed skepticism about the relevance of CPG in daily practice. However, post-TTP they demonstrated improved knowledge, confidence, and commitment to CPG-uptake.

Discussion: The phased-construction of the TTP addressed South African primary healthcare physiotherapists' needs and concerns, using validated evidence-based educational approaches. The TTP content, delivered by podcasts and face-to-face contact, was feasible and acceptable in terms of physiotherapists' time constraints, and it appeared to be effective in improving all outcome domains. This TTP is now ready for intervention to a wider audience.

Key words: knowledge translation, physiotherapy, mixed methods, clinical practice guidelines

Introduction

The last 30 years has seen increasing interest in putting current best evidence into practice (knowledge translation) (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; WHO, 2006). The vast amount of health research available on different library databases may make it difficult for clinicians to efficiently access and apply evidence to determine the best approach for their patients (Greenhalgh, Howick, Maskrey, & Group, 2014). One knowledge translation product is the use of clinical practice guidelines (CPGs), defined as “conveniently packaged documents with evidence-informed recommendations for healthcare stakeholders to optimize patient-care” (p.6) (Treweek et al., 2013). Nilsen (2015) noted the international challenge of contextualizing tailored knowledge translation strategies to translate best-evidence approaches into local practice (Nilsen, 2015). The South African Guidelines Excellence (SAGE) project described CPG-use in South African primary healthcare (Tamara Kredo, Machingaidze, Louw, Young, & Grimmer, 2015), highlighting knowledge translation challenges in South Africa that are not experienced in many developed countries (Dizon, Grimmer-Somers, & Kumar, 2011; Dizon, Grimmer, Machingaidze, Louw, & Parker, 2018; Louw et al., 2018). This particularly relates to complex contextual barriers that may hinder effective local South African uptake of best evidence (Eisenberg, 2002; Ridde, 2016).

It is unlikely that one knowledge translation strategy will be effective in all circumstances, particularly in resource-limited primary healthcare settings such as South Africa (Baker et al., 2015; Grol, Wensing, Bosch, Hulscher, & Eccles, 2013; Mody & Brooks, 2012). To support effective knowledge translation, local factors (barriers and facilitators) influencing CPG-uptake must be identified so that appropriately-planned interventions can be developed to address them (Grimshaw et al., 2012; Stander, Grimmer, & Brink, 2018, 2020b). Barriers to research evidence uptake (irrespective of the health discipline or country) are lack of time,

resources, employer support; and generalisability of evidence to local contexts (Grimshaw et al., 2012; Scurlock-Evans, Upton, & Upton, 2014). Further barriers are a lack of skills in accessing and understanding research evidence; and lack of interest in, and commitment to using these skills (Scurlock-Evans et al., 2014). Clinicians may need to be educated about the value of integrating CPGs into their treatment plans, by understanding CPG content in light of local contexts; the strength of the evidence underpinning recommendations; how different interventions may interrelate during episodes of care, and the availability of end-user guides (decision-making prompts, questionnaires, algorithms, etc.) (Côté, Durand, Tousignant, & Poitras, 2009; Stander et al., 2020b).

The SAGE team highlighted the progress occurring in South Africa to focus research efforts on contextualizing knowledge translation strategies for effective CPG-uptake (Tamara Kredo et al., 2015). In South Africa, innovative contextualization of medical CPGs has occurred with training programs to support CPG-uptake for respiratory conditions (including tuberculosis), HIV/AIDS and malaria (T Kredo, Gerritsen, van Heerden, Conway, & Siegfried, 2012; Schull et al., 2011). However, to date there has been little attention on training for the therapies (physiotherapy, occupational therapy, speech pathology, clinical nutrition or podiatry (Turnbull et al., 2009).

Recent reviews by Jones et al. (2015) and Stander et al. (2018), identified that single knowledge translation strategies, such as educational meetings, education materials and educational outreach visits are mostly utilized in physiotherapy implementation research. Multi-faceted knowledge translation strategies contained at least one educational component, usually combining above-mentioned educational approaches (Jones, Roop, Pohar, Albrecht, & Scott, 2015; Stander et al., 2018). A multi-faceted programme including educational

meetings and/ or educational outreach strategies, were found to be effective at improving evidence-based practice (EBP) utilisation (educational meeting 69% (11/16 reviews); educational outreach 67% (8/12 reviews)) and possibly patient outcomes (educational meeting 25% (2/8 reviews); educational outreach 14% (1/7 reviews)) (Johnson & May, 2015; Stander et al., 2018). Other strategies that were also combined were reminders, local opinion leaders, audit and feedback, and local consensus (Jones et al., 2015; Stander et al., 2018).

Passive approaches (educational meetings and material), are usually less effective than active approaches (opinion leaders and audit and feedback processes), particularly when active strategies have multiple components with clinicians contributing prior to, and during the process (Jones et al., 2015; Menon, Korner-Bitensky, Kastner, McKibbin, & Straus, 2009; Stander et al., 2018). Passive, single strategy studies showed nonsignificant outcomes, with dissemination of CPG leaflets being least effective, or used as the control (with a known effect) in these studies (Baker et al., 2015; Jones et al., 2015; Stander et al., 2018).

Many allied healthcare knowledge translation intervention studies show significant positive effects for behavioural changes, but have low methodological quality and rigor, some with outcome reporting bias and poorly described interventions (Baker et al., 2015; Johnson & May, 2015; Jones et al., 2015; Scott et al., 2012). The knowledge translation strategy itself must be evidence-based and underpinned with a well-developed theoretical framework (Graham et al., 2006; Grol et al., 2013; Hogan & Logan, 2004; Michie, van Stralen, & West, 2011). Furthermore, as the contextualisation of CPGs are important to implement it effectively within a specific population, so to the intervention itself needs to be underpinned by knowledge of the local context to ensure it addresses the needs and constraints of the population.

Work to date: The overarching mixed methods research project took a novel approach to determine whether a tailored training programme (TTP) addressing local factors influencing CPG-uptake, is feasible to improve knowledge, skills, attitudes and behaviours of South African physiotherapists who treat patients with acute or sub-acute low back pain in primary healthcare settings. An adapted Implementation-of-Change model was first developed to assist in identifying the domains that needed to be addressed when developing and testing the TTP (Bernhardsson et al., 2014; Grol, Bosch, Hulscher, Eccles, & Wensing, 2007). Figure 1 shows the 5-step Implementation-of-Change (dark arrow) model and the research's corresponding phases to each step.

>>Figure 1: Implementation-of-Change model (adapted with permission from Grol et al. (2013))>>about here

The development of the evidence based TTP reported in this study took five steps, aligning with the IoC model (Figure 1). The first two steps have been published, and are summarised here:

- Stander et al. (2018) reported on training programmes (step 1a: *set-up* phase) to improve CPG-uptake by physiotherapists (Stander et al., 2018). Two high quality, recent, relevant international physiotherapy TTPs were identified (Stander et al., 2018). At the time of the review, nine studies were identified and screened for its appropriateness to this study. The authors of the two TTPs provided details of these training programmes to the first author, to be used as the basis of the newly developed South African TTP. Dizon's programme was deemed relevant, as it focused on teaching Filipino physiotherapists to apply basic principles of the EBP approach in daily practice (Dizon et al., 2011), the only programme to date designed and tested on a developing country's physiotherapy population and thus this was relevant to the TTP design for South Africa. Bernhardsson's programme was deemed appropriate, as it was designed to teach Swedish physiotherapists how to source

and use CPGs more effectively in daily practice, similar to the focus of this particular study (Bernhardsson et al., 2014).

- Stander et al. (2019) reported on learning styles (step 1b: *set-up* phase) of physiotherapists, assisting us to plan and deliver learning activities ((Stander, Grimmer, & Brink, 2019). Physiotherapists seem to learn best through a variety of learning opportunities, such as active participation, underpinned with practical exercises of previously learned theoretical concepts. However, they are less likely to learn through brainstorming activities.
- Stander et al. (2020b, c) reported on interviews with 31 South African physiotherapists (step 2: *qual-1* phase) to determine their perceptions of, and factors influencing, CPG-use in South Africa. The identified overarching factors (facilitators and barriers) influencing CPG-uptake were resources, training and organisational factors (Stander et al., 2020b; Stander, Grimmer, & Brink, 2020c). Similar to both developed and developing countries, South African physiotherapists had a positive attitude towards EBP and CPGs, but they did not know how to source and appraise CPGs (da Silva, Costa, Garcia, & Costa, 2015; Scurlock-Evans et al., 2014). CPGs also seemed unrealistic, costly to implement and too prescriptive (Côté et al., 2009; Parr & May, 2014; Stander et al., 2020b). The interviews affirmed the need for a TTP to overcome the main barrier of a lack of time for research evidence-uptake (Stander et al., 2020c).

This paper describes the methods and results in steps 3 to 5 of Figure 1 in which the content of the TTP was developed, validated by experts and pilot tested to verify that it met end-user needs. The purpose of this paper is to report on the feasibility and acceptability of implementing an evidence based TTP to improve knowledge, skills, attitudes and behaviour in CPG uptake among South African physiotherapists in a primary care setting. This paper

presents the scaffolding of research findings and each stage informing the next and the iterative process of developing and pilot testing a knowledge translation strategy to improve CPG uptake.

Methods

Ethics: Ethical approval was obtained from Stellenbosch University (S17/05/100). All participants for each phase of the study completed informed consent forms.

Overarching reporting framework: The Mixed Methods Appraisal Tool (MMAT) Checklist (Appendix 1) was used to guide the reporting of the mixed methods study (Hong, Gonzalez-Reyes, & Pluye, 2018).

Research design: A multi-stage mixed methods research design was applied (Clark et al., 2013; Creswell, 2014). Integration through narrative occurred through a staged approach (Fetters, Curry, & Creswell, 2013).

Table 1 reports the implementation matrix of the study mapped to the Implementation-of-Change model, showing the stages building and informing each other (integration through building) and includes the first two steps (reported in the introduction) (Fetters et al., 2013).

Integration also occurred during the analysis of the feasibility findings (step 5: *QUAN* + *qual-2*; Table 1), using a joint display of the feasibility study's quantitative survey results and the qualitative findings (Guetterman, Fetters, & Creswell, 2015).

>>Table 1: Implementation matrix>> about here

Step 3: Contextualisation of TTP

The aim of Step 3 was to develop a contextualized TTP. The elements of the Filipino and Swedish training programmes (Bernhardsson et al., 2014; Dizon et al., 2011) (identified from step 1a: *set-up* phase) were unpicked, mapped, compared, and combined where possible, by grouping similar/ overlapping elements of each programme. Element were plotted according to the Cochrane Effective Practice and Organization of Care (EPOC) taxonomy of implementation strategies dimensions (Cochrane Effective Practice and Organisation of Care Group (EPOC), 2015). The EPOC taxonomy was developed to better describe health systems interventions, i.e. knowledge translation strategies, and provided a concrete evidence-based framework to develop the TTP (Cochrane EPOC Group, 2016). Each element was displayed using the steps outlined by Proctor et al. (2013) i.e. Name it, Define it and Operationalize it (Appendix 3) (Cochrane Effective Practice and Organisation of Care Group (EPOC), 2015; Proctor, Powell, & McMillen, 2013). The “Name it” heading referred to what each element would be referred to, for example the knowledge translation strategy of Educational Outreach is categorized as “regional programme”. The “Operationalize it” heading reflected how the programme would run (French et al., 2012; Proctor et al., 2013).

The elements of the Filipino and Swedish training programmes were amalgamated with the eight learning objectives identified from interviews (step 2: *qual-1* phase) (Stander et al., 2020b). These were that participants will:

- know how to define CPGs (differentiate them from protocols, checklists, etc.)
- know how to find CPGs
- demonstrate skills to critically appraise CPGs and identify acceptable versus unacceptable quality CPG
- understand key barriers to CPG-uptake into daily practice
- know how to deconstruct barriers to CPG-uptake and design locally appropriate solutions

- critically reflect on and analyse their current practice and compare it to best practice CPG recommendations, to facilitate changed behaviours in clinical decision-making in the management of specific conditions
- understand how to use outcome measures to review their practice; and
- employ tools to engage with other healthcare professionals and managers about best practice CPG recommendations for managing specific conditions.

During the interviews (Step 2; Table 1), physiotherapists highlighted the need for flexible individual learning components, i.e. an online platform that the participants can access at their own convenience (Stander et al., 2020b). Most participants wanted face-to-face training, combined with the flexible component (Stander et al., 2020b). These interviews also identified South African physiotherapists' hesitance to use international CPGs in their practice as they felt that these were not applicable to local contexts and patient populations (Stander et al., 2020b). This led to the development of a summary CPG (Stander, Grimmer, & Brink, 2020a) on the management of low back pain that was used as *CPG training material* during the contact component to introduce user-friendly support as part of CPG-uptake and implementation.

Step 4: Expert validation of TTP

The aim of Step 4 was to validate the draft South African-contextualized TTP through an expert validation study (step 4: *quan*; Table 1), consisting of five local and international physiotherapists and medical experts in EBP and CPGs. A purposive sampling approach identified these participants (Palinkas et al., 2015), using criteria of: EBP and CPG knowledge and experience; capacity and willingness to participate, time availability to participate and communication ability with the researcher (Skulmoski, Hartman, & Krahn,

2007). All contact was via email and the experts were blinded to each other's identity. The experts received an expert validation checklist (Appendix 4) to evaluate the TTP components, and expert resource booklet (available from author on request). This checklist is based on a previously used validation checklist in a similar physiotherapy population (Tilson, 2010). To provide the framework for the validation study, a series of statements about the South African-contextualized TTP was developed. The content validity criteria (with operational definitions) were clarity; use of technical language; application to praxis, relationship to problem; mode of delivery; content; time allocation (Tilson, 2010). The expert group was asked to score each criteria on a scale from 1 (not acceptable, major modifications needed) to 4 (exceeds expectations, no modifications needed), and to provide additional input if required. The experts' comments were considered and incorporated into the finalized TTP.

Step 5: Feasibility study

Step 5 aimed to test the feasibility of the South African-contextualized TTP. The template for intervention description and replication (TIDieR) Checklist (Appendix 2) was used to report the findings of this knowledge translation intervention study (Hoffmann et al., 2014). The finalized TTP (material available from author on request) was prepared for the feasibility (intervention) study (step 5: *QUAN + qual-2*; Table 1). This took place in a rural town, located 160km from a major South African city. The town houses a rural medical campus from a tertiary education institution, but this campus does not provided training to registered physiotherapists. The relative geographical isolation from learning institutions limited participants' exposure to post-graduate training in EBP (Booth, Carroll, Papaioannou, Sutton, & Wong, 2009). The study population and sampling frame consisted of 27 physiotherapists actively practicing and treating acute and sub-acute low back pain patients in this rural area, and who were registered with the Health Professions Council of South Africa. Minimum

sample size (n=10) was calculated on the likelihood of these physiotherapists agreeing to participate in this study (estimated as 1:3), based on a previous study undertaken on South African physiotherapists (Simpson, 2013). The main presenter was the first author, with guidance from the co-authors.

The feasibility study integrated data from qualitative and quantitative research approaches administered during the TTP delivery to determine the:

- feasibility of delivering the TTP to South African physiotherapists in terms of recruitment of participants, presentation timeframe, and resources (financial, participant's time, training and infrastructure) needed for implementation (Ritzwoller, Sukhanova, Gaglio, & Glasgow, 2009);
- acceptability of the TTP to South African physiotherapists in terms of quality and worth of information gained, the likelihood that their practices will change, and the value they placed on the time spent on the TTP. Physiotherapists also commented on the outcome measures, which measured change in knowledge, skills, attitudes and behaviour of participants participating in the TTP (Ritzwoller et al., 2009);
- Physiotherapists' perspectives on CPG-use as part of, and during, the TTP.

The study procedure was explained to each participant at time of recruitment, and upon agreeing to participate, they signed a consent form. The participants were given 14 days to complete the online component, consisting of approximately three hours of podcasts. After completion of the online component, the participants were asked to complete two written assignments: reflections of their own current practice, and on barriers and facilitators to CPG-uptake in their clinical environment.

The outcomes of the feasibility study were assessed by questionnaires and datasheets before, and after, the TTP intervention. For the assessment of the delivery of the TTP in the proposed format, timeframe and resources needed to implement the TTP, the following information was recorded by each participant: 1) time to explain procedures and obtain informed consent; 2) time to complete each TTP component; 3) time to complete each outcome measure. The quality and worth of information gained, the likelihood that practice behaviour will change, and the value placed on the time spent on the TTP was assessed via open- and closed-ended questions.

Knowledge and skills were defined as the ability to retain CPG facts/ concepts and apply these concepts in practice. Attitudes and behaviours refer to the importance placed by physiotherapists on the applicability and CPG-use in daily practice (Tilson et al., 2011).

Qualitative data from previously conducted interviews (Stander et al., 2020b) were used to build the quantitative survey items aiming to evaluate participants' self-perception of CPG-use (Fetters et al., 2013). The quantitative survey (available on request from the author) consisted of nine items, with five items following a 5-point Likert scale:

- How confident are you that you understand what a clinical practice guideline is?
- How confident are you that you can find clinical practice guidelines quickly?
- What value do you place on clinical practice guidelines in your daily clinical practice?
- How confident are you in using outcome measures in your daily practice?
- How often do you currently use clinical practice guidelines in your daily practice?

Furthermore, a post-course evaluation evaluated the feasibility of the usefulness of the proposed TTP. A reference number was allocated to each subject, and all assessments were linked to this number to ensure participant anonymity during data collection and subsequent

analysis. Each feasibility outcome was categorized as highly, moderately, or poorly achieved (Table 2) as adapted from Item 6 of the CONSORT statement for feasibility studies (Eldridge et al., 2016).

>>Table 2: Feasibility outcome categories about here>>

Statistical analysis: Descriptive statistics were used to report pre-post result differences in quantitative outcome measures (using paired t-tests, significance set at $p < 0.05$).

Exploratory analysis: The online reflections and transcribed discussions (which were audiotaped, transcribed verbatim without participant identifiers) were used to explore reasons for the pre-post differences in quantitative data.

Results

Step 3: Contextualisation of TTP

The TTP was classified as both an educational meeting and educational outreach strategy. It consisted of online podcasts (approximately one-hour in total; Table 3) and a one-day workshop (Table 4). The eight learning objectives were addressed throughout the TTP, explicitly stating these objectives in the training material. The training material of the TTP can be obtained from the corresponding author.

>>Table 3: Tailored training program – online component about here>>

>>Table 4: Tailored training program – contact component about here>>

The contact component presented CPGs as a practical and easy-to-use tool to promote EBP.

The assessment and management case studies aimed to give the participants an opportunity to

apply the knowledge and skills obtained throughout the TTP on “paper patients”. Case studies give clinicians a vehicle by which to discuss how they would assess and manage a patient with acute or sub-acute low back pain (McCluskey, 2013). It links to physiotherapists’ learning style of wanting to problem-solve through real-world examples (Stander et al., 2019). The drafted TTP included a training material booklet, presentation slides and scripts for the online sessions.

Step 4: Expert validation of TTP

The experts commented on the varying degrees of experience that potential participants would have in CPG-use. One expert noted that background information regarding previous experience would help determine how much information to provide. This linked to the decision to incorporate a self-perceived CPG behaviour change scale to ensure that the TTP was “pitched” at the right level, but also gave valuable information post-TTP on CPG-uptake. Two experts commented on the “good mix of mode of delivery”. Two experts were concerned about the volume of material that the TTP wanted to cover during the proposed timeframe, with one expert concerned that the TTP may not “seem to allow for deep exploration of CPGs”. The feedback was incorporated into the TTP contact sessions using regular pauses with different questions of “checking-in” with the participants’ understanding of the material.

Step 5: Feasibility study

The feasibility study tested the proposed TTP with 11 physiotherapy participants completing both the online and face-to-face components of the TTP. Six participants, who initially agreed to participate in the study, dropped out before commencing the TTP due to having difficulty navigating the online process (n=3) and due to personal reasons (n=3). Most of the

participants were female (n=10) and working in the private sector (n=10). All of the participants had a bachelor's degree in Physiotherapy with no post-graduate training in EBP. The participants' years in practice were: 0-5 years (n=2); 6-15 year (n=2); 16-20 years (n=2); and 21+ years (n=5). The first reflection assignment highlighted the participants' skepticism towards CPG-use in clinical practice, with most participants seemingly unaware of the nature and intent of CPGs, how CPGs are constructed, accessed, implemented or evaluated.

P2: "I think of myself as an experienced therapist (30+ years of experience), I find it unnecessary to spend time on the Internet, as I feel that I already know what works best."

P5: "I never even knew there existed something like clinical protocols up until a year ago... [CPGs] feels like a recipe and different patients react different to certain treatment modalities..."

However, most participants identified areas of clinical practice where they required guidance, and all indicated an interest in learning more about providing evidence-based care.

P1: "I do believe that I should include more evidence-based practice into my treatments/management of patients. That will improve my knowledge and my skills when managing a patient."

>>Table 5: Feasibility Questionnaire about here>>

All of the feasibility outcomes (n=7) were highly met (Table 5):

- recruitment of participants: there were more (n=11) than the calculated sample of participants (n=10) that completed the TTP.
- presentation timeframe: the TTP was delivered in the timeframe as determined during the development of the TTP.

- resources (including financial, participant's time, training, and infrastructure): the estimated resource allocation was sufficient.
- quality and worth of information gained: 100% of the participants scored positively.
- likelihood that their practices will change: 90% (n=10) of the participants indicated that their practice will change due to the TTP.
- value they placed on time spent on the TTP: 100% of the participants indicated that time spent on the TTP was of value to them.
- outcome measures as methods to measure change in knowledge, skills attitudes and behaviour: 100% of the participants completed the outcome measures in the time allocated to them and had a good understanding of the questions.

There was a statistically significant improvement when comparing pre-post course evaluations in “confidence in CPG-use” (mean 1.18 ± 1.17 ; median 1), “confidence in finding CPGs” (mean 1.55 ± 1.04 ; median 2), and “confidence in using outcome measures” (mean 1.09 ± 0.83 , median 1), with t-values of 3.36, 4.95 and 4.35 respectively. However, there was no statistically significant difference in “value of CPGs in practice” (mean 0.45 ± 1.04 ; median 0) and “frequency of CPG-use” (mean 0 ± 1.55 ; median 0), with t-values of 1.46 and 0 respectively.

The 3-month post-TTP follow-up demonstrated significant self-perceived behaviour change (Table 6) by most participants (n=7) in using CPGs more regularly, not just to treat patients with low back pain, but managing patients with other challenging conditions. One of the participants that demonstrated a plateau in behaviour change, commented “*old habits die hard*” when returning the score sheet.

>>Table 6: Behaviour change of participants pre-post training about here>>

Exploratory findings: Overall feedback was that the TTP was of unanticipated value in assisting participants to use CPGs to better manage patients with low back pain. Most of the participants enjoyed the practical, interactive nature of the workshop. Two participants also felt they could participate without judgement.

P6: *“Informal, I had the confidence to ask questions and “air” my concerns - never felt like the old dummy physio I often felt like on course”*

Three participants did not enjoy the “Contextualisation” activity. This feedback was also evident from the discussion transcriptions, as the participants were unsure of how to answer the questions posed to them to complete the activity. One participant felt that there was not enough practical application. The most beneficial part of the training seemed to be training on sourcing, appraising and the benefits of CPGs. Nine participants believed that their daily management of low back pain patients would change due to the training, while one participant felt that it will change slightly and one participant said that it will not change, as she was already following the discussed approach.

P2: *“Yes, I will refer most to the treatment guidelines”*

P3: *“Definitely – already changed”*

On the question of what could be improved in the training, two participants commented on including more small-groupwork activities. One participant wanted more online activities, while another wanted computers to practice sourcing of CPGs. On the question of further comments or recommendations, some of the participants showed gratitude for the course.

P6: *“The best course I've done for a long time, I needed this so badly! Thanks a lot!”*

Integration of qualitative and quantitative data sets: Figure 2 presents the joint display of the quantitative mean difference in the pre-post questionnaire results and exemplar quotations from the essay assignments and open-ended questions that aim to explore the changes reported.

>>Figure 2: Joint display of quantitative results and qualitative findings about here>>

Discussion

This paper reports one of the few mixed methods studies into the development, validation and feasibility of a multi-faceted knowledge translation strategy (utilizing active and passive approaches) for physiotherapists. To the authors' knowledge, this is the first time such a project has been conducted in a physiotherapy population in this resource-limited setting (Baker et al., 2015; Mody & Brooks, 2012).

The development of the TTP took approximately 12 months to complete. Due to the structured reporting of the different phases of this study, it is envisaged that this process can be completed in much shorter timeframes. The TTP was informed by two previously published scoping reviews (Stander et al., 2018, 2019), the subsequent identification of two previously published training programmes (Bernhardsson et al., 2014; Dizon et al., 2011) and contextualized according to interview findings of local physiotherapists (Stander et al., 2020b). The expert validation study served to ensure that the TTP was relevant to the intended population. The expert panel's feedback re-enforced the relevance of the TTP, with only minimal changes suggested by the panel.

A core- and flexible-component TTP was constructed to address the translation of summary CPG recommendations into the real world of physiotherapy practice, thus the TTP

incorporated the principles of best learning within the contexts of South African physiotherapy service delivery. It contained core learning about EBP and evidence translation which could be adopted more broadly within the profession, because it was delivered electronically, passively and could be followed at clinicians' own learning pace. It was apparent, however, that without the face-to-face workshop, the core component would not be as successful in engaging physiotherapists with discussions on translating evidence into their own practice contexts. The feasibility study's results showed significant improvement in pre-post evaluation, except "value of CPGs in practice" and "frequency of CPG-use". Both of these can be explained by the high baseline values, which decreased opportunities for significant change. However, the statistical significance has to be interpreted with caution due to the small sample sizes. The self-perceived behaviour change with CPG-uptake was as expected, due to behaviour change occurring at different speeds for different individuals and moving between stages of change occurring often (Prochaska, 2008).

The feasibility study could inform future research for power calculations of sample sizes for a randomised controlled trial evaluating the effect of the TTP on changing knowledge and skills on and professional behavioural change and attitude toward CPG-uptake among South African physiotherapists. Furthermore, the above-mentioned outcomes need further exploration of how to measure it accurately in these study design types. The continuous feedback received from participants help guide adjustments and adaptations to the TTP for future use, with different CPGs, and different physiotherapy populations (Chambers & Norton, 2016; Glasgow et al., 2014). The integration of qualitative and quantitative results in the feasibility study, presented us with a richer understanding of the process of behaviour change that the participants underwent during their training (Fetters et al., 2013; Guetterman et al., 2015). It broadens the understanding of how to shape the TTP to a wider audience by

understanding the “why” behind the improvements reported during the post-course assessment. Future research needs to consider basic computer literacy skills needed to access and implement online content as part of the TTP. It is acknowledged that South Africa is a resource-constrained country and Internet facilities may also be limited. Furthermore, when this TTP is implemented in a larger sample, the outcome measures need to be captured on this larger sample to further explore this study’s results.

Limitations

Step 3: The development of the TTP was based on two well conducted studies. However, the programmes were not used as-is due to contextual factors of the local community. The authors attempted to be as transparent as possible about the process followed to contextualize the TTP to ensure that the process, rather than the TTP itself can be reproduced.

Step 4: The expert validation study only consisted of a small number of experts (n=5) and this may have led to limited feedback. However, the expert panel represented both local and international experts in different fields of healthcare.

Step 5: The small sample size from one geographical area limits the generalisability of study findings. However, the lessons learnt in delivering, and analyzing the findings of the feasibility study will inform ways in which the TTP-content might be modified for physiotherapists in other settings. In particular, the three participants that dropped out due to difficulties accessing the online component, gives insight into possible computer literacy skills that needs to be addressed. This may include the development of a step-by-step instruction process to navigate the user through the online component. Furthermore, in a resource-limited country such as South Africa, access to Internet facilities need to be considered while conceptualizing a larger study, such as a randomized controlled trial, including a distance learning component that may not be dependent on external factors.

Conclusion

The phased-construction of the TTP ensured that it addressed South African primary healthcare physiotherapists' needs and concerns, using validated evidence-based educational approaches. The TTP content delivered by podcasts and face-to-face sessions, was feasible and acceptable in terms of participants' time constraints, and it appeared to be effective in improving all outcome domains. This TTP is ready for implementation to a wider physiotherapy audience. While this TTP was shown to be effective in the context for which it was delivered, further validation is required prior to implementing this TTP in other settings.

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Table 1: Implementation matrix

IoC Model	Implementation Matrix			
Steps	Phases	Objectives	Procedure	Outcomes
1. Develop a change proposal	Set-up	<ul style="list-style-type: none"> Developing TTP Finalising interview schedule 	<ul style="list-style-type: none"> Scoping reviews Adapting 2 previously used interviews on CPG use 	<ul style="list-style-type: none"> Groundwork to help inform and develop the TTP and the interview schedule, that will underpin project
2. Identify barriers to change	qual-1: interview	<ul style="list-style-type: none"> Exploring PT perceptions of and experience with CPG use 	<ul style="list-style-type: none"> Semi-structured interview on purposively selected sample from SA PT population 	<ul style="list-style-type: none"> Determining how they feel about CPG use in practice
3. Link interventions to barriers	quan: Expert validation	<ul style="list-style-type: none"> Validation of TTP 	<ul style="list-style-type: none"> Expert validation study with local and international EBP and CPG experts (n=5) 	<ul style="list-style-type: none"> Rigorously developed TTP to address CPG-uptake among SA PTs
4. Develop a plan	QUAN: Feasibility study	<ul style="list-style-type: none"> Delivering TTP Evaluating feasibility of TTP Evaluating PT behaviour change with CPG use, underpinned by TTP 	<ul style="list-style-type: none"> Feasibility study on PTs (n≈10) Pre-post intervention study 	<ul style="list-style-type: none"> Implementation and evaluation of TTP to determine its feasibility and effectiveness with PTs' CPG use
5. Carry out plan & evaluate progress	qual-2: Participant discussions on sessional topics during feasibility study	<ul style="list-style-type: none"> Exploring the PT reflections on CPG use 	<ul style="list-style-type: none"> Discussions between participants during the TTP 	<ul style="list-style-type: none"> qual: Understanding the reflections of PT CPG use during the TTP learning process MM: Are there relationship(s) between the qualitative & quantitative findings?

Key: IoC: Implementation of Change; **QUAN**: Main design component is quantitative study; quan: smaller complementary quantitative study; qual: smaller complementary qualitative studies; MM: mixed methods; TTP: tailored training programme; PT(s): Physiotherapist(s); CPG: Clinical practice guidelines; SA: South Africa(n)

Table 2: Feasibility outcome categories

Feasibility outcome	Highly met	Moderately met	Poorly met
Recruitment of participants	100% of sample (n=10) participates in TTP	80% of sample (n=8) participates in TTP	60% of sample (n=6) participates in TTP
Presentation timeframe	TTP delivered in timeframe as determined during development of TTP	Presentation timeframe exceeded by 30%	Presentation timeframe exceeded by 50%
Resources (financial, participant's time, training, infrastructure)	Estimated resource allocation was exceeded	Estimated resource allocation was exceeded by 30%	Estimated allocation was exceeded by 50%
Quality and worth of information gained	80% of participants scores positively	70% of participants scores positively	60% of participants scores positively
Likelihood that their practices will change	60% of participants indicate their practice will change due to the TTP	50% of participants indicate their practice will change due to the TTP	40% of participants indicate their practice will change due to the TTP
Value placed on time spent on TTP	70% of participants indicate time spent on TTP was of value	60% of participants indicate time spent on TTP was of value	50% of participants indicate time spent on TTP was of value
Outcome measures as methods to measure knowledge, skills, attitudes and behaviour change	70% of participants complete outcome measures in allocated time, with good understanding of the questions	60% of participants complete outcome measures in allocated time, with good understanding of the questions	50% of participants complete outcome measures in allocated time, with good understanding of the questions

Table 3: Tailored training program – online component

Online course		Total time: 150min	
Time	Topic	Approach/ Focus	Participant outcome
15min	Introduction to the workshop		
15min	What are CPGs?	Lecture 1	
15min	What is the purpose of CPGs and why are CPGs important?	Lecture 2	
15min	How to source a CPG	Lecture 3 Demo 1	
30min	Conducting the search	Practical 1	Own CPG
60min	Reflection on current practice	Practical 2	Reflection on own current practice
		Practical 3	Reflection on own barriers to CPG-uptake

Table 4: Tailored training program – contact component

Contact session		Total time: 8h 30min	
Time	Topic	Approach/ Focus	Participant outcome
8:30-9:30	Ice breaker/ Feedback session	Lecture 1	
9:30-10:15	Case study: Assessment	Discussion 1	Knowledge to utilize CPG
10:15-11:00	Case study: Management	Lecture 3	Knowledge to utilize CPG
		Discussion 2	
10:30-11:00	Tea		
11:30-12:00	Evidence sources & tiers	Lecture 3	Sourcing own CPGs and outcome measures
		Demo 1	
12:00-12:30	Context factors	Lecture 3	Applying the CPG
		Discussion 3	
12:30-13:00	Finding & appraisal of CPGs		Sourcing own CPGs and outcome measures
13:30-14:00	Lunch & reflection		
14:00-14:30	Feedback on reflection	Lecture 4	
		Discussion 4	
14:30-15:00	Contextualisation		Applying the CPG
15:00-15:45	New case barriers/ strategies	Discussion 5	Addressing own barriers and actioning strategies
15:45-16:30	Feedback on barriers/ strategies	Discussion 6	Individual feedback on reflections
16:30-17:00	Programme assessment	Outcome measures	

Table 5: Feasibility Questionnaire

Task	Description	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 11	Total /11
Informed consent	Sufficient time to explain the procedure	1	1	1	1	1	1	1	1	1	1	1	11
Informed consent	Sufficient time to obtain written, informed consent	1	1	1	1	1	1	1	1	1	1	1	11
Objectives of TTP	Clearly defined objectives of TTP	1	1	1	1	1	1	1	1	1	1	1	11
Outcome measures	Sufficient time to complete Pre-course quiz	1	1	1	1	1	1	1	1	1	1	1	11
TTP	Ice Breaker												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	1	1	1	1	1	1	11
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11
	Case study: Assessment												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	0	1	1	1	1	1	10
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11
	Case study: Management												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	0	1	1	1	1	1	10
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11
	Evidence sources & tiers												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	1	1	0	1	1	1	10
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11
	Context factors												
	Sufficient time to complete session	1	1	1	1	1	1	1	0	1	1	1	10
	Acceptable training level of session	1	1	1	1	1	0	1	1	1	1	1	10
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11
	Finding & appraisal of CPGs												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	1	1	0	1	1	1	10
	Satisfied with session	1	1	1	1	1	1	1	0	1	1	1	10
	Feedback on reflection												
	Sufficient time to complete session	1	1	1	1	1	0	1	1	1	1	1	10
	Acceptable training level of session	1	1	1	1	1	0	1	1	1	1	1	10
	Satisfied with session	1	1	1	1	1	0	1	1	1	1	1	10
	Contextualisation												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	1	1	1	1	1	0	10
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	0	10
	New case barriers/ strategies												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	1	1	1	1	1	1	11
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11
	Feedback on barriers/ strategies												
	Sufficient time to complete session	1	1	1	1	1	1	1	1	1	1	1	11
	Acceptable training level of session	1	1	1	1	1	1	1	1	1	1	1	11
	Satisfied with session	1	1	1	1	1	1	1	1	1	1	1	11

Outcome measures	Sufficient time to complete Post-course assessment	1	1	1	1	1	1	1	1	1	1	1	11
TTP	Efficient use of your time to attend TTP	1	1	1	1	1	1	1	1	1	1	1	11
TTP	Would you be willing to pay for such a TTP?	1	1	1	1	1	1	1	1	1	1	1	11
CPD points	Acceptable amount of CPD points allocated to TTP?	1	1	1	1	1	1	1	1	1	1	1	11
TTP catering	Acceptable quality of catering during TTP	1	1	1	1	1	1	1	1	1	1	1	11
TTP venue	Acceptable quality of venue during TTP	1	1	1	1	1	1	1	1	1	1	1	11
CPG utilisation	Perceived improvement of knowledge on CPG utilisation	1	1	1	1	1	1	1	1	1	1	1	11
TTP Objectives	Objectives were met by the delivered TTP	1	1	1	1	1	1	1	1	1	1	1	11
Key: P1-P11=Participant 1 to Participant 11; 1=Yes; 0=No; TTP=Tailored training programme; CPD=Continuous professional development; CPG=Clinical practice guideline													

Table 6: Behaviour change of participants pre-post training

	Pre-training		Post-training follow-up	
Participant	Score /10	Stage of change	Score /10	Stage of change
P1	2.8	Contemplation	5.4	Preparation
P2	2.2	Pre-Contemplation	8.0	Action
P3	4.8	Preparation	4.2	Contemplation
P4	1.0	Pre-Contemplation	2.2	Pre-Contemplation
P5	4.8	Preparation	5.7	Preparation
P6	0.8	Pre-Contemplation	3.8	Contemplation
P7	3.0	Contemplation	2.8	Contemplation
P8	4.9	Preparation	6.0	Preparation
P9	3.9	Contemplation	2.0	Pre-Contemplation
P10	4.9	Preparation	4.5	Preparation
P11	1.6	Pre-Contemplation	6.6	Action

Figure 1: Implementation of Change model (Adapted with permission from Grol et al. (2013))

Participant experiences

- P5: “That [CPGs] exist! And how to get hold of them. Make me rethink my way of approaching and treating patients”
- P7: “Re-assurance of what I currently know and use at/in my practice. Gained confidence in my using of CPGs.”
- P4: “Yes, will try and implement outcome measures more”
- P6: “Did not know what it was - now I know; was afraid of unknown - shy - will embrace change; did not know how to get hold of them - now I do!”
- P4: “It made me re-think the way I treat patients. The first case study was very informative - made me question myself.”
- P1: “Difficult to access some information. It takes a lot of time to get the information and then to read/understand it- especially if you work full time and have other responsibilities after work.”
- P5: “If I have a very busy day but will make time in the week to read up about [CPGs].”

Figure 2: Joint display of quantitative results and qualitative findings

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