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Health practitioners' perceptions of adopting clinical prediction rules in the management of musculoskeletal pain: a qualitative study in Australia

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ABSTRACT

Objectives To investigate health practitioners' understanding and practice behaviours with regards to clinical prediction rules (CPRs) and explore their perceptions of adopting a new whiplash CPR.

Design Qualitative study using six semistructured focus groups.

Setting Primary and secondary care in New South Wales and Queensland, Australia.

Participants Physiotherapists (n=19), chiropractors (n=6) and osteopaths (n=3) were purposively sampled to include health practitioners who provide routine treatment to people with whiplash-associated disorders.

Methods Focus group discussions (n=6) were audio-recorded, transcribed verbatim and analysed using an inductive thematic approach.

Results Health practitioners' understanding and use of CPRs were mixed. Clinicians considered components relating to acceptability ('whether I agree with it') and implementation ('how I'll use it') when deciding on whether to adopt a new CPR. Acceptability was informed by four themes: knowledge and understanding, CPR type, congruence and weighted value. Consideration of matters that promote implementation occurred once a CPR was deemed to be acceptable. Three themes were identified as potentially enhancing whiplash CPR implementation: the presence of an external driver of adoption, flexibility in how the CPR could be administered and guidance regarding communication of CPR output to patients.

Conclusions Education on CPR purpose and fit with practice is needed to enhance the perceived acceptability of CPRs. Strategies that facilitate practitioner motivation, enable administrative flexibility and assist clinicians in communicating the results of the whiplash CPR could promote adoption of the whiplash CPR.

Strengths and limitations of this study

- ► Focus group methodology provided an in-depth exploration of clinicians' perspectives of CPR use and adds to existing survey-derived literature.
- ► Insight into the research aims from those most likely to be consumers of musculoskeletal pain CPRs facilitated by inclusion of multiple professional groups.
- ► Transferability of findings may be limited given the geographical constraints and an absence of general practitioners in the study.

INTRODUCTION

Clinical prediction rules (CPRs) have been developed to assist health practitioners to make decisions on the assessment and treatment of people with musculoskeletal disorders.[1–3] These tools determine the relative contribution of various patient characteristics to provide quantified probabilities for a certain diagnosis, prognosis or response to a specific intervention.[4 5] CPR use is ideal where there is complexity in the condition, clinical uncertainty or population heterogeneity.[4 5] For example, CPRs have been advocated for use in people with whiplash-associated disorders (WADs), because targeted management based on prognostic subgrouping could improve the efficacy of treatment strategies by addressing heterogeneity with the population.[6] A prognostic CPR has been developed for this purpose, and uses age, Neck Disability Index[7] and Posttraumatic Stress Diagnostic Scale hyperarousal subscale[8] scores to predict whether an individual with acute WAD will experience full recovery or ongoing moderate/severe disability at 12-month follow-up.[9 10] Additionally, a randomised controlled trial (Whiplash ImPaCT) is being conducted to determine whether targeted treatment based on CPR stratification is superior to usual care.[11] While the whiplash CPR's predictive accuracy has been demonstrated in a validation study,[9] a trial such as Whiplash ImPaCT is needed to determine whether adoption of the CPR improves patient outcomes and/or the cost-effectiveness of care. This process is required before widespread CPR implementation is advocated.[4]

Evidence suggests that clinical adoption of CPRs relevant to the management of musculoskeletal disorders is poor.[12–14] Reasons for low uptake remain uncertain. However, preliminary investigations have proposed inadequate awareness and understanding of CPRs, disagreement with CPR purpose, fear of reduced clinical autonomy and incompatible practice behaviours as barriers to use.[13 15 16] Consideration of usefulness, clinical sensibility and user-friendliness have been recommended when developing CPRs,[16–20] but it is unclear whether these factors are important to clinicians. Similarly, it is not known if the whiplash CPR is acceptable to practitioners or whether barriers to implementation exist. A preliminary investigation into clinician perceptions of CPR usefulness found the tool was understandable, relevant and easy to use.[9] However, inclusion of responses from only one professional group and use of a survey design limit the generalisability of these findings. Successful implementation of research output, such as the whiplash CPR, requires investigation of barriers and incentives likely to influence uptake.[21 22] Insight into these factors could inform the design of strategies to maximise adoption. This study aimed to investigate health practitioners' understanding and practice behaviours with regards to CPRs generally and to explore their perceptions of adopting a new prognostic whiplash CPR.

METHODS

Design

This qualitative descriptive study was nested within a larger investigation that aimed to improve recovery from WAD through the development of targeted treatment pathways based on whiplash CPR categorisation.[11] Focus group discussions were considered optimal in exploring clinicians' understanding and practice behaviours regarding CPRs as comparison of multiple participants' perceptions enables the identification of group norms and values, provides insight into how and why individuals think and act as they do and renders rich experiential data.[23 24]

Participants

Participants were recruited according to a purposive sampling framework to enable insight into the research aims from those most likely to be consumers of the whiplash CPR.[25] Participants were registered physiotherapists, chiropractors, osteopaths or general practitioners who provide treatment to people with WAD in Queensland or New South Wales, Australia, and were able to attend a focus group venue on a selected date. Practitioners with a variety of experience levels were targeted from a range of practice settings in rural and metropolitan areas to enhance study transferability.[26] Potentially eligible participants were recruited via email to clinicians identified from professional body practitioner locator services, a Chiropractic Association of Australia mail out, local Primary Health Network newsletter and professional contacts of the research team. Ethics approval was granted by University of Sydney and Griffith University Human Research Ethics Committees and participants provided informed consent prior to inclusion in the study. Participants were compensated for the time that they contributed to the discussion groups.

Procedures

An online survey presented background material on the whiplash CPR and collected information on participant demographics, clinical experience and impressions of a proposed pathway of care for WAD. Three female research team members (JK, ANB and TR) with experience conducting clinical interviews and facilitating group learning moderated six semistructured focus groups involving four to six participants in each session. Four to 12 participants has been identified as optimal in maximising the benefit of group interactivity, while reducing the likelihood of socially driven conformity or non-participation.[27] A second research team member was also present on each occasion to record field notes and improve research dependability by promoting consistency in data collection.[26] Focus group discussions were held in independent offices between September and December 2015. Participants were briefed on the reasons for conducting the research prior to the commencement of each session. Content specific to CPRs was similar in all sessions (table 1) and was allocated approximately 40 min of the two-hour sessions. Focus groups were audio-recorded, transcribed verbatim and independently reviewed to ensure transcription accuracy. Participants were deidentified to reduce risk of bias that may have resulted from existing researcher–participant relationships.

Data analysis

Transcripts were uploaded to NVivo (QSR International, Australia) and analysed thematically using established methods.[28] Thematic analysis enabled exploration of views, experiences and practices at an individual and group level and allowed investigation of factors that underpin participants' experiences and decisions.[28] A multistaged inductive approach was used to create a set of coherent themes driven primarily from the data.[29] Two authors familiarised themselves with the transcripts and recorded initial observations. These concepts were then discussed and category development commenced via initial coding of segmented text. Progressive coding of basic themes with commonality were arranged into organising themes that related to the study's aims. It was recognised that findings would be shaped by the assumptions and experiences of the authors performing the analysis.[29] As such, team subjectivity checks of coding and early findings occurred to maximise reliability and credibility of the inquiry.[26] Additionally, member checking occurred by inviting comment on the authenticity of a summary of outcomes from one participant of each focus group (n=6) prior to finalising the analysis.[26]

Table 1 Content structure for focus group discussions

Key research question	Discussion prompts	Time
1. What do you think of CPRs in general?	What CPRs are you familiar with/do you use? In what situations do you find CPRs helpful? When would you deliberately not use a CPR? Why/why not? How do CPRs fit within your usual clinical reasoning or treatment planning process?	10 min
2. How is the whiplash CPR relevant or irrelevant to your current practice?	When/in what situations would it be beneficial and non-beneficial? Advantages/disadvantages of using it? How might it fit within your usual clinical reasoning process? When might its use alter your treatment planning? How? What other tools or processes do you rely on to predict a patient's likely outcome?	15 min
3. How do you think the whiplash CPR could be best implemented in practice?	Barriers for use? What is needed to help you use it? Preferred format for CPR delivery? Information to assist conveying the meaning of each categorisation to a patient? What would you say to low/high risk patients? Advantages/disadvantages to consumers having access to the CPR outside of interpretation by a health practitioner?	15 min

CPR, clinical prediction rule.

RESULTS

Six focus groups were undertaken with 28 clinicians (table 2), including 19 physiotherapists, 6 chiropractors, 3 osteopaths and no general practitioners. Feedback received from the member-checking process was supportive of the summarised themes and did not lead to alteration of the study's findings. Thematic saturation was reached on analysis of the final focus group.

Participant awareness of CPRs was mixed. Many participants could name one or more CPRs that related to musculoskeletal conditions. However, some clinicians did not recognise specific tools as CPRs due to being unfamiliar with the terminology, and a few participants reported that the concept of CPRs was new to them. A prescriptive CPR for manipulation of the lumbar spine,[30] Canadian C-Spine Rule,[31] Ottawa Ankle Rules[32] and Keele STarT Back screening tool[33] were most frequently cited. The latter three CPRs, plus diagnostic rules for sacroiliac joint mediated pain[34] and deep vein thrombosis[35] were reported as being used in practice by some participants. While most practitioners were unfamiliar with the whiplash CPR prior to dissemination in the prefocus group survey, two participants expressed having already adopted it (one physiotherapist and one chiropractor with 10 and 48 years of clinical experience, respectively).

Table 2 Participant characteristics

	Study participants (n=28)
Demographic variables	
Mean age (SD)	45.5 (12.7)*
Male gender (%)	16 (57.1)
Profession	
Physiotherapist (%)	19 (67.9)
Chiropractor (%)	6 (21.4)
Osteopath (%)	3 (10.7)
Clinical characteristics	
New South Wales practice location (%)	18 (64.3)
Mean clinical practice years (SD)	21.0 (13.9)
Median n whiplash patients seen per year (IQR)	10.0 (10.0)

*n=27.
n, number.

KEY THEMES

The components practitioners considered when deciding on whether to apply a CPR in practice were categorised as themes relating to CPR acceptability ('whether I agree with it') and implementation ('how I'll use it'). Participants reflected on CPRs from past practice when considering tool acceptability, often using the whiplash CPR to exemplify identified components. Discussion on implementation was directed specifically at the whiplash CPR. Assessment of adequate CPR acceptability appeared necessary prior to consideration of implementation. Table 3 provides an overview of identified themes.

CPR acceptability

CPR acceptability was informed by four themes: knowledge and understanding, CPR type, congruence and weighted value. Online supplementary file 1 provides additional support for these themes.

Theme 1: Knowledge and understanding

Knowledge and understanding of the purpose, development and subsequent application of CPRs was mixed. A clear understanding of CPRs appeared to facilitate acceptability.

Purpose

Some clinicians articulated a thorough understanding of CPR purpose and appropriate processes for application. However, many participants had difficulty differentiating CPR purpose from that of an outcome measure or expressed the desire to incorrectly apply prognostic CPRs selectively to target those suspected to not make a full recovery.

Table 3 Summary of themes

Domain	Theme	Subthemes
1. CPR acceptability	Knowledge and understanding	Purpose, population, fit with practice
	CPR type	
	Congruence	Past use, retrospective application, predictor variables
	Weighted value	Management, communication, patient expectations
2. CPR implementation	External driver	
	Administrative flexibility	Delivery process, access
	Guidance	

CPR, clinical prediction rule.

P14: It's a prediction rule, so you only do it once. The outcome measures you repeat, don't you, but the actual prediction rule, it's a predictor.

P15: Can I just clarify, is this like discussed with the patient? Or is it something that we're just utilising in assessment and then writing as an outcome measure?

P24: I tend to use them for- rather than use them as a general for everybody- maybe from, if I know something about their history, choose the people that I think may be more at risk of not responding to what I have to offer.

Population

CPRs were recognised as being specific to a certain population. Most clinicians appreciated that application should occur only where an individual matched the eligibility criteria of the CPR's development studies.

P9: One of the problems we have with clinical prediction rules is sometimes- a lot of the time- patients don't actually fit the criteria where the clinical rules have been developed from.

Fit with practice

Some participants understood that CPRs ideally fit within the suite of usual assessment and clinical reasoning processes. However, several participants envisaged using CPRs in isolation and expressed concern that they may bias or override usual decision-making processes. These practitioners conveyed a desire to avoid or delay use of a CPR.

P20: People need to appreciate that it is not hard and fast. It's not like you will do this without any input from anything else. It's just likely, and I think it just guides you.

P14: I wouldn't want to use it for the first couple of visits in case it prejudiced my own thinking, and if after, say, two visits or maybe three, give myself a little bit of a chance without bias, and if they're not progressing as I'd like them to, then I might instigate it then.

Theme 2: CPR type

A preference for prognostic and diagnostic CPRs over prescriptive tools was evident. CPRs that guided decisions were found to be more acceptable to clinicians than those that dictated a specific course of action.

P8: The very strong thing about the STarT Back is that it isn't prescriptive about what you do in the specialist care.

Theme 3: Congruence

The degree of congruence between a specific CPR and a participant's personal experience informed judgement of CPR acceptability. This was evidenced by reflection on past use of CPRs, retrospective application of the new CPR to patients that 'came to mind' and assessment of the plausibility of predictor variables within a CPR.

Past use

Past experience of predictive inaccuracy, such as experience of a false-negative result following application of a CPR caused participants to question the acceptability of CPRs in general.

P21: I have seen indications where the Canadian C-Spine rule, where they don't need x-rays and in fact we had radiographed them down the line because they weren't responding and they had an occult fracture from the accident. So you know, to trust that as a practitioner.

Retrospective application

Participants recalled experiences of specific patient prognostic trajectories and assessed the likelihood of a new CPR being 'correct' in each situation.

P15: I had a patient who was 19 [years old] and didn't make a fully recovery… So if I had of used it [whiplash CPR] for her, unfortunately it wouldn't have been positive [for ongoing disability]. So that's why I was a little bit apprehensive about it.

Predictor variables

The face value of individual CPR components were scrutinised to determine the degree of clinical relevance.

> P11: Look at the lumbar spine clinical prediction rule for manipulation, it talks about hip range of motion for god's sake - has nothing to do with anything.

Theme 4: Weighted value

Participants recognised that numerous CPRs are available and expressed the need for a CPR to be considered valuable before it could be deemed acceptable.

> P23: If I'm going to spend x, y, z time looking at the results of a screening tool then it better have value to both my practice and my patient.

Participants described weighing up the 'pros and cons' of using a specific CPR and then identifying a CPR as having 'value' if on the balance, it could positively enhance patient management and/or provide evidence for improved communication.

Management

Many practitioners believed that prognostic categorisation using the whiplash CPR could usefully direct an individual's management by heightening awareness of probable prognosis, prompting altered timing of referral to specialist or multidisciplinary care and/or guiding the frequency and duration of care provided. Improved identification of prognosis was seen to be particularly valuable to clinicians who have limited experience in managing people with WAD.

> P2: It helps you to siphon this group of people into kind of like the STarT Back tool in terms of where - you need to put a little bit of resource, but not heaps into this group, they're likely going to do well anyway… Whereas down this end - very clearly you'd be referring across disciplines and getting other people involved.

Communication

The whiplash CPR was seen to provide a framework for prognostic categorisation that could be used to enhance the clarity of education provided to patients regarding expectations of recovery, as well as improve the consistency of communication with compensation bodies and other practitioners.

> P23: It's useful for explaining to a patient and creating a story for them and say, 'Alright, this is what's likely to happen. Most patients will respond and such and such with your presentation,' and that way you can give them some expectations.

The effect of disclosing a predicted adverse outcome was viewed as a potential CPR use 'con'. Participants agreed that informing a patient that they may not recover could increase an individual's level of anxiety, promote catastrophising behaviours and create a nocebo effect on treatment.

> P5: I don't think you can categorically say…'You are going to struggle to get better'. Personally as a therapist I don't think I'd ever say that to a patient in the acute stage, because you know you're setting yourself up for failure.

Patient expectations

Some participants raised concerns that CPR application may not fit within patients' expectations of care, and in the context of a time-constrained session, may compromise their management.

> P27: Patients that assumably get to the point where 2 weeks down the track would be back to doing what they're doing before, those are the ones that they're not wanting to fill out extra paperwork. They just want to come in for the fix.

Whiplash CPR implementation

Participants considered matters that would help them (and other clinicians) adopt the whiplash CPR. Implementation themes included the presence of an external driver, administrative flexibility and guidance. Online supplementary file 1 provides additional support to these themes.

Theme 1: External driver

Provision of a motivation source that is external to the practitioner was suggested as a strategy for enhancing adoption of the whiplash CPR. Many practitioners believed that compensation bodies or practitioner regulatory agencies should mandate the use of this CPR.

> P4: I think there needs to be a stick, and I don't know who that needs to come from… but there needs to be some governing body that says, 'If you are going to treat whiplash and you're a registered physiotherapist, this is mandatory'.

Theme 2: Administrative flexibility

Delivery process

It was recognised that administrative processes in healthcare settings are diverse. Flexibility in delivery was regarded as essential to ensuring that CPR application would fit within current practices. Substantial variation existed in how participants perceived using the CPR and as such multiple formats, plus the ability to synchronise the CPR with electronic clinical platforms were recommended.

> P5: Probably depends how your practice runs. If it's a tech heavy practice or…

Access

Opinions on how the whiplash CPR should be delivered to patients were mixed. Many participants were comfortable

with a patient completing the CPR outside of their supervision provided that a practitioner interpreted the results. However, others expressed being uncomfortable with patients completing any clinical assessments outside of the care of a health practitioner.

> P13: It could be misinterpreted perhaps. Like they're not really scoring it, but if they had access to the scoring maybe it would be detrimental.
>
> P10: You don't know whether they've been sitting at home reading up on it modifying their responses to fit in to a particular category. I just think that it's potentially information that they will misunderstand or misapply to their own situation.

Theme 3: Guidance

It was recognised that the provision of a script that included an example of how each of the whiplash CPR's prognostic categories might be explained would be helpful in providing a message that is both consistent and appropriate for a patient. Assistance with communication was regarded as particularly important for practitioners with limited experience in managing individuals with WAD. It was stressed that this script would act as a guide only and expected that practitioners would individualise the message to target each individual's level of interest, language, disease understanding and personal experience.

> P15: From a standardisation point of view, especially from a new graduate level, having that little script box could avoid them getting themselves into a little bit of a tied knot.

DISCUSSION

The results of this study highlight that a multitude of factors underpin the decision-making process of health practitioners when considering whether to adopt a new CPR. Assessment of adequate acceptability or 'agreement in general' with a specific CPR appeared an essential first step in the adoption process and was determined prior to consideration of how the tool may be practically implemented. These considerations may be broader than components proposed in past research, which have included CPR usefulness, clinical sensibility and user-friendliness.[16–20]

Considerations for clinical acceptability of CPRs

The conceptual misunderstanding of CPRs by some participants in this study appeared to impede judgement of acceptability and means that clinicians may find it difficult to identify value in CPR use, incorrectly apply CPRs at multiple time points in a patient's care or be misinformed by the results. These findings are consistent with those of other works, where confusion over the term 'clinical prediction rule', difficulty distinguishing CPRs from outcome measures and misconception of CPRs as a simple formalisation of regular clinical reasoning strategies were noted in physiotherapy practice.[13 36] Alternatively, some concepts were better understood. For example, participants in this study understood the importance of external validity. Recognition of the need to match clinical population and setting to those used in the CPR's development appears more prevalent than an understanding of purpose or potential fit with practice.[13 16] Clinicians in this study also understood the distinction between different CPR types, in that they voiced preference for prognostic and diagnostic tools over prescriptive models. Preference for CPRs that do not dictate a specific course of action is similar to those of a past report of health practitioner priorities for CPR development; however, participants of that study were also open to prescriptive CPRs.[37] A more thorough understanding of CPR fit with practice reported by the authors and the perception of these tools as being helpful in *informing* treatment decision making by participants (reported in Haskins *et al*)[13] may account for this difference in results.

Participants in this study appeared to assess CPR performance by comparing specific past experiences with patients with probable CPR output. Lack of health practitioner understanding of accuracy measures, such as specificity, sensitivity and likelihood ratios,[38 39] may explain reliance on past experience as a measure of accuracy instead of interpreting statistical measures as has been recommended.[4] However, comparison with personal experience, in combination with judgement of the clinical relevance of predictor variables within a CPR evident in participants of this and a previous study,[37] could also be interpreted as an attempt at 'sense making',[40] or determining a tool's 'local validity'[41] in the absence of an opportunity for real-life application. These behavioural change concepts outline the need for practitioners to engage in the incorporation of ideas and practices[41] to try out and evaluate new practices to see if on the balance they add value in the local context.[40 42 43] This process of rationalising the potential value of CPR implementation appears similar to assessing its usefulness, which has been identified as key indicator of clinical uptake in the past.[16]

Facilitating implementation of the whiplash CPR

Health practitioners in this study identified several facilitators of whiplash CPR use that could overcome reported barriers to adoption. First, participants appeared to consider this tool as part of evidence-based practice and expressed the desire for mandating CPR use so that more practitioners would adopt it. This external source of motivation could address the barrier of inadequate incentive to overcome the inertia of previous practice.[15 18] However, the desire for mandated CPR use was somewhat unexpected, given clinicians have expressed concerns that CPRs may negatively impact autonomy in decision making.[10] Our focus on a prognostic CPR (which by nature does not direct a specific course of action) as opposed to a prescriptive CPR could account for this difference in findings. Second, flexibility

in CPR administration could overcome issues with inadequate supportive infrastructure.[18] Research findings in primary care settings have similarly identified the need to accommodate diverse practitioner preferences and clinical environments[37 44] and also recommended enabling electronic, phone application and computer-embedded platforms for use.[44] Finally, the desire for guidance on communicating the CPR's results to patients may reduce fear of unintended consequences from CPR use.[18] Provision of a framework that assists communicating unfavourable news to patients[45] and transitions medical information into lay language[46] have been advocated in the past.

Strengths and weaknesses

To our knowledge, this is the first investigation into the perspectives of more than one professional group regarding CPR use in clinical practice. The use of focus groups provided an in-depth exploration of the topic and adds to the existing body of literature, which has been predominantly derived from survey data. However, it should be noted that the findings might not be transferable to all clinicians that manage individuals with WAD given geographical constraints placed on eligibility, the requirement to physically attend a focus group session and an absence of general practitioners in the study. General practitioners play a prominent role in managing people with compensable injuries in the Australian context,[47] and as such would be considered a target group for adoption of the whiplash CPR. While participation from chiropractic (21.4%) and osteopathic (10.7%) professionals appears small, these groups are well represented when compared with national registration statistics. At the time of study completion, chiropractors and osteopaths comprised 15.0% and 4.5%, respectively, of total physiotherapists, chiropractors and osteopaths in New South Wales and Queensland.[48] Finally, it is plausible that the environment in which clinicians learn about specific CPRs may impact adoption. Focus on a new CPR presented to participants as part of a preinvolvement survey may have directed attention away from discussing the influence of more routine sources of information or settings in which clinicians learn about CPRs.

Recommendations and conclusions

Clinicians' understanding and use of CPRs appears mixed. Considerations for deciding whether to adopt a CPR are complex and include components relating to acceptability ('whether I agree with it') and implementation ('how I'll use it'). General education aimed at enhancing understanding of CPR purpose and fit with practice is needed so that practitioners are able to judge the merits of using specific tools. The acquisition of knowledge has been identified as a driver of change.[49 50] However, an increased understanding of CPRs in isolation of other acceptability considerations will unlikely result in improved adoption. It is therefore recommended that researchers consider CPR acceptability components during tool development to enhance the potential for clinicians to be in agreeance with their end product. In particular, developing CPRs that do not dictate a specific course of action and ensuring congruence is possible between current clinical reasoning frameworks and the new CPR may maximise its potential for use. Specific to the whiplash CPR, the provision of opportunities for clinicians to experientially learn, test and monitor the CPR's performance in the context of their own clinical setting[51] may be an avenue for enabling optimal assessment of acceptability. Learning experiences such as these, combined with the provision of an external source of motivation for change, administrative flexibility and appropriate interpretive guidance to support the tool's use, could be embedded in an impact analysis study of the whiplash CPR. As such, identified barriers to change could be addressed concurrent to progressing the CPR's stage of development to one that supports more widespread implementation.

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