



The measurement properties of pediatric observational pain scales: A systematic review of reviews



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ARTICLE INFO

Keywords:

Bias
Child
Evidence-based practice
Pain measurement
Systematic review
Validity

ABSTRACT

Background: Valid observational pain scales are needed to assess pain and ensure sufficient treatment of pain in children that lack the verbal ability to self-report pain. Published reviews attempt to synthesize results from primary studies validating these scales and based on the findings recommendations may be given, for example which pain scales are the most appropriate for use in different pediatric populations.

Objectives: The aims of this review were to describe how systematic reviews have evaluated and recommended observational pain scales for use in children aged 0–18 years and appraise the evidence underlying these recommendations.

Design: Systematic review of reviews.

Data sources: The Cochrane Library, PubMed/MEDLINE, CINAHL, Web of Science, and PsychINFO were searched from inception to September 2016. Reference lists and gray literature were searched for additional studies.

Review methods: Study selection and data extraction were performed by two reviewers independently with a disagreement procedure in place. Methodological quality or study validity was measured using the Assessment of Multiple Systematic Reviews checklist and risk of bias or internal validity was measured using the Risk of Bias in Systematic Reviews tool. The review protocol was registered with PROSPERO: registration number CRD42016035264.

Results: Twelve reviews met the inclusion criteria. Together, they included 65 different observational pain scales for use in children, of which 28 were recommended at least once. Face, Legs, Activity, Cry, Consolability/revised version of Face, Legs, Activity, Cry, Consolability, COMFORT/COMFORT behavioral scale and Children's Hospital of Eastern Ontario Pain Scale were evaluated and recommended most frequently. Few of the included reviews assessed the methodological quality of the studies included in the review. The narrative analysis consisted mostly of a reiteration of the results from the primary studies. In general, more recent reviews showed a lower risk of bias than older ones.

Conclusions: Included reviews exhibited low quality of evidence; thus, their recommendations regarding pain scales for use in clinical practice or research with children that lack the verbal ability to self-report pain should be interpreted with caution.

What is already known about the topic?

- The implementation and use of structured pain scales are considered

the foundation for effective management of pain

- Children that lack the verbal or cognitive ability to self-report pain are at increased risk for suffering untreated pain and a large number

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of observational scales to assess pain in these children have been published over the last 30 years

What this paper adds

- There is no clear consensus regarding which scales to use; although the Face, Legs, Activity, Cry, Consolability/revised version of Face, Legs, Activity, Cry, Consolability, COMFORT/COMFORT behavioral scale and Children's Hospital of Eastern Ontario Pain Scale were recommended most frequently, 28 of the 65 evaluated scales were recommended at least once
- These recommendations should be interpreted with caution due to the high or uncertain risk of bias and corresponding low evidence in the reviews

1. Introduction

The implementation and use of pain measurement scales in clinical practice are considered a prerequisite for the effective treatment of pain (Stevens et al., 2014). A large number of different scales have been published, both for self-report (von Baeyer, 2014) and for assessment based on behavior and/or physiological signs (Chorney and McMurtry, 2014; Lee and Stevens, 2014), but the quality of the evidence supporting these scales vary (Stevens et al., 2007).

Children that lack the verbal or cognitive ability due to age, cognitive impairment or illness, to self-report pain present additional challenges to pain assessment and are at increased risk for having their pain not recognized or underestimated (Herr et al., 2011). No self-report means the clinician is left with the task of interpreting behavior to assess if and how much pain the child is in (Drendel et al., 2011). The use of a structured observational scale can support the clinician's assessment of pain in children that lack verbal ability to self-report pain (Drendel et al., 2011; Herr et al., 2011), but only if the measurement properties of the scale are satisfactory (de Vet et al., 2011; Herr et al., 2011). Measurement properties include aspects of validity, reliability and responsiveness (Terwee et al., 2007). A pain scale with inadequate measurement properties might neither measure pain magnitude adequately nor be able to identify changes in pain intensity. This leaves the child at risk for both under- and over-estimation of pain, even though a scale is used. Underestimation of pain may cause additional suffering from untreated pain and increase the risk of developing chronic pain conditions (Connelly et al., 2014; Pagé et al., 2014). Conversely, if pain is overestimated, the child may be exposed to unnecessary pharmacological treatments and are at increased risk of negative side effects (Strassels, 2014).

Published reviews attempt to synthesize findings from primary studies to increase the knowledge on a given subject (Cooper, 2010). Based on the findings, recommendations may be given, for example which pain scales are the most appropriate for use in different pediatric populations. The quality of such recommendations depend upon to what extent the review have been carried out without risk of bias or systematic errors (Higgins and Green, 2011), as the methodological quality of a review directly influences its conclusions and recommendations (Shea et al., 2007b). Published reviews influence clinical practice and patient care whenever clinicians select pain scales based on their recommendation. In order to decrease the risk of over- and under-assessment of pain and increase the likelihood for optimal pain treatment, the selection of pain measurement scales for use in clinical practice or research should be based on the best available evidence. The quality of reviews addressing observational pain scales for use in children, including the evidence supporting their recommendations of specific pain scales, has not been previously addressed.

Therefore; the aims of this review were to describe how systematic reviews have evaluated and recommended observational pain scales for use in children aged 0–18 years and appraise the evidence underlying these recommendations.

2. Methods

2.1. Design

This systematic review was conducted according to PRISMA guidelines (Liberati et al., 2009) and the review protocol has been registered with PROSPERO, registration number CRD42016035264.

2.2. Data sources and search strategy

The Cochrane Library, PubMed/MEDLINE, CINAHL, Web of Science, and PsychINFO were searched from inception to November 2015 and the search updated last in September 2016. No language or time limitations were applied. Search terms described the population (children from birth to 18 years of age), type of study (review), and the phenomenon under study (assessment of pain using observational assessment scales). For a complete search strategy for all included databases, see Appendix A, eTable 1. The reference lists of the included reviews, central articles and grey literature (published guidelines and book chapters) were screened for further eligible review studies.

2.3. Eligibility criteria

We included articles that

- Claimed to be systematic reviews and/or were considered to be a systematic review.
- Concerned observational pain scales for use in children from birth to 18 years of age.
- Evaluated and reported on one or more measurement properties of these scales.

Articles were excluded if the population was > 18 years, they did not meet our definition of a systematic review, did not include observational pain scales, did not attempt to evaluate and report the measurement properties of these scales, or if the full text could not be retrieved.

In accordance with Mokkink et al. (2009), we defined systematic reviews as those where at least one search in an electronic database was documented.

Observational pain scales are developed for situations where patients are unable to self-report pain. These scales are based on structured observation by clinicians of behavioral and physiological indicators associated with the expression of pain and distress (Stevens et al., 2007).

Measurement properties concern measurement quality and include the domains validity, reliability and responsiveness (Mokkink et al., 2010b). The term has a wider definition than the more frequently used "psychometric properties", as it is applied to studies that use either a psychometric or an item response theory approach (de Vet et al., 2011; Terwee et al., 2007). In accordance with this definition, we have included studies where the aim was to evaluate psychometric properties, measurement properties, validity, reliability and/or responsiveness of observational pain scales.

2.4. Article selection

Two reviewers independently screened titles and abstracts for eligibility. Full texts were retrieved if one of the reviewers requested it. The reviewers then independently screened retrieved full texts and resolved any disagreements through discussion.

2.5. Data extraction

Descriptive information about the review, names of included and recommended observational pain scales, methodological quality, and

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