SYSTEMATIC REVIEW

Correlation of Single Assessment Numeric Evaluation (SANE) with other Patient Reported Outcome Measures (PROMs)

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Abstract

Background: The Single Assessment Numeric Evaluation (SANE) is a simple, one-question patient-reported outcome measure (PROM). We systematically reviewed correlations between SANE and more extensive PROMs.

Methods: We identified studies with correlation coefficients between SANE and other shoulder, knee, and ankle-specific PROMs. We calculated mean, median and range across studies and time points of data collection.

Results: Eleven studies provided 14 correlations, six shoulder-specific PROMs in four studies, six knee-specific PROMs in six studies and two ankle specific PROMs in one study. The mean correlation comparing SANE and knee-specific PROMs was 0.60 (SD 0.24), median 0.66, and range 0.12 to 0.88. Among studies comparing SANE and shoulder-specific PROMs mean correlation was 0.59 (SD 0.20), median 0.62 and range 0.20 to 0.89. The mean correlation between SANE and ankle-specific PROMs was 0.69 (SD 0.17), median 0.69 and range 0.75 to 0.81.

Conclusion: There seems to be moderate correlation amongst PROMs, even those that are a single question. Future research might address whether patient reported outcome measure a common underlying construct even when they consist of a single question.

Level of evidence: V

Keywords: Patient-reported outcome measures, PROMs, SANE, Single assessment numeric evaluation

Introduction

Patient reported outcome measures (PROMs) quantify symptoms and limitations in people with musculoskeletal illness. Quantification of symptoms and limitations helps identify the most effective and resource-efficient treatments. Early PROMs included dozens of questions, but shorter questionnaires, computer adaptive tests in particular have proved equally valid and responsive (1-8). The Single Assessment Numeric Evaluation (SANE) is a patient rating from 0-100. Patients rate their current illness score in relation to their pre-injury baseline. SANE scores are most commonly used by orthopedic sports specialist surgeons, and usually for the shoulder and the knee. Current best evidence demonstrating good correlation of shorter and more general measures with longer and more specific measures suggests even a single simple question (SANE) could be sufficient (2-4, 9-12).

We systematically reviewed correlations between single question measures and longer PROMs to

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determine how well they correlate.

Materials and Methods

This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We searched Pubmed for English language studies using Single assessment numeric evaluation (SANE) and another PROM, published from January 1999 to April 2018. The following MeSH terms were used: Single assessment numeric evaluation, SANE, Single assessment numeric evaluation AND orthopedic surgery, numeric evaluation AND orthopedic surgery, SANE AND patient reported outcomes, SANE AND PROMs, single assessment numeric evaluation AND patient reported outcomes, SANE AND shoulder scores, SANE AND knee scores. Articles were preliminarily screened using title and abstracts to identify publications that met the inclusion criteria. Full manuscripts that fulfilled the inclusion criteria were further reviewed [Figure 1].

Inclusion and Exclusion Criteria

We included full peer-reviewed publications in English that addressed correlation of SANE with another PROM. We excluded studies that did not report correlation coefficients.

Data Extraction

We recorded the title, journal, study design, patient population, PROM used, time from surgery or initial evaluation, and the absolute value of the correlation coefficients with SANE.

Patient Reported Outcome Measures (PROMs)

Fourteen PROMs were used in the eleven studies included. Six knee specific PROMs were used, two ankle specific PROMs and six specific shoulder PROMs were used. The Lysholm score and the ASES scores were the most frequently used appearing in 50% of the knee specific studies and 75% of the shoulder specific studies, respectively. Other knee specific scores used were the IKDC, Tegner, KOOS, IKDC, KOS and WOMAC scores. The additional shoulder specific scores used were Rowe, WOSI, SST, DASH and PASS. The ankle specific scores reported were the Martin and Berndet & Harty.

Study Characteristics

The characteristics for the eleven studies included six studies with PROMs specific to the knee. The time

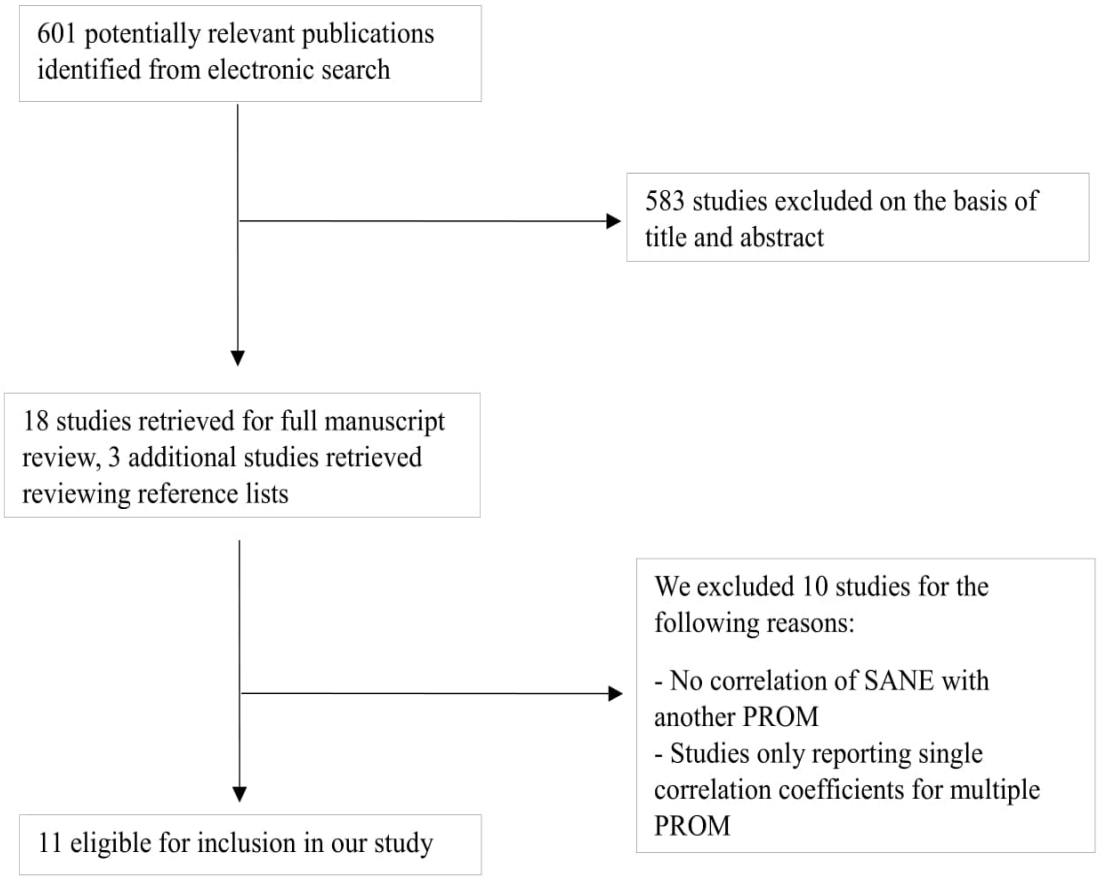

Figure 1. Flow diagram of search strategy.

of administration of the PROMs ranged from initial presentation to 384 months post-operatively or post-intervention. The most common reported PROMs for the knee were IKDC and Lysholm score.

Four studies included correlations of SANE and PROMs specific to the shoulder. The mean time of questionnaire administration was 59 months (range from initial presentation to >104 months after surgery or intervention. The most common reported PROM for the shoulder was the ASES. Only one study measured correlation with the Pediatric/Adolescent Shoulder Survey (PASS).

One study measured correlations of SANE with two ankle specific PROMs.

Statistical analysis

Correlation coefficients for each PROM were extracted from each study. Patient reported outcome measures were grouped based on their anatomical location. The absolute value of the correlation coefficients with knee, ankle and shoulder-specific outcome measures were used for data analysis. For each anatomical location mean, median and range of correlation coefficients were calculated.

Results

Among the 6 studies comparing SANE and knee-specific PROMs the mean correlation was 0.60 (SD 0.24), the median was 0.66, and the range was from 0.12 to 0.88.

Among the 4 studies comparing SANE and shoulder-specific PROMs the mean correlation was 0.59 (SD 0.20), the median was 0.62 and the range was from 0.20 to 0.89.

There was one study comparing SANE with two ankle-specific PROMs, the mean correlation between ankle-specific PROMs was 0.69 (SD 0.17), the median was 0.69 and the range was from 0.75 to 0.81.

Discussion

As measurement of patient reported outcomes becomes more commonplace, it's useful to keep the instruments short and meaningful (1, 13-15). Our study examined the correlation of a single question assessment (SANE) with other longer multi-question shoulder, knee and ankle-specific PROMs. The study reported the mean, median and range of correlation coefficients between SANE and other validated knee, ankle and shoulder specific patient reported outcome measures.

The data from this study should be interpreted along with its limitations. There are relatively few studies that compare SANE with longer PROMs and the correlations with other PROMs might change with additional data. Single question measures are used in very specific situations, largely by one subspecialty and may not apply in other settings. The advantages and disadvantages of various PROMs are best evaluated in studies specifically designed to test validity and responsiveness of SANE compared to current measures such as PROMIS Physical Function Computer Adaptive Test.

Our study identified moderate correlation of shoulder, knee, and ankle-specific SANE and longer PROMs on average. Seventy percent (31 of 44) of the total number of correlations were stronger than 0.5. Among the shoulder correlations 26% were below 0.5, 35% of knee, and neither of the two ankle correlations were below 0.5.

The American Shoulder and Elbow Surgeons (ASES) Value Committee evaluated patient reported outcome measures for use in daily practice and quality measure reporting and recommended the use of SANE, a general health measure (VR-12), and the ASES score for shoulder problems. For the elbow the ASES recommended the SANE, VR 12, and the Quick Disabilities of the Arm, Shoulder and Hand Questionnaire (DASH). The SANE is recommended for its simplicity, low burden, similar reliability and responsiveness compared to the ASES score across various patient populations. (14).

Current best evidence shows moderate intercorrelation of general, disease, and region specific PROMs be they single question, multi-question, or computer adaptive tests (1-4, 9-11, 13-17). The data presented in our study suggests that regardless of the number of questions patient reported outcome measures may be correlated. This suggests that all measures are driven by similar underlying constructs. There is also evidence that the key underlying constructs are the psychological and social determinants of human illness more so than measures of pathophysiology (18-22). Future research might address the possibility that all PROMs—simple to complex-are driven by common underlying constructs.

Conflict of interest statement: CO certifies that he had nothing of value related to this study.

DR certifies that he had nothing of value related to this study.

Ethical review committee statement: The study has been performed in accordance with the ethical standards in the 1964 Declaration of Helsinki and has been carried out in accordance with relevant regulations of the US Health Insurance Portability and Accountability Act (HIPAA).

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