Scientific/Clinical Article

Normative data for the Patient-Rated Wrist Evaluation questionnaire

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ABSTRACT

Study Design: Cross-sectional study.
Introduction: The Patient-Rated Wrist Evaluation (PRWE) questionnaire is used to evaluate functional outcomes after treatment of wrist and hand injuries and nontraumatic conditions. Since patients commonly present with an injury, it is impossible to assess preinjury physical functioning. Therefore, it is important to be aware of the population-based normative data.
Purpose of the Study: The aim of this study was to determine the normative data for the PRWE questionnaire. Secondary, we aimed to determine if there were factors influencing these normative data.
Methods: Visitors and employees of 4 hospitals were requested to participate. Excluded were all participants who were scheduled for surgery or were in treatment or after treatment for an injury of the wrist or hand within 1 year after trauma. All participants were asked to complete the PRWE questionnaire and were asked for their age, sex, history of wrist or hand fracture or surgery, daily activities, and the type of employment. The socioeconomic status was determined based on the zip code.
Results: The median PRWE score was 0 (interquartile range: 0-8.5) and the mean score 7.7 (standard deviation: 15.0). Women had significantly higher scores compared to men, and younger individuals had significantly lower scores. Participants with a history of wrist or hand fracture or surgery, and participants who were unfit for work had significantly higher scores. Socioeconomic status was not correlated with the PRWE score.
Discussion: The purpose was to provide an representative overview of the normative data for the normal population. We did not want to present the data of an unnatural healthy population, which is not representative of the normal population. Deleting patients with chronic wrist or hand complaints, would have resulted in normative values which are not representable for the normal, average population.
Conclusion: Low scores are observed for the PRWE in the general population. These scores are age and sex dependent and are higher in individuals with a history of wrist or hand fracture or surgery or who are unfit for work.

Introduction

The Patient-Rated Wrist Evaluation (PRWE) is a well-known and validated 15-item questionnaire that focuses on the measurement

of wrist pain and disability in activities of daily living.[1,2] The PRWE questionnaire is extensively used to evaluate functional outcomes after treatment of wrist and hand injuries and nontraumatic conditions.[3,4]

Commonly, patients already have an injury of the wrist at presentation, which makes it impossible to assess preinjury physical functioning. Since questionnaires assessing preinjury wrist functionality are administered after injury, they are impeded by recall bias.[5] Consequently, it is difficult to examine the effect of a treatment and whether patients have returned to, or at least come closer to, predisease ranges of functioning. For this reason, it is important to be aware of the population-based normative data. A comparison of posttreatment clinical data with normative data from a general

population serving as a reference group permits physicians and researchers to assess whether their findings are different from populations norms. Moreover, normative data can ascertain whether posttreatment function is comparable to normal age- and gender-expected values or whether patients suffer from persistent pain or disability due to the sustained injury.[6] Normative data for 2 upper extremity–specific patient-reported outcome measures have been determined in specific populations.[7-10] For the Disability of the Arm, Shoulder and Hand (DASH) questionnaire, these normative values range from 10-15 and proved to be age, sex, and vocational activity dependent. However, for the PRWE questionnaire, no such data are available.

Purpose of the study

The aim of this study was to determine the normative data for the PRWE questionnaire. Secondary, we aimed to determine the influence of age, sex, history of wrist or hand fracture or surgery, type of employment, and socioeconomic status (SES) on the normative data for the PRWE.

Methods

Study design and participants

Adult visitors to the outpatient clinic of the department of surgery and employees of 4 hospitals, 1 university, and 3 teaching hospitals were asked to participate in this study. The 4 participating hospitals were situated in different regions, both rural as urban, in the Netherlands. Excluded were all participants who were scheduled for surgery or were in treatment or after treatment for an injury of the wrist or hand within 1 year after trauma. The need for informed consent was waived by the local Medical Ethics Review Board.

Outcomes

All participants were asked to complete the Dutch version of the PRWE questionnaire and were asked for their age, sex, history of wrist or hand fracture or surgery, daily activities, and the type of employment. The Dutch version of the PRWE has been translated and validated, showing adequate model fit.[11,12] The PRWE questionnaire consists of 15 questions, of which 5 relate to pain of the wrist and 10 to functionality of the wrist while performing daily activities. Participants rate their level of pain and disability on a scale from 0 to 10. The lowest score is 0, indicating no pain and disability, the highest score is 100, indicating worse pain and severe disability.[1]

Daily activities (roles) were classified as working, student, homemaker, retired, unemployed, unfit for work, or other. Unfit for work was defined as not able to work due to any condition, including a condition of the wrist or hand. In case of a working participant, they were asked whether they considered their employment to be blue (physically very demanding), pink (physically moderately demanding), or white collar (physically not demanding). Furthermore, the SES was determined based on the zip code of the participants. The SES for each zip code or area was derived from a list from the Netherlands Institute for Social Research, providing a value between −6.7 and +3.1. Zero represents the average SES of the Netherlands.

Additionally, the optional 2 questions on the esthetics of the hand were added to the PRWE questionnaire. The first question is about the appearance of the hand. Participants have to indicate if they feel the appearance of their hand is very important to them, somewhat important, or not important at all. In the second question, participants have to scale their satisfaction with the appearance of their hand on a scale of 0 (no dissatisfaction) to 10 (complete dissatisfaction). These 2 questions are not taken into account in the total PRWE score but are reported separately and are therefore nonobligatory, consistent with the PRWHE scoring.

Sample size

We considered at least 250 participants per hospital sufficient in order to be representative for the entire population, resulting in a total of at least 1000 participants. During collection of the data, age and sex of the participants were continuously monitored in order to obtain comparable group sizes. When necessary, participants of a specific age or sex were explicitly approached to participate in this study.

Statistical analysis

Although missing data of the PRWE may be imputed, no information is given regarding the amount of missing answers allowed. In the present study, missing data were imputed by using mean imputation if less than 3 questions were missed on the pain subscale and less than 4 questions on the function subscale as proposed by John et al.[13]

Descriptive statistics were used to summarize baseline characteristics. Categorical variables were presented as frequencies and percentages. Normality of the PRWE was assessed by visually inspecting the normality plots. Due to the non-normal distribution, the PRWE was presented as median and interquartile range (IQR). Additionally, the mean and standard deviation (SD) were provided to show the variability of the whole population and to allow comparison with other studies. This has also been done by previous studies assessing the normative values for patient-reported outcome measures.[7,8,14,15] Age was divided into 3 subcategories: 18-40 years, 40-65 years, and 65 years and older. In addition, age- and sex-matched normative data were calculated according to the Sex and Gender Equity in Research (SAGER) guidelines.[16]

The Mann-Whitney U test was used to test for differences in sex and history of wrist or hand fracture or surgery. The Kruskal-Wallis test was used to test for differences in the 3 age groups, in type of employment (blue, pink, or white collar), and in activities of daily living. The Spearman's rho test was used to calculate the correlation between the PRWE and age and SES. To test for independent predictors for the PRWE score, a linear multivariable analysis was performed using 1000 bootstrap samples due to the non-normality of the data.

Additionally, the Mann-Whitney U test and the Kruskal-Wallis test were used to determine if there were any differences between the subscales pain and function, and sex and the 3 different age groups, respectively. A P value $<.05$ was considered statistically significant. Analysis was performed using SPSS, version 23 (IBM, Armonk, New York, NY).

Results

Demographics

A total of 1155 participants were approached, of which 113 participants were excluded. This left 1042 eligible participants for analysis, equally divided among the 4 participating hospitals (Fig. 1).

The median age was 51 years (IQR: 38-64), with a range of 18-90 years and 56% of the participants were women. Almost half of the participants were between 40 and 65 years old (46.8%). Of all patients, 15% had a history of a wrist or hand fracture or surgery more