PM R 8 (2016) 399-404

www.pmrjournal.org

Original Research—CME

Test-Retest Reliability of the Self-Reported Impairments in Persons With Late Effects of Polio (SIPP) Rating Scale

Christina Brogårdh, RPT, PhD, Jan Lexell, MD, PhD

Abstract

Background: A new 13-item rating scale, the Self-Reported Impairments in Persons with Late Effects of Polio (SIPP), has been developed. The SIPP has been analyzed using the Rasch method and has shown good construct validity and internal consistency. To establish its clinical utility, further evaluation of its psychometric properties is needed.
Objective: To evaluate the test-retest reliability of the SIPP and to define limits for the smallest change that indicates a real change, both for a group of persons and a single individual.
Design: A postal survey.
Setting: University Hospital.
Participants: Fifty-one persons (31 men and 20 women; mean age, 72 years) with clinically verified late effects of polio.
Intervention: Not applicable.
Main Outcome Measurements: The participants completed the SIPP twice, 2 weeks apart. The response frequencies at test occasion 1 (T1) and test occasion 2 (T2) were calculated. Test-retest reliability was analyzed using the percentage agreement of each item, the intraclass correlation coefficient, and the mean difference between the test occasions (đ), together with the 95% confidence intervals for đ, the standard error of measurement, the smallest real difference, and a Bland-Altman plot.
Results: The percentage agreement (ie, the same scoring at both test occasions) was >70% for 10 of 13 items. The mean score (standard deviation) was 27.9 (5.7) points at T1 and 28.2 (6.0) points at T2, with no systematic difference between the test occasions. The intraclass correlation coefficient was 0.88, the standard error of measurement (the smallest change for a group of persons) was 2.0 points, and the smallest real difference (the smallest change for a single individual) was 5.6 points, respectively.
Conclusion: The SIPP is a reliable rating scale in persons with late effects of polio and can be used to evaluate effects of rehabilitation interventions and changes of perceived impairments over time both for a group of persons and for a single individual.

Introduction

Many persons who were affected by an acute poliomyelitis infection in their childhood or youth can experience new impairments or symptoms several decades later, referred to as late effects of polio or postpoliomyelitis syndrome [1,2]. The most common impairments that persons with late effects of polio report are muscle weakness, muscle fatigue, musculoskeletal pain, general fatigue, and cold intolerance [3-5]. Other impairments such as sleep disturbances, concentration difficulties, memory difficulties, and mood swings are also reported and may be directly or indirectly associated with the prior experience of polio [1,3,6,7]. The new or increased impairments can lead to activity limitations and participation restrictions and thus have an impact on life satisfaction [5,8,9].

To increase our understanding of the degree by which persons with late effects of polio perceive different impairments, a new rating scale—the Self-Reported Impairments in Persons With Late Effects of Polio (SIPP)—was developed at our clinic. The SIPP, which consists of 13 items, includes impairments typical of and directly related to late effects of polio, in addition to impairments that are commonly reported by the patients and are indirectly related to their prior experience of polio. In a previous study we used the Rasch method to evaluate the psychometric properties of the

1934-1482/$ - see front matter
http://dx.doi.org/10.1016/j.pmrj.2015.09.023

SIPP [10]. In that study, 273 persons who previously had polio responded to the SIPP and the analyses showed that, after adjustment from 5 response options to 4 options and after adjustment of local dependency, the rating scale was unidimensional with good construct validity and internal consistency [10].

To be able to follow changes in self-reported impairments over time and to determine the effects of different rehabilitation interventions, further evaluation of the psychometric properties of the SIPP is needed. Therefore, the aim of this study was to evaluate the test-retest reliability of the SIPP and to define limits for the smallest change that indicates a real change, both for a group of persons and for a single individual with late effects of polio.

Methods

Participants and Recruitment

The participants were recruited from a database at a specialized university hospital postpolio rehabilitation clinic in the south of Sweden. They had previously participated in another postal survey in which 325 persons with verified late effects of polio had responded to questionnaires (in Swedish) about falls, fear of falling, self-reported impairments, and walking limitations [11]. Twenty-five percent of the original population (81 persons) were randomly selected and invited to participate in the present study, and 51 persons accepted the invitation. A sample size of 50 persons is considered to be sufficient to analyze test-retest reliability [12].

All participants dwelled in the community and had a confirmed history of acute poliomyelitis with new symptoms after a period of functional stability of at least 15 years. An electromyogram had been recorded in the upper and lower limbs as part of the initial routine clinical examination and verification of prior polio. Inclusion criteria to participate in the present study were (1) clinically verified late effects of polio and (2) the ability to walk indoors with or without an assistant device. Background data such as age, gender, age when acute polio was experienced, and years with late effects of polio were obtained from the existing database.

Ethics

Each participant gave his or her written consent to participate in the study. The principles of the Declaration of Helsinki were followed.

Procedures

The following materials were sent to the participants by post: information about the study, an informed consent form, a questionnaire about their living situation, vocational situation, walking ability, and mobility aids, and the SIPP. The participants responded to the questionnaires within 1 month and sent them back to the clinic in a prepaid envelope. The participants provided the date that they completed the SIPP the first time (test occasion 1; T1). When the second SIPP was sent to the participants, a date for responding to the SIPP again was provided (test occasion 2; T2), so the time interval between the 2 test occasions was 2 weeks. The participants returned the second SIPP to the clinic in a prepaid envelope within 1 week.

The Self-Reported Impairments in Persons With Late Effects of Polio Rating Scale

The SIPP was developed as part of clinical assessments and was based on previous studies [3,13-15], as well as on interviews with persons who had late effects of polio. The SIPP consists of 13 items about impairments typical of and directly related to prior polio, in addition to impairments that are commonly reported and thus indirectly associated with prior polio [5,10]. The respondents were asked to rate how much, in the past 2 weeks, they had been bothered by muscle weakness; muscle fatigue; muscle and/or joint pain during physical activity and at rest; sensory disturbance; breathing difficulties at rest and during physical activity; cold intolerance; general fatigue; sleep disturbances; concentration difficulties; memory difficulties; and mood swings (ie, irritability, anxiety, and feeling depressed). The SIPP has 4 response options: 1 = not at all; 2 = a little; 3 = quite a bit; and 4 = extremely, giving a total sum score ranging from 13-52 points. A higher score indicates more self-reported impairments. Because the SIPP is Rasch analyzed and considered unidimensional [10], a total sum score can be calculated and parametric statistics can be used even if the scale is ordinal in nature.

Statistics

Descriptive statistics (means, standard deviations [SDs], and frequencies) were calculated for the participants' demographic data and clinical characteristics. The response frequencies of each item in the SIPP were recorded at T1 and T2.

Several statistical methods were used to evaluate the test-retest reliability [12]. The percentage agreement (PA) of paired data (ie, the same scoring at T1 and T2), as well as the difference in scoring for each item, were analyzed. According to Kazdin [16], a PA of >70% is considered satisfactory. The test-retest reliability of the total sum score was calculated with a one-way random, single measures intraclass correlation coefficient (ICC) with absolute agreement definition of concordance [12,17]; an ICC >0.8 is considered acceptable [18].