Activities Scale for Kids

An Analysis of Normals

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Abstract: Several outcome tools have been developed to measure physical functioning in pediatric orthopedic patients. One such tool, the Activities Scale for Kids (ASK), allows assessment of physical functioning in the community in 5- to 15-year-olds. Previous validation of the ASK showed a significant difference in scores according to global ratings of disability. In this study, the ASK was administered to children without musculoskeletal disability to determine how normal respondents scored. ASK questionnaires were distributed to 137 children and 122 (89%) were returned. Normal children scored quite high, with a mean summary score of 93.12 (SD 6.45). This score differs significantly from the mean summary score for children with mild disabilities as determined in previous studies of disability (*P* = 0.005).

Key Words: functional assessment, normal children, pediatric orthopedics, ASK, musculoskeletal

Recently, several outcome measures designed specifically for children with musculoskeletal disabilities have been developed. These outcome measures focus on the child's physical functioning in his or her environment rather than such traditional measures as range of motion, strength, and radiographic changes. To better understand the meaning of a score on these outcome measures, it is useful to determine how children with different level of disabilities score and to compare this value to a "normal" child's score. One such measure, the Pediatric Outcomes Data Collection Instrument (PODCI), has been well validated in children and adolescents with disability,[1] and values for "normal" children have now been published.[2] The PODCI consists of 108 items and takes about 13 to 20 minutes to complete.[3] The Activities Scales for Kids (ASK) is another such scale. It is a self-administered 30-item questionnaire that, despite its relatively small number of items, is valid, reliable, and able to discriminate between level of disabilities.[4] It does so by asking children what they have been doing at home, at school, and in the playground. The ASK's feasibility in a clinical setting is a significant benefit in that its completion time averages about 5 to 9 minutes.[3] There are two forms of the ASK, the ASK performance (ASKp) and ASK capability (ASKc); they measure what a child usually "does do" and "could do," respectively. The purpose of this study was to determine the ASKp score in a population of children without musculoskeletal disabilities.

MATERIALS AND METHODS

This was a prospective study involving the determination of the ASKp score in children without musculoskeletal limitations. Children ages 5 to 15 years with no musculoskeletal limitations were eligible to participate in the study. A convenience sample of children of active staff of the Children's Hospital of Eastern Ontario were recruited through a hospital-wide memo detailing the study. This study was deemed to have no ethical issues by the Children's Hospital of Eastern Ontario Research Ethics Committee.

It has been shown that the ASK and the PODCI scale correlate very well, and they have the same range of possible scores (0–100).[3] Consequently, the PODCI scale standard deviation for normal children[4] may be a good proxy for the standard deviation of ASK scores for normal children. Using this information, a sample size of at least 100 children would allow estimating the mean to within ±1.42 19 times out of 20. Hence, we aimed to recruit a sample size of a minimum of 100 children.

The ASKp summary score is reported as a value out of a maximum score of 100 points. High scores are indicative of a favorable outcome. Each of the 30 items is answered using a 5-point ordinal scale, and this summary score is then converted to a score out of a 100. When certain activities the ASKp in-

quires about may not be applicable, there is a sixth response option ("not applicable"). Any questions not answered or marked "not applicable" are not included in the summary score's denominator or numerator.

Data collection packages were mailed to families who had provided verbal consent in January 2002. The package contained a pen-and-paper version of the ASKp questionnaire and standardized instructions on its administration. The questionnaire was completed by the child, although parents could read the questions to children under the age of 9 years, but the children determined and recorded the answers. These questionnaires were then returned by the parents. Data from a previous study[4] validating the ASKp in children with musculoskeletal disabilities was provided by one of the coauthors and used in our comparison of the ASKp score in normal children to those with musculoskeletal disabilities. Children in this earlier study had been categorized as having being mildly, moderately, or severely disabled based on the clinicians' global ratings of disability severity. Data entry and analysis were performed using the statistical package SPSS-PC Version 10 (SPSS, Cary, NC) with 10% double entry to reduce data entry errors. Descriptive statistics were used to characterize the sample and response rates. Summary data are expressed with means and standard deviations (SD). The symmetry of the participants' distribution was assessed using the Pearson skewness statistic. Comparison between children with disabilities has been assessed using analysis of variance (ANOVA) with the Tukey test for multiple post-hoc comparisons.

RESULTS

One hundred thirty-seven questionnaires were distributed and 122 (89%) were returned. The mean age of the respondents was 10.45 years (SD 2.99) with a frequency distribution showing a relatively even spread of ages from 5 to 15 years. There were 54 male (44.3%) and 68 female (55.7%) respondents. One hundred four of the 122 questionnaires (85%) were fully completed. Of the incomplete questionnaires, the number of missed questions ranged from one to nine. Children were asked about the degree of assistance they had obtained to complete the questionnaires. Seventy-four (61%) reported no help, 26 (22%) reported having the questions read to them, while 16 (13%) had help with some of the answers and 5 (4.1%) reported needing some of the questions explained by their parents. The age of the children needing help with some of the questions ranged from 5 to 15.

The ASKp summary score showed a range from 74.14 to 100 with a mean score of 93.12 (SD 6.45) and a median score of 95.54. The high ASKp score indicates that children with no musculoskeletal disability should score quite high, and the low standard deviation suggests that individual scores did not deviate far from the mean scores. The high median score near the maximum score on the scale suggests that the ASKp question-
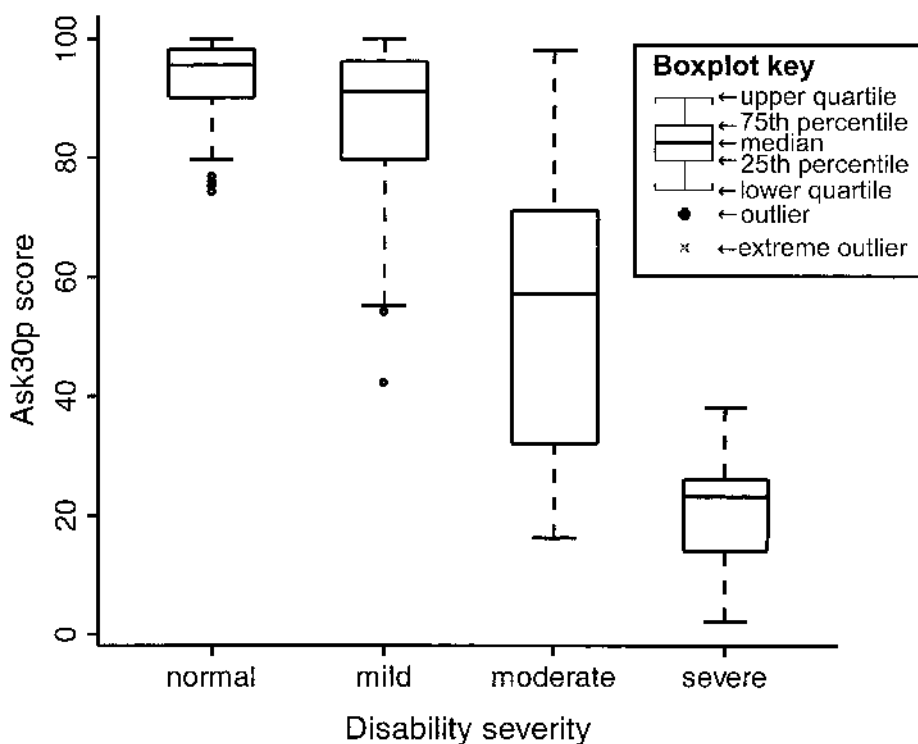

FIGURE 1. Comparison of ASKp scores by level of disability. (Reprinted, in part, from *Journal of Clinical Epidemiology*, Vol. 53, Young NL, et al, Measurement properties of the Activities Scale for Kids, p. 130, 2000 with permission from Elsevier Science.)

naire has a ceiling effect with respect to normal children. This is emphasized by a large skewness Z score (ratio of Pearson skewness statistic to its SD) of -5.324 ($P < 0.001$), indicating that individual scores are significantly gathered around the very end of the scale.

Children with mild disabilities have previously been shown to have a mean score of 85.86 (SD 13.77),[4] and this differs significantly from the mean score of children with no disabilities in our study ($P = 0.005$). Similarly, the latter group is significantly different than children with moderate (mean 52.66 ± 22.53 SD) and severe disabilities (mean 21.00 ± 10.23 SD)[4] ($P < 0.001$ for both). The medians and interquartile percentiles for normal children and those with mild, moderate, and severe disabilities are shown in Figure 1.

DISCUSSION

In the use of any outcome tool, it is essential to understand what a score represents in clinically relevant terms. While previous studies of the ASK had given a good understanding of what children with mild to moderate disabilities might score, this is the first to report on the scores of normal children. Importantly, this score differs significantly even from those children classified as having a mild disability. This study has demonstrated that children without disability should have high ASKp scores and furthermore that the ASKp can discriminate not only between levels of disability but between those with and without musculoskeletal disability. This study has indicated, however, that the ASKp is not the correct instrument for assessing functional differences among children without musculoskeletal disabilities, given its large (negative) skewness score and ceiling effects. This is not surprising since the ASK was developed for assessing children with musculoskeletal disabilities.

The normal child data presented in this study was collected at a different tertiary care hospital than the one used for the original validation of the ASK score. Since both sites are large tertiary care hospitals that reflect similar populations in terms of size and cover a wide range of demographics, we believe this to be a minor limitation to this study.

In conclusion, the determination of ASKp score in children without musculoskeletal disabilities provides important information that will assist in the use of the ASKp in both clinical and research settings to assess a child's level of function and to monitor for change.

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