VALUE IN HEALTH 16 (2013) 837–841

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jval

Updating the Canadian Hemophilia Outcomes–Kids Life Assessment Tool (CHO-KLAT Version$_{2.0}$)

Nancy L. Young, BScPT, MSc, Phd[1,2,*], *Cindy Wakefield, BA, RN*[3], *Tricia A. Burke, BA*[1], *Randi Ray, BPHE, MHK*[4], *Patricia J. McCusker, MD, FRCPC*[5], *Victor Blanchette, MD, MA, FRCP, FRCPC*[2,3]

[1]*School of Rural and Northern Health, Laurentian University, Sudbury, Ontario, Canada;* [2]*Department of Pediatrics, Toronto, Ontario, Canada;* [3]*Division of Hematology and Oncology, The Hospital for Sick Children, Toronto, Ontario, Canada;* [4]*School of Human Kinetics, Laurentian University, Sudbury, Ontario, Canada;* [5]*Department of Pediatric Hematology, University of Manitoba, Winnipeg, Manitoba, Canada*

ABSTRACT

Objectives: Hemophilia is an X-chromosome–linked disorder associated with recurrent bleeding into muscles and joints, leading to pain and limitations in physical function that may diminish quality of life. The Canadian Hemophilia Outcomes–Kids Life Assessment Tool (CHO-KLAT) is a disease-specific measure of quality of life that was recently revised to facilitate cross-cultural adaptation. This study assessed the validity and reliability of version 2.0 of the CHO-KLAT (CHO-KLAT$_{2.0}$). **Methods:** Content validity was assessed via detailed cognitive debriefing to confirm that Canadian boys understood the CHO-KLAT$_{2.0}$. The measurement properties of the CHO-KLAT$_{2.0}$ were assessed in comparison to those of the PedsQL, the Haemo-QoL, and two global ratings. Most children completed the CHO-KLAT$_{2.0}$ a second time to assess test-retest reliability. **Results:** Cognitive debriefing was completed with 12 boys (age 8.6–17.8 years) and 9 of their parents and resulted in no substantive changes. Sixty boys (mean age 11.8 years) participated in the validation phase, which showed a mean CHO-KLAT$_{2.0}$ score of 75.4 ± 12.0, strong correlations with the PedsQL ($r = 0.62$, $P < 0.001$) and Haemo-QoL ($r = 0.64$, $P < 0.001$), and moderate correlations with global ratings of hemophilia bother ($\rho = -0.39$, $P = 0.002$) and health ($\rho = -0.47$, $P = 0.0002$). Test-retest concordance was better among parents (0.79) than among boys (0.63). **Conclusions:** This study establishes the measurement properties of the CHO-KLAT$_{2.0}$. The summary scores are very similar to those from the original development study, and thus, these have not been affected by the revisions. These results provide reference standards for comparing data from other countries to the Canadian experience and to estimate sample sizes for future clinical trials.

Keywords: health outcomes, hemophilia, quality of life, questionnaires.

Background

Hemophilia is a congenital, X-chromosome–linked recessive bleeding disorder that results in low levels of either factor VIII (hemophilia A) or factor IX (hemophilia B) [1]. The incidence of hemophilia A is approximately 1 in 5,000 male live births; hemophilia B is less common, with an incidence of approximately 1 in 30,000 male live births [1]. Boys with severe hemophilia A and B experience recurrent bleeding into joints, muscles, and soft tissues [1]. Repeated bleeds can cause permanent damage to joints and soft tissues, with associated pain and limitations in physical function, resulting in diminished quality of life (QOL).

In Canada, boys with hemophilia are treated by intravenous infusions of factor concentrates. For those individuals with mild disease, bleeding is usually associated with trauma and thus treatment (referred to as "on-demand" therapy) is given only following bleeding or in preparation for invasive procedures, such as surgery. Individuals with severe hemophilia typically experience unprovoked bleeding and are increasingly treated with prophylaxis, where factor replacement therapy is given on a regularly scheduled basis (generally two or three times per week) to prevent significant bleeding and consequent arthropathy [1]. Some aspects of treatment, for example, the need for intravenous infusions, may also have a negative impact on QOL. Thus, QOL is an important outcome measure for studies of hemophilia [2–4].

QOL has been defined by the World Health Organization as the net consequence of life characteristics on a "person's perception of their position in life, in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns" [5]. Health-related quality of life (HRQOL) often refers to the specific impact a disease or illness may have on the overall QOL [6] and was introduced into medical care because of the concern that the global concept of QOL may not be affected by health care interventions [7]. In many instances, however, the terms QOL and HRQOL are used interchangeably [8]. The constructs of QOL and HRQOL are subjective,

* *Address correspondence to:* Nancy L. Young, School of Rural and Northern Health, Laurentian University, 935 Ramsey Lake Road, Sudbury, ON, Canada P3E 2C6.

E-mail: nyoung@laurentian.ca.

1098-3015/$36.00 – see front matter Copyright © 2013, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.

http://dx.doi.org/10.1016/j.jval.2013.02.004

reflecting present lifestyle, experience, hopes for the future, dreams, and ambitions [6].

Canadian Hemophilia Outcomes–Kids Life Assessment Tool Development

The Canadian Hemophilia Outcomes–Kids Life Assessment Tool (CHO-KLAT) was developed to address the need for a disease-specific measure [9]. CHO-KLAT's validity was confirmed by a correlation of 0.59 ($P < 0.001$) with the PedsQL [10]. The initial version of the CHO-KLAT, tested on 52 boys with hemophilia (31% moderate and 69% severe), had a mean score of 74.6 ± 14.2 (range = 33.9–97.2) [10]. By comparison, the mean PedsQL score was 84.0 ± 16.2 (range = 5.4–100) on the same clinical cohort, and the mean Haemo-QoL score was 78.2 ± 15.3 (range = 17.9–99.3). A ceiling effect was observed in four boys, but it occurred only with the generic measure [10].

In 2008, we began a detailed process of linguistic translation and cognitive debriefing to develop versions of the CHO-KLAT for five European countries (France, Germany, The Netherlands, Spain, and the United Kingdom). During this process, we identified that one of the response sets used in the original CHO-KLAT (the seven-point Likert-type responses ranging from *strongly disagree* to *strongly agree*) was not well understood by children in Europe. However, the main response set (that ranged from *never* to *always*) was well understood. Thus, our solution was to use the main response set for all questions. Eleven of the 35 items underwent changes in the question stem to accommodate the change in response options. In addition, some minor wording changes had occurred as part of the European cognitive debriefing process and were incorporated. The revised tool is referred to as the CH0-KLAT (version 2.0) (CH0-KLAT$_{2.0}$) [11].

Purpose

The purpose of this study was to establish the validity and reliability of the CHO-KLAT$_{2.0}$. In addition, this study compared the CHO-KLAT$_{2.0}$ scores to those found in the original CHO-KLAT validation study [10]. Finally, this report provides estimates of the mean scores and SDs for use in sample size calculations for future studies.

Methods

Sample

This study included boys between the ages of 6 and 17 years who were recruited from the Comprehensive Care Hemophilia Clinic at The Hospital for Sick Children, Toronto. They were approached in clinic or via invitations sent through the mail. Brief chart reviews were conducted on each participant to record baseline plasma levels of circulating clotting factor, identify their current treatment protocol, and record the extent of joint damage. This study had two main phases: a) cognitive debriefing and b) validity and reliability. Participants were recruited separately for each phase.

Data Collection for Cognitive Debriefing

This study began by confirming that Canadian boys understood the CHO-KLAT$_{2.0}$. This was assessed through a detailed cognitive debriefing process, similar to that used in the initial CHO-KLAT development study [9] and the recent European cross-cultural adaptation study using the methodology as described by Price et al. [12]. This involved detailed individual interviews with 5 to 10 boys with hemophilia and a separate interview with one parent of each boy. These interviews were conducted in the hematology outpatient clinic at The Hospital for Sick Children in Toronto. The cognitive debriefing results were entered into an Excel spreadsheet and analyzed in an iterative process. After each series of two to three boys and their parents had completed the cognitive debriefing process, the cumulative results were used to catalog problems. The research team then met to discuss any problems and revise questions, if necessary, to improve the consistency and accuracy of question comprehension. This process continued until all items were consistently and accurately interpreted by participants.

Data Collection for Validity and Reliability

The second phase of this study evaluated the measurement properties of CHO-KLAT$_{2.0}$ via mail-administered surveys. Boys and their parents were requested to complete a survey package containing a consent/assent (as required), a global health rating form, the CHO-KLAT$_{2.0}$, the PedsQL [13–15], and the Haemo-QoL [2,16]. Boys and parents were instructed to complete these self-report surveys independently. Participants were requested to complete packages twice, approximately 2 weeks apart, at home, and return the survey in a prepaid envelope. The two packages were mailed separately, with each participant's time 2 packages mailed when their time 1 package was returned. Phone calls were made after the packages were sent to ensure that they were received. Reminder phone calls were made by the team if the packages were not completed in a timely fashion [17]. Demographic forms were completed by study staff and details confirmed with parents.

Analysis

Analysis of the data from this study was done by using Stata version 11.0.

Analysis for Cognitive Debriefing

The cognitive debriefing data were reviewed to describe the sample and determine the number of items with comments and the number of revisions required.

Analysis for Validity and Reliability

The survey analysis began by describing the sample. Disease severity was defined by baseline plasma levels of circulating clotting factor (mild > 5%; moderate 1%–5%; and severe <1%) [18]. We classified all survey participants on the basis of their current treatment regime and recent bleeding history, because these characteristics are expected to affect QOL outcomes. The treatment protocol was either on-demand (i.e., treated only when a bleed occurred) or on-prophylaxis (i.e., treated on a regular basis to prevent bleeds). Recent episode(s) of bleeding were based on self-report for the 2-week period preceding the completion of the surveys, and were subdivided into no bleeds, recent bleed (occurring between 24 hours and 2 weeks prior to the survey), and current bleed (occurring in the 24-hour period prior to the survey). This resulted in four possible groups. Details of the groups are listed in Table 1 in the Results section.

Summary scores were calculated for each measure according to the rules provided by the developers. Pearson's correlations were computed to establish the validity of the CHO-KLAT$_{2.0}$ relative to the PedsQL. The original CHO-KLAT had a correlation of 0.59 ($P < 0.001$) with the PedsQL [10]. Thus, a similar correlation was expected in this study. Because the PedsQL was believed to be a rough approximation of QOL in this population, we also compared the CHO-KLAT$_{2.0}$ to the Haemo-QoL (a disease-specific measure) by using a Pearson's correlation. In addition, we compared the CHO-KLAT$_{2.0}$ to a global rating of how much they