



# Quality of Life Assessment After HSCT for Pediatric and Adults

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## 34.1 Introduction

Methodological advances in the HCT field have increased the population of survivors worldwide. However, HCT is associated with significant morbidity that impairs survivors' recovery and adversely affects their QoL. A significant body of literature has addressed QoL after HCT and highlights significant deficiencies in physical, psychological, social, and role functioning both in adult and pediatric survivors (Pidala et al. 2010). These data are clinically relevant as they help to understand the impact of HCT on patient's lives. Clinically, assessment of QoL can inform patient education and be used to evaluate the benefit of supportive care interventions.

## 34.2 QoL Assessment

QoL can be considered a patient-reported outcome (PRO). PROs are defined by the US Food

and Drug Administration (FDA) as the "measurement of any aspect of a patient's health status that comes directly from the patient, without the interpretation of the patient's response by a clinician or anyone else" (US Food and Drug Administration 2009). Thus, PROs specifically describe the impact that HCT has on patients' lives and provide information unavailable from other sources (Kurosawa et al. 2017; Russell et al. 2006). PROs are also used in pediatric populations, although parents or other proxies might be used as source of information when children are unable to report their own QoL. However, the use of patients' own reports is clearly recommended because significant discrepancies are found when comparing patients' self-reported QoL to reports of physicians, parents, or other proxies (Kurosawa et al. 2017; Russell et al. 2006). In general, measures to assess patient- and proxy-reported QoL are questionnaires.

These instruments can be broadly categorized as general or disease- or procedure-specific. General measures assess QoL of the general population and can also be administered to specific populations, such as HCT recipients. These questionnaires allow comparisons of QoL across populations, such as between HCT survivors and individuals without cancer. In contrast, disease- and procedure-specific instruments examine specific aspects of the health conditions assessed. These measures capture specific PROs that are likely to be important to patients.

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### 34.3 Measures to Assess QoL in Adults and Pediatric Patients Undergoing HCT

There are numerous measures assessing QoL on adults and pediatric HCT recipients. Measures used have been both general and disease-specific. The following sections list some of the most common used questionnaires in the field of HCT.

#### 34.3.1 Adults

Interest in assessing QoL in adult HCT recipients is reflected in the variety of measures used to assess this outcome. However, there is a need for the scientific community to reach consensus about which questionnaires to use in order to facilitate comparison across studies (Shaw et al. 2016). Table 34.1 summarizes alphabetically some of the most common questionnaires to assess QoL in adults.

**Table 34.1** QoL questionnaires assessing QoL in adult HCT survivors

(a) General	
<i>European Quality of Life- 5 Dimensions (EQ-5D-5L)</i> (van Reenen and Jansen 2015)	
Aim	Health status
Items	6
Domains/subscales	Mobility, self-care, usual activities, pain, anxiety, depression
Results	Profile of each of the domains assessed, and an index of the health status. Higher scores indicate better health status
Translations	Available in more than 130 languages
<i>Medical Outcomes Study-Short Form (MOS SF-36)</i> (Ware et al. 1994)	
Aim	QoL
Items	36; shorter versions feature 12 items (SF-12) or 8 items (SF-8)
Domains/subscales	General health, physical, role, emotional and social functioning, mental health, pain, vitality
Results	Physical Component Score; Mental Component Score and Global Score. Higher scores indicate better QoL
Translations	Available in more than 170 languages
<i>Patient-Reported Outcomes Measurement Information System (PROMIS)</i> (Cella et al. 2010)	
Aim	Mental, physical, and social health and QoL in healthy populations as well as those with chronic conditions
Items	Multi-item measures varying in length and complexity; for example, PROMIS-29 has 29 items, PROMIS-43 has 43 items, PROMIS-57 has 57 items
Domains/subscales	Each subscale measures a single domain; PROMIS Profile measures assess multiple domain
Results	Higher scores indicate more of the concept being measured. Measures use standardized T-score metric against normative data for the US population
Translations	Available in Spanish and several other languages
(b) Cancer and HCT specific	
<i>European Organization for Research and Treatment of Cancer QoL Questionnaire Core 30 (EORTC QLQ-C30) version 3.0</i> (Aronson et al. 1993)	
Aim	QoL in cancer
Items	30 items
Domains/subscales	Functional scales, symptom scale and a QoL scale
Results	Higher scores in functional and QoL scales indicate better wellbeing. Higher scores in the symptom scale indicate worse symptomatology
Translations	Available in more than 100 languages

**Table 34.1** (continued)

<i>Functional Assessment of Cancer Therapy—Bone Marrow Transplant (FACT-BMT)</i> (McQuellon et al. 1997)	
Aim	QoL in HCT
Items	47
Domains/subscales	Consists of the FACT-G (Cella et al. 1993) and the BMT concerns subscale
Results	Higher scores indicate better QoL
Translations	Available in more than 38 languages
<i>Functional Assessment of Cancer Therapy—General Scale (FACT-G)</i> (Cella et al. 1993)	
Aim	QoL in cancer
Items	33
Domains/subscales	Physical, functional, social and emotional well-being
Results	Higher scores indicate better wellbeing and global QoL
Translations	Available in more than 60 languages

### 34.3.2 Pediatrics

There is less research on QoL on pediatric patients than adult patients. Initial pediatric studies focused on a single aspect of functioning, such as psychosocial and physical limitations. It was not until the early 1990s that pediatric QoL began to be addressed as a multidimensional construct. Most of the measures used in pediatric studies were originally developed to be used in the general population or in children with specific illnesses. Table 34.2 lists alphabetically the most common measures used to assess QoL in pediatric population.

## 34.4 Challenges when implementing QoL assessment

Improvement in patients' QoL is included among the strategic goals of major cancer organizations such as the American Society of Clinical Oncology and regulatory agencies such as the FDA and the European Medicines Agency. Recognition of the importance of the patient experience is reflected in the increasing incorporation of patient-reported QoL measures in observational research and clinical trials. However,

some aspects should be considered when implementing patient-reported QoL measures.

Historically, studies and clinical trials performed in the USA have often used the FACT instruments, whereas studies performed in Europe have chosen the EORTC. This divergence makes results difficult to compare (Shaw et al. 2016), although efforts are underway to map common QoL measures such as the EORTC QLQ-C30 and FACT-G to one another (Young et al. 2015). Second, the mode of administration should also be considered. PRO measures have traditionally been administered by paper and pencil, but new technologies offer the potential to use electronic measures. Electronic measures administered before or during a clinic visit allow results to be available at the time of consultation and may facilitate symptom monitoring to guide supportive treatment. One example is the PROMIS instrument, which is available using computer adaptive testing or through REDCap software. Computer adaptive testing selects questions based on the previous responses that patients have provided to approximate the construct being measured in the fewest number of questions. The implementation of routine assessment of patients' QoL on clinical care and clinical trials has the potential to improve patients' well-being.

**Table 34.2** QoL questionnaires assessing QoL in pediatric HCT survivors

(a) General	
<i>Child Health Questionnaire (CHQ)</i> (Landgraf et al. 1996)	
Aim	QoL
Versions	Parent-reported versions feature 50 items (CHQ-PF50) or 28 items (CHQ-PF28) and are intended for parents of children aged 5–18 years. The child-report version (CHQ-87) has 87 items and is appropriate for children aged 10–18
Domains/subscales	Global health, physical functioning, role/social-physical functioning, bodily pain/discomfort, role/social-emotional functioning, role/social -behavior, parental impact -time, parental impact -emotional, self-esteem, mental health, global behavior, family activities, family cohesion, and changes in health
Results	Higher scores indicate higher physical and psychosocial wellbeing
Translations	The CHQ-PF50 and CHQ-PF28 are available in more than 80 languages, and the CHQ-87 to 34
<i>Patient-Reported Outcomes Measurement Information System (PROMIS)</i> (Hinds et al. 2013)	
Aim	Health and QoL in healthy populations as well as those with chronic conditions
Versions	Multi-item measures varying in length and complexity: PROMIS-25 has 25 items, PROMIS-37 37 items, and PROMIS-49 49 items. PROMIS measures are child- and parent-reported. Child-report measures are intended for children aged 8–17, and parent-report for children 5–17
Domains/subscales	Physical, mental and social health, and a global QoL score
Results	Higher scores indicate more of the concept being measured. PROMIS use standardized T-score metric against normative data for the US population
Translations	Children and proxy measures are available in Spanish and in several other languages
<i>Pediatric Quality of Life Inventory (PedsQL™) 4.0 Generic Score Scales</i> (Varni et al. 2001)	
Aim	QoL in healthy children or those diagnosed with an acute or chronic disease
Versions	Parent-report form for children aged 2–4 has 21 items, and child and parent reports for children aged 5–18 have 23 items
Domains/subscales	Physical, emotional, social, and school functioning
Results	Physical health summary score; Psychosocial health summary score; Total score. Higher scores indicate better QoL
Translations	Available in more than 70 languages
(b) Cancer and HCT specific	
<i>Child Health Rating Inventories (CHRIs)-and Disease-Specific Impairment Inventory-Hematopoietic Stem Cell Transplantation (DSII-HCT)</i> (Parsons 2005)	
Aim	The disease specific (DSII-HCT) module assesses QoL of childhood HCT survivors
Versions	10-item module intended to child-report (aged 5–12), adolescent-report (13–18) and parents-report (5–18)
Domains/subscales	Items are grouped in three domains reported by parents and patients to be most salient to the HCT experience: worry, hassless, and body image
Results	Higher scores indicate better QoL
Translations	The questionnaire is available in English
<i>Peds Quality of Life Cancer Module 3.0 (PedsQL CM™)</i> (Varni et al. 2002)	
Aim	QoL in children with cancer
Versions	Parent-report form for children aged 2–4 has 25 items, child and parent reports for children aged 5–7 has 26 items, and child and parents reports for children more than 8 years has 27 items
Domains/subscales	Pain and hurt, nausea, procedural anxiety, treatment anxiety, worry, cognitive problems, perceived physical appearance and communication
Results	Higher scores indicate better QoL
Translations	Available in more than 100 languages
<i>The Behavioral, Affective and Somatic Experiences Scales (BASES)</i> (Phipps et al. 1994)	
Aim	QoL during the acute phase of HCT
Versions	There are separate versions to be completed by nurses (BASES-N), parents (BASES-P) and children (BASES-C). The BASES-N and BASES-P have 38 items and the BASES-C has 14 items. The questionnaire is intended to be used in child aged 5–17
Domains/subscales	Somatic distress, mood disturbance, compliance, quality of interactions and activities
Results	Higher scores indicate more distress/impairment
Translations	Available in English

### Key Points

- Assessing HCT survivors' QoL is essential in order to know the impact that the HCT, its morbidity, its treatments, and related interventions have on survivors' well-being.
- Enhanced efforts should be made in order to include QoL assessment in routine clinical practice. Engaging clinicians in using QoL assessments, potentially by means of electronic administration, as well as broadening the interpretation of their scores into the clinical field, might facilitate incorporation.
- Further efforts should elucidate to what extent QoL results are incorporated into management decisions, treatment recommendations, and patients' education.
- Additional efforts should also be made to include QoL outcomes in clinical trials.
- The incorporation of QoL assessment into clinical and research practice has the potential to improve HCT outcomes.

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