Assessment of Health-related Quality of Life in Saudi Children with Cancer

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ABSTRACT: Advances in pediatric cancer treatment and dramatic improvement in long-term survival have made health-related quality of life (HRQOL) a priority. This study describes the HRQOL of Saudi children on cancer treatment, given the paucity of data on the subject. Parents of children undergoing cancer treatment between the ages of 2 and 12 years enrolled to answer the Arabic version of the parent proxy report PedsQL™ 3.0 cancer module. The module items were reverse-scored to a linear scale from 0 to 100, in which higher scores indicated a better HRQOL. Of the 95 study participants, 61 (64.2%) were hematological malignancies and 34 (35.8%) solid malignancies. The mean score of our sample's total HRQOL was 72.3, which is in line with the results of similar studies worldwide. The lowest scores were observed for procedural anxiety (60.14), perceived physical appearance (67.37), and treatment anxiety (67.58), while the highest were for communication (80.21), nausea (78.32), and cognitive problems (78.32). Significant associations were reported between the patients aged younger than 5 years and procedural anxiety, those aged 5 years or older and perceived physical appearance, and frequent hospital visits and worry. Healthcare professionals should consider the poor HRQOL sub-scales and their associated risks to improve treatment outcomes.

KEYWORDS: Quality of life, childhood cancer, Saudi Arabia, cancer module

Background

The long-term survival of children with cancer has improved over the past few decades. More than 80% of children diagnosed with cancer can achieve disease-free survival.[1,2] Advances in cancer treatment outcomes are related to improved supportive care, new treatment modalities, centralization of medical care, and the outcomes of international clinical trials. Survivors of childhood cancer have been exposed to multiple aggressive treatments, which compromise their quality of life (QOL).[3] Health-related QOL (HRQOL) is defined as a multi-dimensional concept that entails a patient's perception of the impact of disease and treatment on their functioning in various aspects of life, including physical, mental, emotional, and social functioning.[4]

Regardless of age, gender, diagnosis, and type of treatment, many studies show a significant effect on QOL manifested primarily after the first few months of diagnosis with reduced organ function and autonomy, poor psychological status with reduced self-esteem, and depression.[5,6] HRQOL in children can be assessed based on patients' self-reports or the parents' proxy reports.

The assessment of the HRQOL in pediatric cancer patients is becoming increasingly important in clinical trials. Most studies that have focused on survivors have reported a significant impairment of the HRQOL, especially of patients with brain tumors, who are at higher risk.[7,8] This knowledge may help patients and parents anticipate the expected course during treatment and identify groups of children with expected poor HRQOL who can be targeted for supportive care to improve their health.[9] Additionally, measurement of HRQOL may help healthcare professionals and families choose specific treatment strategies based on the HRQOL outcome.[10,11]

Worldwide, the assessment of the HRQOL in pediatric cancer patients is increasing. However, data from Saudi Arabia are scant. Here, we describe the profile of the HRQOL in Saudi children with cancer. Additionally, the impact of cancer treatment and social and demographic variables on the HRQOL are evaluated.

Methods

Following approval by our institute, the IRB (HP-01-R079), and between September 2019 and February 2020, 95 parents, out of those of 104 pediatric cancer patients, agreed verbally to be enrolled for the study; the patients, aged 2 to 12 years, were on treatment in inpatient and outpatient departments at the cancer center of Prince Sultan Medical Military City (PSMMC) at Riyadh, Saudi Arabia. Parents of 74 patients were interviewed face to face, whereas those of the rest (ie,

21 patients) were interviewed through telephone; the latter interviews were conducted by one pediatric physician trained in the management of pediatric cancer patients to complete the PedsQL™ 3.0 booklet (Arabic version), as well as a sheet for demographic and social features. The PedsQL™ 3.0 cancer module is a reliable and valid instrument designed to measure pediatric cancer-specific HRQOL.[12] The Arabic version of the parent proxy report PedsQL™ 3.0 cancer module was used to match the native language of the study sample.[13] The 27-item module covers 8 essential domains to measure HRQOL in children with cancer: (1) pain and hurt (2 items), (2) procedural anxiety (3 items), (3) treatment anxiety (3 items), (4) perceived physical appearance (3 items), (5) worry (3 items), (6) communication (3 items), (7) nausea (5 items), and (8) cognitive complications (5 items). Each item contains a 5-point response scale (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem). The scale is reverse-converted to a 0 to 100 scale, on which the higher the score, the better the HRQOL. The total HRQOL is the average score of all 8 domains, and the HRQOL for each domain is the average score for the included items. Treatment-related features, including cancer type, the intensity of treatment, therapy duration at the time of the study, and the frequency of hospital visits, were collected from patients' medical records. The intensity of treatment is classified into low, medium, and high, based on the type of treatment, duration of chemotherapy, and cancer prognosis. The patients who received only surgery and/or 6 months of chemotherapy with a favorable prognosis were considered to be on low-intensity treatment. Chemotherapy that was longer than 6 months, with intermediate prognosis, upgraded treatment intensity to medium, while high-intensity treatment patients were considered to be those who received high-risk protocols, bone marrow transplantation, and/or with cancer of less favorable prognosis.

Statistical Analysis

The results are expressed in terms of the mean, standard deviation, median, minimum, and maximum values. A comparison between the total HRQOL and its 8 subscales, classified according to the different variable groups, was performed using either the unpaired *t*-test for 2 groups or the ANOVA test for 3 groups. The Bonferroni correction was used to avoid multiplicity. The Statistical Package for Social Sciences (SPSS) computer program (version 19 Windows) was used for data analysis. A *P*-value ≤.05 was considered significant.

Results

The demographic features, sample size, and cancer and treatment type are summarized in Table 1. Of the study patients, 53.6% were female, while 46.3% were male, with the age for both ranging between 2 and 12 years, with a median age of 7 years. Hematological malignancies constituted 64.2% of the cancer types, while 35.8% were diagnosed with a solid tumor.

Table 1. Descriptive demographics and medical features of the study groups.

VARIABLE	NUMBER	PERCENTAGE
Age		
<5	19	20
⩾5	76	80
Gender		
F	51	53.7
M	44	46.3
Cancer type		
Hematological	61	64.2
ALL	43	45.3
AML	4	4.2
HL	7	7.4
NHL	3	3.2
LCH	3	3.2
CML	1	1.1
Solid	34	35.8
Brain	14	14.7
NB	4	4.2
OS	4	4.2
Wilms	3	3.2
RMS	3	3.2
ES	2	2.1
Germ cell	2	2.1
Sarcoma	1	1.1
Desmoid	1	1.1
Hospital visits		
≤3/month	64	67.4
⩾3/month	31	32.6
Duration of therapy		
≤1 y	11	11.6
⩾1 y	84	88.4
Intensity of therapy		
Low	15	15.8
Medium	25	26.3
High	55	57.9
Residence*		
Local	74	77.9
Outside Riyadh	21	22.1

*Patients who live more than 100 km away from PSMMC are considered to be outside residents.

Table 2. Scores of total QOL and its subclasses among the studied group.

SCALE/SUBSCALE	MIN.	MAX.	MEDIAN	MEAN	SD
Total QOL	38	100	73.58	72.32	13.50
Pain and hurt	20	100	80.00	75.47	22.63
Nausea	24	100	80.00	78.32	18.96
Procedural anxiety	20	100	66.67	60.14	29.19
Treatment anxiety	20	100	66.67	67.58	25.18
Worry	20	101	80.00	71.19	27.04
Cognitive problems	24	100	80.00	78.32	18.96
Perceived physical appearance	20	100	73.33	67.37	27.51
Communication	20	100	86.67	80.21	24.93

SD, standard deviation.

The cancer type labeled "ALL" is the most frequent, representing 45.3%. Among those with solid tumors, most are brain tumors, with 14 patients (14.7%). The intensity of therapy was low in 15.8%, medium in 26.3%, and high in 57.9% of the patients. More than half of the study sample (67.4%) visited the hospital 3 or fewer times per month. The duration of therapy at the time of the study was more than 1 year for 88.4% and <1 year for 11.6% of the patients. Most of the study group (77.9%) were local residents, while 22.1% were outside residents.

The total HRQOL registered a mean value of 72.23. The lowest 3 scores for the subscales were 60.14 (procedural anxiety), 67.37 (perceived physical appearance), and 67.58 (treatment anxiety), while the highest scores were observed for communication (80.21), nausea (78.32), and cognitive problems (78.32), as shown in Table 2.

Table 3 shows the significant correlations between the different variables as well as the HRQOL values for the subscales. Procedural anxiety and perceived physical appearance are affected by the age of the patients. The patients that are younger than 5 years have more procedural anxiety than those who are older (≥5 years). Perceived physical appearance is also affected by the patients' age; however, among the patients 5 years or older, it is negatively impacted by age. The patients with a hospital visit frequency of more than 3 times per month are significantly more worried than those with a frequency of 3 or fewer visits per month. The duration of therapy, the intensity of therapy, gender, and residence have no statistically significant impact on either the total HRQOL or that of its 8 subscales.

Discussion

The assessment of the HRQOL among pediatric patients with cancer is valuable for many reasons. Finding the impact of various phases of cancer treatment on the HRQOL can improve the support provided by parents, medical teams, and social workers for children with cancer. Our use of the parent proxy report PedsQL™ 3.0 cancer module is similar to a previous study from Saudi Arabia that obtained a total HRQOL of 72.3 for pediatric cancer patients, which was one of the of highest scores in the world (Table 4).[12-16]

Of the 8 subscales, communication and procedural anxiety had the highest and lowest scores, respectively (Table 2). Similar to our data, other studies reported most frequent high scores for the communication subscale and most frequent low scores for procedural anxiety (Table 4), emphasizing the importance of these 2 subscales.[12-15]

The patients that were younger than 5 years were significantly associated with a poor QOL score in the procedural anxiety subscale. This finding emphasizes the importance of preventing the anxiety associated with medical procedure during cancer treatment. Procedural anxiety can be stressful for both pediatric cancer patients and their parents, and may render treatment challenging. Pain, fear, and an unfamiliar environment are the underlying causes of the anxiety associated with medical procedures. The aim is to move the child from fear to trust through several interactive techniques, such as shifting awareness from the procedure to a patient's interest and permitting the patient to touch various medical instruments to improve their trust. The use of distraction, positive encouragement, sensory explanation of the procedure, and allowing the child to describe their feeling also reduces procedural anxiety.[17] In addition to the above techniques, the CARE approach (choices, agenda, resilience, and emotional support) may be adopted during interaction with pediatric cancer patients to minimize procedural anxiety.[18] "Choices" provide developmentally appropriate choices, such as asking the child which hand to offer for measuring blood pressure. Healthcare professionals can provide their "agenda" (what to expect in the medical visits) to patients and their parents to minimize fear from medical procedures. "Resilience" empowers patients by asking about their strengths in previous visits. "Emotional support" decreases acute anxiety and helps in long-term

Table 3. Total QOL and 8 subscales with the study variables.

	TOTAL QOL	PAIN AND HURT	NAUSEA	PROCEDURAL ANXIETY	TREATMENT ANXIETY	WORRY	COGNITIVE PROBLEMS	PERCEIVED PHYSICAL APPEARANCE	COMMUNICATION
Age at diagnosis									
<5years (n=19)	73.98±11.641	81.58±21.15	80.00±19.37	47.37±22.76	66.68±27.86	78.98±25.97	80.00±19.37	81.05±19.78	76.14±26.70
≥5years (n=76)	71.91±13.965	73.95±22.87	77.89±18.96	63.33±29.86	67.81±24.67	69.24±27.11	77.89±18.96	63.95±28.20	81.23±24.55
P-value	.554	.190	.667	.015*	.863	.161	.667	.004*	.429
Gender									
Female (n=51)	71.53±13.88	74.71±21.76	78.75±19.44	63.01±29.64	64.31±23.96	69.84±28.37	78.75±19.44	64.05±28.94	78.82±25.32
Male (n=44)	73.25±13.14	76.36±23.83	77.82±18.59	56.82±28.63	71.37±26.30	72.74±25.65	77.82±18.59	71.21±25.55	81.82±24.67
P-value	.540	.724	.814	.305	.175	.605	.814	.208	.562
Hospital visits									
≤3/month (n=64)	71.68±14.32	74.69±23.16	78.12±18.71	62.81±29.04	67.50±25.16	66.69±28.56	78.12±18.71	65.63±27.74	79.90±26.06
>3/month (n=31)	73.65±11.73	77.10±21.79	78.71±19.77	54.62±29.18	67.75±25.66	80.46±21.11	78.71±19.77	70.97±27.14	80.86±22.82
P-value	.509	.629	.889	.201	.964	.010*	.889	.378	.861
Duration									
≤6months (n=11)	71.25±10.47	73.64±28.03	76.36±18.37	57.58±31.17	65.45±26.30	70.30±24.29	76.36±18.37	59.39±30.91	90.91±17.96
≥1year (n=84)	72.46±13.89	75.71±22.02	78.57±19.12	60.48±29.10	67.86±25.19	71.30±27.51	78.57±19.12	68.41±27.07	78.81±25.46
P-value	.781	.776	.719	.758	.767	.909	.719	.309	.131
Intensity of therapy									
Low (n=15)	70.43±14.06	70.00±21.04	80.00±13.69	53.33±27.83	74.22±22.80	64.98±32.71	80.00±13.69	62.22±28.25	78.67±28.42
Medium (n=25)	74.13±13.68	76.40±20.79	83.36±14.59	63.20±30.68	65.07±22.55	67.76±23.97	83.36±14.59	69.07±25.88	84.80±21.56
High (n=55)	72.02±13.43	76.55±23.98	75.56±21.49	60.61±29.10	66.92±26.98	74.44±26.70	75.56±21.49	68.00±28.35	78.55±25.55
P-value	.685	.599	.220	.581	.519	.374	.220	.727	.568
Residence									
Local (n=74)	72.31±13.27	75.95±21.45	77.30±20.40	60.90±29.53	66.67±25.00	72.64±27.27	77.30±20.40	66.67±28.26	81.08±24.25
Outside Riyadh (n=16)	70.48±14.09	70.62±28.86	83.25±11.97	57.08±27.75	65.83±26.65	62.52±26.90	83.25±11.97	63.75±25.29	77.50±25.98
P-value	.621	.401	.128	.637	.905	.181	.128	.704	.598

*$P \leqslant .05$. Significant difference.

Table 4. Scores of total HRQOL in pediatric cancer patients from different countries.

STUDY	TOTAL HRQOL	HIGHEST SUBSCALES	LOWEST SUBSCALES
USA[12]	73.6	Communication	Procedural anxiety
		Nausea	Treatment anxiety
Lebanon[14]	72.8	Communication	Nausea
		Cognitive problems	Treatment anxiety
Saudi Arabia	72.3	Communication	Procedural anxiety
		Cognitive problems and nausea	Perceived physical appearance
China[15]	71	Perceived physical appearance	Worry
		Pain and hurt	Procedural anxiety
Egypt[13]	62.3	Communication	Worry
		Cognitive problems	Perceived physical appearance

patient-medical provider relationships. Besides the above techniques, oral or intranasal anxiolytic medications, such as midazolam, may be required to reduce procedural anxiety.

On the other hand, a significant decrease in the QOL was observed in the perceived physical appearance domain with the patients that were older than 5 years. Disease and treatment-related physical appearance changes, such as hair loss, weight gain or loss, skin changes, and physical disfigurement have been shown to have a negative impact on QOL in children with cancer.[13,16,19] Adverse effects of cancer treatment on physical appearance are expected to be more stressful and recognizable in older patients since they are more careful about their appearance. Many children with cancer have expressed themselves by showing hair loss or incomplete body parts in their drawings.[19] Such findings are likely to end in social anxiety and isolation. Oncologists should be aware of ways in which the side effects of cancer treatment can be minimized, such as scalp cooling for certain chemotherapies or preventive and treatment measures for skin changes due to radiotherapy.[20,21] Children with cancer who experience treatment-related physical appearance changes should be taught to handle teasing, questions, and comments from peers that may weaken their self-esteem.[22] Reassurance from parents, friends, and the medical team is required to improve their emotional development and for coping with physical appearance changes. The supportive role of religion has been shown to help families with childhood cancer to have a positive outlook on the future.[23]

A hospital visit frequency of more than 3 times per month was associated with significant worry, compared to a frequency of 3 or fewer visits per month. During the treatment plan, it is imperative to consider reducing hospital visits, which is likely to reduce worry in children with cancer. A reduction of hospital visits may be challenging, given the required strict following of the cancer treatment protocol. Nonetheless, hospital visits should be reduced as much as possible; for example, if a child

with cancer were on anticoagulant medication and needed a hospital visit for testing the drug level, it would be preferable to delay or bring the testing forward by a few days, to coincide with the visit for cancer treatment.

Using a large all-Saudi cohort and a wider range of ages, our data was able to confirm the results of Hegazy et al[16] regarding total HRQOL. In addition, we explain and discuss simple ways to improve QOL based on the results of our study. The limitations of the current study include the absence of variables that may affect HRQOL, such as family size, level of parental education, compliance with treatment, and frequency of hospital admissions. The correlation between cancer type and QOL was not included in the current study.

Conclusion
Ours is the largest study to describe the profile of HRQOL in Saudi children with cancer, and the first to include a more comprehensive age range from 2 to 12 years. The total HRQOL score for Saudi children with cancer is similar to that reported for most children with cancer worldwide. Procedural anxiety, treatment anxiety, and perceived physical appearance are the factors with the most negative impact on the QOL in Saudi children with cancer. Health care professionals should consider the best ways to minimize the negative effects of the above factors on total HRQOL. More clinical studies are required to include other aspects of HRQOL to improve the treatment outcome of children with cancer.

Author Contributions
All authors contributed equally. All authors contributed to this manuscript accordingly. All authors have read and approved

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