

Quality of life in patients with sickle cell disease

Qualidade de vida em portadores de doença falciforme

Calidad de vida en portadores de enfermedad falciforme

Adeline Soraya de O. da P. Menezes¹, Cláudio Arnaldo Len², Maria Odete E. Hilário³, Maria Teresa R. A. Terrei⁴, Josefina Aparecida P. Braga⁴

ABSTRACT

Objective: To evaluate the quality of life in children and adolescents with sickle cell disease attending a blood reference center, and to assess the quality of life of their relatives.

Methods: Cross-sectional study that included 100 patients with sickle cell disease, which were divided into three subgroups according to age: 5 to 7 (n=18), 8 to 12 (n=32), and 13 to 18 years-old (n=50), and their parents. The Control Group included 50 healthy children and adolescents from a public local school, also divided into the same three age subgroups and their caregivers. The Pediatric Quality of life Inventory (PedsQL), version 4.0, was applied in both groups. The generic questionnaire Medical Outcomes Study 36 - Item Short-Form Health Survey (SF-36) was applied to the relatives. The answers were linearly transformed into a score and compared by non-parametric tests.

Results: The PedsQL scores of patients were significantly lower than those obtained in the Control Group ($p<0.0001$) in all studied areas (physical, emotional, social skills, and school activities). Similarly, SF-36 scores applied to the patients' parents were lower than those obtained in the Control Group in all studied aspects ($p<0.0001$).

Conclusions: Sickle cell disease affects the quality of life of children, adolescents, and their families. Patients sense restrictions in the emotional, social, family and physical aspects, among others.

Key-words: quality of life; anemia, sickle cell; children; adolescents.

RESUMO

Objetivo: Avaliar a qualidade de vida relacionada à saúde de crianças e adolescentes com doença falciforme assistidas em um hemocentro de referência e mensurar a qualidade de vida relacionada à saúde dos respectivos familiares.

Métodos: Estudo transversal e seccional com 100 pacientes portadores de doença falciforme, divididos em três subgrupos conforme a faixa etária: de 5 a 7 (n=18), de 8 a 12 (n=32) e de 13 a 18 anos (n=50) e com seus respectivos pais. O Grupo Controle foi composto por 50 crianças e adolescentes saudáveis de uma escola pública local, também divididos nos três subgrupos de idade e seus respectivos cuidadores. Foi aplicado o questionário genérico "Pediatric Quality of Life Inventory" (PedsQL), versão 4.0, em ambos os grupos. Aos familiares foi aplicado o questionário genérico Medical Outcomes Study 36 - Item Short-Form Health Survey (SF-36). As respostas obtidas foram linearmente transformadas em um escore e comparadas com o auxílio de testes não paramétricos.

Resultados: Os escores dos pacientes no PedsQL foram inferiores àqueles do Grupo Controle ($p<0,0001$) nos aspectos estudados (capacidades física, emocional, social e atividade escolar). Da mesma forma, os escores do SF-36 aplicados aos pais dos pacientes foram mais baixos que os de pais do Grupo Controle em todos os aspectos estudados ($p<0,0001$).

Conclusões: A doença falciforme compromete a qualidade de vida das crianças, dos adolescentes e de suas respectivas famílias. Os pacientes percebem restrições nos aspectos emocional, social, familiar e físico, dentre outros.

Palavras-chave: qualidade de vida; anemia falciforme; crianças; adolescentes.

Instituição: Escola Paulista de Medicina (EPM) da Universidade Federal de São Paulo (Unifesp), São Paulo, SP, Brasil

¹Mestre em Ciências pela EPM da Unifesp, São Paulo, SP, Brasil

²Livre-Docente em Pediatria pela Unifesp; Professor Adjunto do Departamento de Pediatria da EPM, Unifesp, São Paulo, SP, Brasil

³Livre-Docente em Pediatria pela Unifesp; Professora-Associada do Departamento de Pediatria da EPM, Unifesp, São Paulo, SP, Brasil

⁴Doutora em Pediatria pela Unifesp; Professora Adjunta do Departamento de Pediatria da EPM, Unifesp, São Paulo, SP, Brasil

Endereço para correspondência:

Claudio Arnaldo Len
Rua dos Otonis, 725
CEP 0402-002 - São Paulo/SP
E-mail: claudiolen@gmail.com

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RESUMEN

Objetivo: Evaluar la calidad de vida relacionada a la salud en niños y adolescentes con enfermedad falciforme asistidas en un servicio de hemoterapia de referencia y medir la calidad de vida relacionada a la salud de los respectivos familiares.

Métodos: Estudio transversal y seccional en 100 pacientes portadores de enfermedad falciforme, divididos en tres subgrupos conforme a la franja de edad: de 5 a 7 (n=18), de 8 a 12 (n=32) y de 13 a 18 (n=50) años con sus respectivos padres. El Grupo Control fue compuesto por 50 niños y adolescentes sanos de una escuela pública local, también divididos en los mismos tres subgrupos de edad y sus respectivos cuidadores. Se aplicó el cuestionario genérico «Pediatric Quality of Life Inventory» (PedsQL), versión 4.0, a ambos grupos. A los familiares se aplicó el cuestionario genérico Medical Outcomes Study 36 – Item Short-Form Health Survey (SF-36). Las respuestas obtenidas fueron linealmente transformadas en un score y comparadas con la ayuda de pruebas no paramétricas.

Resultados: Los scores de los pacientes en el PedsQL fueron inferiores a aquellos del Grupo Control ($p < 0,0001$) en los aspectos estudiados (capacidades física, emocional, social y actividad escolar). Del mismo modo, los scores del SF-36 aplicados a los padres de los pacientes fueron más bajos que los de padres del Grupo Control en todos los aspectos estudiados ($p < 0,0001$).

Conclusiones: La enfermedad falciforme compromete la calidad de vida de los niños, de los adolescentes y de sus respectivas familias. Los pacientes perciben restricciones en los aspectos emocional, social, familiar y físico, entre otros.

Palabras clave: calidad de vida; anemia falciforme; niños; adolescentes.

Introduction

Sickle cell disease (SCD) is a chronic hemolytic hereditary anemia resulting from a mutation in which valine substitutes for glutamic acid in codon 6 of the β -hemoglobin chain, which leads to the formation of hemoglobin S. This basic defect is the main cause of the various clinical signs and symptoms of this disease⁽¹⁾. SCD is the result of a combination of hemoglobin S (HbS) with another abnormal hemoglobin, such as hemoglobin C (HbC), beta-thalassemia and HbS, which characterize hemoglobinopathies HbSC, HbS beta-thalassemia and HbSS^(2,3). Sickle cell anemia is the most

severe form of sickle cell disease. In Brazil, it is classified as a public health problem because of its high prevalence⁽⁴⁾.

SCD has high morbidity and mortality. It is characterized by acute clinical symptoms, such as painful vaso-occlusive episodes, splenic sequestration and acute thoracic syndrome, that make the patient seek the emergency services frequently, and also by chronic signs, as it affects organs and systems. Survival and quality of life improvement for these patients is based on general and preventive measures⁽⁵⁾. Several changes affect the life of patients with SCD which force them to face limitations, frustrations and losses and to adapt to a new life style. These changes are necessary because of the use of medications, hospitalizations and lost working capacity. Because of these events, there may also be a variable impact on their health-related quality of life (HRQL)⁽⁶⁻⁸⁾.

HRQL is a construct made up of different elements: biological, social and relational, psychological and of functional autonomy. They come together for individuals to evaluate how much more or less quality their life has^(9,10). In the last decades, several instruments have been designed to measure quality of life of children⁽¹¹⁾. The Pediatric Quality of Life Inventory (PedsQL) 4.0 stands out as a scale to measure quality of life of both healthy children and children with chronic diseases. This questionnaire has been recently translated and culturally validated for use in Brazilian children⁽¹²⁾. The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) is a general instrument to evaluate quality of life, easy to administer and to understand.

This study used the SF-36 and the PedsQL questionnaires to measure HRQL of children and adolescents with SCD followed up in a reference blood center and to compare findings with those of a control group of the same age.

Method

This study was approved by the Ethics in Research Committee of the Escola Paulista de Medicina of the Universidade Federal de São Paulo (EPM/Unifesp) and the Hemocentro de Alagoas (HEMOAL), in Brazil. Patients and controls and their caregivers (parents and guardians) received information about the study and signed an informed consent term in the presence of the author.

This cross-sectional study included a convenience sample and was conducted from March to December 2009. Of 495 patients with SCD detected by hemoglobin electrophoresis who were registered in the blood center, only the children aged 5 to 18 years were included in the study. According

to the database, there were 162 patients in that age group registered in HEMOAL. Patients and their caregivers were invited by the author to come to HEMOAL where meetings to explain the study were conducted and where they were asked to sign the informed consent term. Exclusion criteria were: physical comorbidities (stroke, femoral head avascular necrosis and lung disease) or mental diseases (cognitive development delay and psychic disorders) and absence caregiver during consultation. Exclusion criteria for patient parents were chronic or acute disease in the previous 30 days. A total of 100 patients were included in the study.

The control group had 50 healthy children and adolescents that studied in a public school in a suburb of Maceió, Brazil, whose socioeconomic status was the same as that of the patients. They were also subdivided into the same age groups, together with their parents or guardians.

Quality of life was measured using the SF-36 and the PedsQL 4.0 questionnaires in three stages.

Stage 1

The general PedsQL 4.0⁽¹³⁾ questionnaire translated to Portuguese and adapted to the Brazilian culture was applied to the patients. This questionnaire has versions for four age groups: 2–4, 5–7, 8–12 and 13–18 years. Its domains evaluate problems such as physical capacity, emotional and social aspects and school activities. Items are score-reversed and linearly transformed using a 0 to 100 scale (0=100, 1=75, 2=50 and 4=0), so that higher scores represent better quality of life⁽¹³⁾. In the administration of PedsQL 4.0, children were asked how much of each problem they had experienced in the previous month. In the reports of children aged 5 to 18 years and their parents, a five point scale was used (0=never; 1=almost never; 2=sometimes; 3=often; and 4=almost always). For children aged 5 to 7 years, the scale was simplified to three points (1=never; 2=sometimes; 3=many times, and each answer was given according to a visual analog scale with a happy, a neutral and a sad face.

Stage 2

The general SF-36 questionnaire translated to Portuguese and adapted to the Brazilian culture⁽¹⁴⁾ was applied to evaluate the impact of the disease on the patients' parents. SF-36 is a multidimensional questionnaire with 36 items divided into 8 scales or domains: functional capacity, physical aspects, pain, general health, vitality, social and emotional aspects and mental health. The final score ranges from 0 to 100, where 0 corresponds to the worst general health and 100, the best⁽¹⁴⁾.

The present instrument version has eight domains grouped into two components: physical and mental. Each item is evaluated by the sum of points (Likert-like scale), and values range from 0 to 100 points. The highest scores correspond to better quality of life. Scores are calculated according to the points of the items in each domain, as well as those of the components that are derivations of the related domains.

Stage 3

The questionnaires were applied to the control group of 50 children and adolescents (5 to 18 years) and their caregivers after the school board granted permission.

For statistic analyses, the Kolmogorov-Smirnov test was used, and results showed that the domain scores were not normally distributed. Therefore, the nonparametric Mann-Whitney test was used to compare domain values. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) 13.0.

Results

The group of patients had 64 girls and 36 boys, and 18 were aged 5 to 7 years, 32, 8 to 12 years; and 50, 13 to 18 years. The control group had 31 girls and 19 boys, and 11 were aged 5 to 7 years; 19, 8 to 12 years; and 20, 13 to 18 years.

PedsQL 4.0 scores for the patients and controls are shown in Table 1. Patient scores in all aspects were significantly lower than those of controls ($p < 0.0001$).

HRQL results for the parents are shown in Table 2. Parents' scores, in all aspects, were significantly lower than those of the control participants ($p < 0.0001$).

Discussion

This study found that SCD is associated with limitations in different aspects of HRQL, particularly physical, social, emotional and school aspects. In all those aspects, PedsQL 4.0 scores were lower than those found for normal children and adolescents of the same age.

This negative impact, particularly in the physical aspect, is associated with pain due to SCD and the overload of work due to the care and attention directed to the child or adolescent with the disease⁽¹⁵⁾. Pain is the complication that has the greatest impact on HRQL of patients with SCD and their families, although its intensity is variable and depends on individual characteristics, family and cultural context and the multi-professional team that is responsible for their health care^(6,16).

Table 1 - Score of the Pediatric Quality of Life Inventory (PedsQL) 4.0 for the three age groups of children and adolescents with sickle cell and healthy controls

	Group of patients		Control group		p-value
	Mean	Standard Deviation	Mean	Standard Deviation	
5–7 years		n= 18		n=11	
Physical	56.16	12.33	91.81	9.36	<0.0001
Emotional	70.55	13.04	96.36	9.24	<0.0001
Social	79.44	12.11	98.18	6.03	<0.0001
School	68.88	11.82	93.63	12.06	<0.0001
8–12 years		n= 32		n=19	
Physical	48.37	13.77	94.10	6.64	<0.0001
Emotional	75.31	12.11	92.89	7.69	<0.0001
Social	72.65	9.50	95.00	7.07	<0.0001
School	65.15	15.78	97.10	6.08	<0.0001
13–18 years		n= 50		n=20	
Physical	42.86	13.77	94.55	6.31	<0.0001
Emotional	71.50	13.41	96.00	6.40	<0.0001
Social	72.10	11.56	95.50	8.09	<0.0001
School	57.60	17.61	94.50	9.30	<0.0001

Table 2 - Score of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) for caregivers of patients with sickle cell disease and for controls

Domain	Group of patients				Control group				p-value
	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Mean	Standard deviation	
Functional capacity	15.0	100.0	54.6	17.2	75.0	100.0	92.6	9.3	<0.0001
Limitations due to physical aspects	0.0	100.0	66.8	41.6	100.0	100.0	100.0	0.0	<0.0001
Pain	0.0	70.0	32.5	16.1	50.0	70.0	51.6	5.5	<0.0001
General health	10.0	95.0	62.4	20.7	90.0	100.0	96.5	4.2	<0.0001
Vitality	10.0	85.0	56.2	16.2	70.0	75.0	72.2	2.5	<0.0001
Social aspects	12.0	100.0	77.5	15.6	87.5	100.0	99.0	3.4	<0.0001
Limitations due to emotional aspects	0.0	100.0	74.9	36.6	100.0	100.0	100.0	0.0	<0.0001
Mental health	40.0	96.0	69.5	17.9	96.0	100.0	97.9	2.0	<0.0001

The negative repercussion in the mental components and domain may be a result of the excessive concerns that caregivers have with the patient's health, of the difficulty in dealing with the disease symptoms and of the possible changes in the family routine because of medical treatments and frequent hospitalizations. These findings indicate that

healthcare workers should have a global understanding of patients and caregivers to promote strategies that have a higher possibility of improving well-being and health^(17,18).

A chronic disease in childhood generates the need of greater parental participation in the care provided to the child and adaptation to new situations along time⁽¹⁹⁾. Even

healthy individuals experience changes in their expectations and in the feeling of well-being along life, and adolescents are less happy with their family relationships than children⁽²⁰⁾.

Palermo *et al*⁽²¹⁾ reported a greater commitment with physical health among adolescents with SCD than among children when they evaluated HRQL of children and adolescents according to their parent. However, Panepinto *et al*⁽²²⁾ did not find any significant differences in HRQL when comparing the scores of children and adolescents with SCD, neither in the physical nor in the psychosocial domains.

According to Silver *et al*⁽²³⁾ and Sloper⁽²⁴⁾, a chronic disease in childhood involves the risk of psychological and psychosocial problems for parents and family members along the years. In a study conducted by Moskowitz *et al*⁽²⁵⁾, the mothers of children with SCD had a higher risk of depression than the mothers of healthy children. Caregivers of patients with SCD usually experience feelings of guilt, anxiety and depression associated with the hereditary aspect of the disease, the medical follow-up and the social and financial demands posed by a chronic disease. Therefore, the caregiver's well being may be compromised, particularly the mental construct. These results support the need to give greater attention and promote more intensively the mental health of these individuals^(17,18,26). Socioeconomic factors affect the quality of life of patients⁽²⁷⁾ with sickle cell disease, as already described in the study conducted by Felix *et al*⁽²⁸⁾ in Uberaba, Brazil.

The socioeconomic condition is related to quality of life, which might have affected the results of this study. However, the control group had the same socioeconomic conditions, which minimized its impact.

In the group of patients with SCD, the survey was not conducted with all patients that were followed up in HEMOAL due to logistic limitations. Moreover, the

exclusion of patients that did not come to the consultation may have affected results, because those patients may have missed because they were hospitalized or were fine and decided not to come to the consultation, or, still, because they were lost to follow-up. The number of painful crises and transfusions in the previous 12 months in children and adolescents, factors that are directly associated with quality of life, were not included in the analysis because that information was not provided by the patients' parents or family member and was not available in the patients charts, as they were not dealt with in HEMOAL. Children and adolescents with SCD are individuals exposed to several factors that may determine a reduction in the physical or psychosocial domains of quality of life. Educational efforts directed to healthcare workers and family members of patients with SCD should be increased to identify the problems associated with their health. Therefore, instruments that can detect some type of risk, such as the PedsQL 4.0, are essential for healthcare workers involved in the treatment of this population. They provide the necessary instruments to interfere precisely in one or more aspects.

The act of taking care demands an overload of attention and intense dedication and, as the family is the main actor in this role, the healthcare team has to ensure that parents have the conditions to reorganize their lives physically and emotionally in face of this new phase of responsibility, because caregivers are the healthcare workers' best allies in the treatment of their patients' health.

Our findings confirmed the need to conduct a more detailed analysis of HRQL of patients with sickle cell anemia. The results of this study showed significant differences between the groups under study, which reinforced the need to promote prevention programs and organize multiprofessional teams.

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