



Health-Related Quality of Life in Lung Transplantation Patients from Israel as Compared with General Population Data: A Pilot Study

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Abstract

Lung transplantation (LT), one of the aims is improving patient's quality of life and survival. Our aim was to assess the impact of LT on health-related quality of life (HRQL) according to the SF-36 questionnaire in a group of 19 post-LT patients from Israel who had undergone lung transplantation more than one year prior to the study. The resulting data was compared with available norm data SF-36 questionnaire results reported in the general population. The results show that patients which were more than one-year (mean 13 ± 5.1 months) post-LT. As compared with norm data, post-LT patients reported significantly lower HRQL scores in 3 of the 8 health domains in the SF-36: Social functioning, physical health, and pain. The post-LT patients reported significantly higher HRQL scores in Vitality and Energy; higher mental health (emotional well-being) HRQL scores and similar HRQL scores in physical functioning, general and emotional health as compared with norm data. Compared with the general population, the significantly lower HRQL scores in 3 health domains as reported by our Israeli post-LT patients calls for additional multidisciplinary resources to support these patients' social functioning, physical health and improve the treatment of pain.

Keywords

Lung transplantation, Quality of life, SF-36 questionnaire

Introduction

Lung transplantation (LT) is an established treatment option for patients with a wide variety of end-stage lung diseases. Survival had been used as the main outcome measure after LT. However, currently one of the clinical aims of LT is to improve both survival and patients' health-related quality of life (HRQL) [1]. Nevertheless, exercise intolerance, functional disability, and peripheral muscle weakness often persist following LT [2-8]. Moreover, HRQL may be the only expected clinical benefit of LT in some indications as COPD, when extended survival is not assured [9]. HRQL is a patient-reported outcome that assesses the patient's perceptions of the impact of the disease and its treatment on their physical, social, functional, and emotional well-being. Numerous studies in recent years have reported on HRQL before and post-LT [10]. However, there is still paucity of studies on HRQL in post-LT patients, due to both the incidence of the procedure and the recipient's limited survival rates [11].

In Israel, this highly complex transplantation procedure is performed each year in 40-50 end-stage lung disease patients, only in one center, at the Rabin Medical Center, Beil-

inson Hospital.

The objective of the present study was to assess the impact of lung transplantation on HRQL in a group of patients from Israel who had undergone lung transplantation more than one year, compared with available norm data from the general population.

Patients and Methods

Sixty Patients who had undergone lung transplantation

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Table 1: Demographic and clinical characteristics of the study group (n = 19).

Age (years)	52 ± 13.9
Male/Female	12/7
Time from Transplantation (months)	13 ± 5.1
Basic lung disease	
Fibrosis	5
Bronchiectasis	2
Cystic Fibrosis	5
Scleroderma	1
Emphysema	6
Type of Transplantation	
SLT	10
DLT	9
BMI (index)	23.8 ± 5.7
Weight (Kg)	67.7 ± 15.7
Height (cm)	168.9 ± 10.9

Abbreviations: BMI: Body Mass Index; DLT: Double Lung Transplantation; SLT: Single Lung Transplantation. Data presented as means and standard deviations at the following measures: Age, Time from transplantation, BMI, Weight, and Height. All other measures are presented as frequencies.

more than one year prior to the study were assessed for eligibility, 41 were excluded (21 not meeting inclusion criteria and 20 declined to participate). They were recruited from the database of post lung transplant patients or at the outpatient clinic of the Pulmonary Institute, Rabin Medical Center, Beilinson Hospital, Petach Tikva, Israel.

Inclusion criteria

At least one year post-LT; clinically stable for at least one month.

Their clinical characteristics are summarized in Table 1.

Study Design

All the data were collected by the same investigator. The study protocol was approved by the institutional ethics committee (The study complied with the principles of the Declaration of Helsinki), and informed consent was obtained from all the subjects.

Assessment of health-related quality of life

The most popular generic HRQL instrument is the short form 36 item health status survey (SF-36). In the present study HRQL was measured by the Hebrew Short-Form (SF-36) Questionnaire [12] which has been used widely in many studies and health service institutions. The SF-36 features physical and mental summary scores, rating on a point scale from 0 to 100 points; the higher the score in each domain, indicates a better HRQL and a 4-point change in the SF-36 questionnaire domains is considered clinically significant.

The SF-36 questionnaire consists of 36-item questions, examining eight health domains:

1. Physical functioning: Limitations in physical activities because of health problems as limited mobility (walking down the street, up the stairs, shopping) and limited activities of daily living (bathing, and dressing etc. requiring assistance).
2. Physical health: Limitations in usual role/work activities because of physical health problems (e.g. lower job performance, necessity to terminate work because of exhaustion, etc.).
3. Emotional health limitations in usual role activities/work performance due to emotional health problems, such as depression and anxiety.
4. Vitality (energy/fatigue) - feelings of exhaustion, fatigue and pessimism, or experience high levels of energy and happiness.
5. General mental health (emotional well-being), situations where the mental and health condition limit social life and activity.
6. Social functioning: Limitations in social activities because of physical or emotional problems with family, friends and at work.
7. Bodily pain (pain)
8. General health perceptions (general health).

All study patients filled out the questionnaires independently. The methodological rules and data analysis from the SF-36 questionnaire have been described previously [13]. The resulting data on the HRQL of the post-lung transplant patients was compared to the published normative data in the general population based on results of the SF-36 questionnaire reported in the Medical Outcomes Study [14]. Notably, even in the general population the maximum result (100 points) is not achieved in any health domain.

Data analysis

Data was presented as means and standard deviations for the following measures: Age, time from transplantation, BMI, weight, and height. The obtained HRQL values were presented as means.

Results

Nineteen patients, 12 male and 7 females were recruited. The lung transplantation was performed in our study group of patients, mainly on patients with idiopathic pulmonary fibrosis (IPF) (5 patients, 26%), emphysema (6 patients, 31%) and cystic fibrosis (CF) (5 patients, 26%). Our study group included 19 patients following LT aged 23-68 years-old, the youngest were the CF patients (Table 1).

A summary of the SF-36 questionnaire results and a comparison with the normal data from the general population are shown in Table 2.

In the physical functioning domain of the SF-36, the re-

Table 2: Summary of the SF-36 questionnaire average scores in post-LT patients and in the general population.

SF-36 Domains	HRQL values in the study group	Average HRQL reported in the general population	The difference in the HRQL values between post-LT patients and the general population
Physical functioning	69.21	70.61	-1.4
Physical health	48.68	52.97	-4.29
Emotional health	63.15	65.78	-2.63
Vitality-energy/fatigue	56.57	52.15	4.42
Mental health/ Emotional Well-being	74.31	70.38	3.93
Social functioning	69.07	78.77	-9.7
Pain	67.76	70.77	-3.01
General health	57.10	56.99	0.11

Categories with the highest difference in the quality of life between patients following LT and the general population are in bold.

sponders' average score of 69.21 can be classified as almost no difficulties with mobility and activities of daily living. Similar compared to the average score of 70.61 in the general population.

In the physical health domain of the SF-36, post-LT patients' average score of 48.68, can be classified as mild limitations with work or activities, as a result of physical health problems. This was significantly lower compared to 52.97, the average score in the general population.

In the emotional health domain of the SF-36, the responders' average score of 63.15, can be classified as mild limitations with work performance due to emotional health problems. Compared to 65.78, the average score in the general population.

In the vitality - (energy/fatigue) domain of the SF-36, the post-LT patients' average score of 56.57, can be classified as no feelings of exhaustion and fatigue, rather experience slightly above average levels of vitality and energy. Which are significantly higher compared to the average score of 52.15, in the general population.

In the general mental health (emotional well-being) domain of the SF-36, the responders' average score of 74.31, can be classified as no limitations in social activities due to mental health problems. Compared to 70.38, the average score in the general population.

In the social functioning domain of the SF-36, the post-LT patients' average score of 69.07, can be classified as mild to moderate reduction in social activities due to health and emotional problems. This was significantly lower compared to 78.77 the average score in the general population.

In the pain domain of the SF-36, the post-LT patients' average score of 67.76, can be classified as a mild problem indicating the presence of pain. This was significantly lower compared to 70.77, the average score in the general population.

In the general health domain of the SF-36, the responders' average score of 57.10, can be classified as no problem with general health. Similar to the average score of 56.99.

in the general population.

Discussion

To the best of our knowledge, the present crossover study is the first to examine the impact of LT on HRQL in a group of patients from Israel, compared with available norm data from the general population. The participants were more than one-year (mean 13 ± 5.1 months) post-LT. The main findings show that adult post-LT patients have exhibited on average lower results in HRQL compared to the general population in HRQL. We found the most significant differences in HRQL compared to the general population were detected in 3 of the 8 health domains: Physical health (lower score by 4.29 points), social functioning (lower score by 9.7 points) and pain (lower score by 3.01 points, almost significant). While on average the study cohort stated significantly higher ratings compared to the general population in Vitality and Energy (higher score by 4.42 points), and similar ratings in physical functioning and emotional and general health. Together, these results could indicate positive improvement following LT.

The one-year benefits sustained regardless of sex, age, type of transplantation and basic lung disease. We observed an improvement post-LT in mental health (emotional well-being), higher than the general population by 3.93 points. It is important to note that SF-36 questionnaire measures global, not disease specific, HRQL. Our results show LT does not confer significant HRQL benefits across all domains. Patients in our study reported higher mental health and vitality domain scores but reported no improvement in social functioning and physical health domains. This suggests that in our group of patients, undergoing lung transplantation had a greater impact on their vitality and mental health. More studies that extend beyond one year are needed to understand the impact of LT on HRQL in this population.

Improvement in HRQL is an important objective of the LT procedure. It has even been suggested that for diseases such as COPD, in which recipient's survival rates are lim-

ited, improving HRQL is one of the primary goal of the LT procedure [9].

Long-term data has demonstrated improved HRQL after LT [15,16]. A two-year follow-up study of post-LT patients found significant improvements on seven of eight subscales in the SF-36, although similar to our results, scores remained below those of the general population [16]. Three to five years after LT, patients reported frequent affective and cognitive problems. Headaches and depression were also more common when compared with patients earlier in their transplant course [16]. These symptoms had a greater influence on women, resulting in a lower gain in quality of life compared to men [17].

Numerous studies have observed improved overall health and HRQL after LT and heart/lung transplantation (HLT) [18-22]. These gains in HRQL tend to be sustained for many recipients, but diminish with complications such as obliterative bronchiolitis (OB) [19,21,23,24]. Van Den Berg, et al. carried out extensive research to examine the relationship between diminished HRQL and the onset of OB [21]. In their study, patients were assessed both cross-sectionally and longitudinally at four months post-transplantation. Although results demonstrated a true association between these events, a causal relationship was not proven [21].

The study by Anyanwu, et al. was one of the first to address the important issue of potential differences in HRQL according to the type of LT procedure, comparing HRQL in single LT (SLT), double LT (DLT), and HLT recipients [22]. They conducted a cross-sectional study of 87 pre-transplant and 255 post-transplant patients and found a greater rate of HRQL improvement among the DLT and HLT recipients, relative to the SLT recipients. The baseline HRQL was found to be lower in the SLT recipients prior to transplant in comparison with the DLT and HLT patients [22]. It is possible that differences in the underlying disease or poorer general health prior to the transplant affected both the choice of transplant procedure and the different HRQL outcomes.

In summary, although the reports about HRQL in post-LT patients are favorable [25], more research is needed to better understand the specific causative factors affecting HRQL in LT recipients.

Limitations of the Study

1. The study results are limited due to the small number of participants combined with the high variability (heterogeneous) between participants, thus to corroborate the current findings, warrants conducting larger cohort studies. Langer, et al. [26] stated one limitation of their study was refusal of almost 40% of eligible candidates to participate. We agree, this low participation rate reflected in the small number of participants in these studies indicates the difficulty in motivating patients to attend participation in research studies following LT. Possible reasons are large travel distances to reach the transplant centers or the large spontaneous improve-

ments, perceived by patients.

2. This study was not a longitudinal pre- and post-transplantation evaluation of patients' HRQL.
3. The side effects of anti-rejection medication and limitations this may bring to post-transplant patients' lifestyle brings an inherent difference to the HRQL of the general population who do not have these limitations or side effects. Further the effects of regular check-ups and limited life expectancy of lung transplant patients makes them difficult to compare to the general population.

Conclusion

Compared with the general population, the HRQL in our adult Israeli LT patients was lower in the following domains of the SF-36 questionnaire: Social functioning, physical health, and pain. Our results call for additional multidisciplinary resources to support patient social functioning, physical health and to make improvements in the understanding and in the treatment of pain. The results of our study could be used as a pilot study for a more extensive study of HRQL in post-LT population, numbers of participants could be raised and a more specific lung disease group targeted at several specific time points after the transplantation. Age differences and differences between SLT and DLT could be also detected.

Financial Disclosure and Conflicts of Interest

None of the authors have financial or other potential conflicts of interest to disclose.

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