Cystic Fibrosis

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Clinical Picture

Cystic fibrosis (CF) is an inherited genetic disease that affects the mucous glands of the lungs, liver, pancreas and intestines, resulting in the production of thick sticky mucous. The disease is caused by a mutation in the cystic fibrosis transmembrane conductance regulator (CFTR) gene on chromosome 7. CF is an autosomal recessive disease that affects males and females equally. The overall prevalence is estimated as little more than one per 10 000 persons. It is most common amongst Europeans and Ashkenazi Jews; one in 22 individuals of European descent is a carrier of one copy of the gene for CF, making it the most common genetic disease in these populations.

Peter, cystic fibrosis

Onset of CF usually occurs during early childhood, although less frequently onset occurs at birth, or later in life. The thick mucus produced in people with CF can clog lungs, obstruct the pancreas and stop natural enzymes from helping the body break down and absorb food. As such, people with CF may present a variety of additional symptoms, including very salty-tasting skin, persistent cough, lung infections, wheezing or shortness of breath, poor growth/weight gain, frequent, greasy, bulky stools or difficulty in passing bowel movements.
The disease is chronic and progressive, causing increasing disability due to multi-organ failure. As such the lifespan of people with CF is shortened. Currently there is no cure for CF and treatment remains symptomatic, revolving around improving drainage of the lungs, antibiotics for lung infections, pancreatic analysis and administration of vitamins and calorie supplements for digestive and nutritional problems.
Lung transplantation may be necessary as CF worsens.

Living With Cystic Fibrosis

CF can vary greatly depending on the individual. Despite this fact, there are many common experiences shared. Nearly all patients with CF need to take daily medication, including inhalations, dietary supplements and enzymes for the duration of their lives to aid breathing and digestion. In addition to daily medication and rehabilitation, a self-care regimen is advised, from regular exercise and avoiding tobacco smoke to frequent hand-washing and daily chest physical therapy. In all, maintaining a healthy routine can be quite exhausting.

As with many illnesses that affect children, a major concern is a desire to feel 'normal'. Symptomatic coughing and frequent trips to the restroom can be disruptive, but with proper education about CF, teachers and adult supervisors can provide a healthy learning environment for children with CF. Furthermore, physical activity should be encouraged for children with CF as it not only helps to develop and strengthen important muscles, but also adds to the 'normal' life the child desires.

'As a parent, you try to not accept the diagnosis, because you are not able to see the disease; you don't see symptoms or particular malformations in an infant with CF.'
Giorgio, parent of a child with CF, Italy

Parents of children with CF can tend to be overprotective, ensuring that medications are always taken on time and limiting time playing outside, yet it is important to encourage independence and self-reliance that will be important as children become adults.

Each year more and more CF patients reach adulthood. At this time, the responsibility for the daily routine of medication and self-care are transferred to the adult CF patient. Patients with CF may have the semblance of a normal life and they may even be able to have children under close supervision by physicians. Nevertheless, they need to cope with the eventuality of an early death. While the average life span is approximately 30 years, life expectancy varies, yet the constant awareness and preparedness for death is a real factor in causing stress and anxiety, allayed by close relationships, understanding and acceptance.

Diagnosis of Cystic Fibrosis

PARTICIPANTS IN THE SURVEY

Responses from 1015 families of patients with CF from nine countries were analysed *(Figure 1)*.

An equal number of female and male patients were represented in the survey (47% and 53%, respectively). The median age of patients at diagnosis was 6 years, although 25% of diagnoses occurred after 5 years of age.

Figure 1
Survey participants affected by CF

AWAITING DIAGNOSIS

Neonatal diagnoses were obtained in 36% of patients, 45% of which resulted from disorders observed during pregnancy or at birth, 31% of which were made following neonatal testing and 17% linked to other cases in the family. For non-neonatal diagnoses, the time elapsed between the first clinical manifestations to diagnosis was nine months for 50% of patients (and as long as three years for 25% of those diagnosed the latest). This time was slightly longer for females than for males. During the quest for diagnosis, more than five physicians were consulted by 21% of families and more than ten physicians by 6% of families. Before obtaining the correct CF diagnosis, another diagnosis was given to 48% of patients, resulting in inappropriate treatments in 77% of patients (medical, 54%; surgical, 2%; psychological or psychiatric, 8%). Misdiagnoses were associated with a longer time to reach a CF diagnosis (12 months versus three months if not misdiagnosed, 24 in the case of a psychiatric misdiagnosis). For 77% of the families, a delay in diagnosis was considered responsible for deleterious consequences. Consequences were associated with a longer time to reach diagnosis (3.9 months in patients without consequences, 18 months for patients reporting personal or familial consequences) *(Figure 2)*.

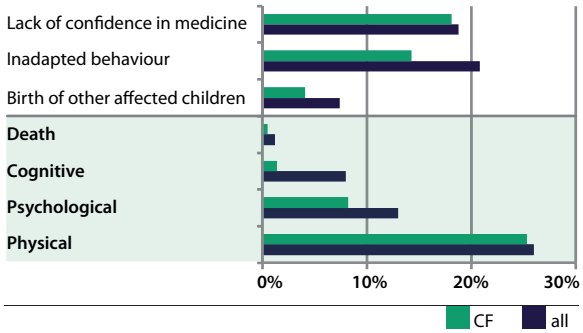

Figure 2 Consequences of delays in diagnosis in CF patients

DIAGNOSIS

Diagnosis of CF was obtained on the basis of clinical (27%), functional (11%), biological (25%) and genetic (17%) data. The structure providing the diagnosis was usually a specialised centre (24%) or other hospital structure (64%). Access to diagnosis required a financial contribution from 38% of families, and was considered a low or moderate contribution by three-quarters of these and a high or very high contribution by one-quarter. A second opinion was sought by 22% of families to confirm the diagnosis.

ANNOUNCEMENT OF DIAGNOSIS

Communication of the diagnosis occurred during a standard private consultation in 68% of cases, but also by phone in 18% *(Figure 3)*. For 17% of patients, diagnoses were given without information on the disease. When provided, the sources were medical in 72% of cases and non-medical in 28%, including patient organisations.

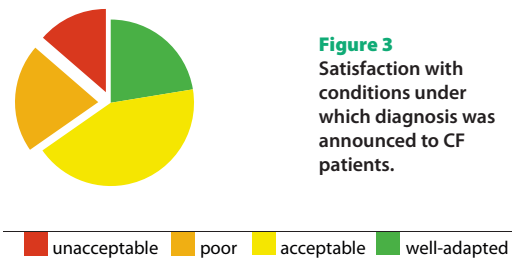

Figure 3
Satisfaction with conditions under which diagnosis was announced to CF patients.

The announcement of diagnosis was accompanied by psychological support in 40% of cases, provided by a psychologist (38%) or a patient organisation member (30%); 86% of families favoured this support.

GENETIC ASPECTS

The genetic nature of the disease was explained to families in 88% of cases, with details about the possibility of other cases in the family in 69% of cases. Genetic counselling was provided for 55% of families. Whether based on the suggestion of a health professional (48%) or not, this information was communicated to the family in 90% of cases either to the parents (63%), grandparents (39%), siblings (79%) or uncles, aunts or cousins (52%). Other diagnoses were identified in 6% of cases and other carriers were identified in 30% of cases following the communication of the diagnosis to family members.

Reactions to Results

A later diagnosis in women than in men is surprising since the life expectancy of women is shorter than that of men among patients with CF. Patients with CF, especially those who experience symptoms later in life, are not taken seriously and told that their symptoms are imaginary. Apart from those who are diagnosed during the neonatal period, many CF patients are not diagnosed until lung function is significantly altered, meaning a portion of the lung is already destroyed. Even after a CF diagnosis has been made, some related complications, such as diabetes, are not considered, despite their well-established associations. Before the possibility of neonatal screening, a delay in diagnosis often resulted in the birth of additional children with the disease. Today, the opposite is true: previously born siblings with CF are diagnosed as a result of the neonatal diagnosis of their newborn brother or sister. Patients vividly remember the announcement of the diagnosis as an unpleasant memory, especially when it occurs in a corridor in haste. It very important that the diagnosis of CF be announced calmly, several times to assure that the reality of the diagnosis is understood. It should be accompanied by psychological support and additional written information on the disease so that patients can have materials to refer to in a day an age when a lot of unreliable information is available on the Internet.

Access to Medical and **Social Services**

PARTICIPANTS OF THE SURVEY

Responses from 539 families of CF patients from seven countries were analysed in the survey *(Figure 4)*.
An equal number of female and male patients were represented (51% and 49%, respectively). The mean age of patients was 18 years (mean age at diagnosis: 4 years).

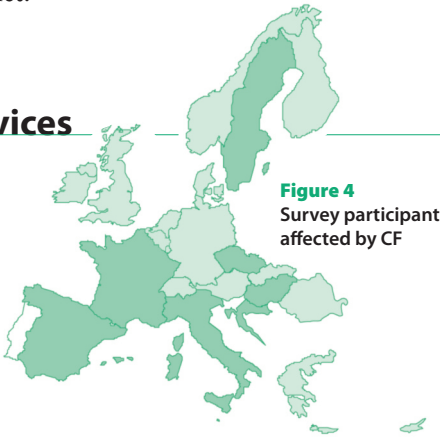

Figure 4
Survey participants affected by CF

NEED FOR MEDICAL SERVICES

Overall, patients with CF needed more than 11 different kinds of medical services related to their disease (more than the average nine medical services for the 16 rare diseases surveyed). In addition to consultations mentioned in Figure 5, consultations of ophthalmology, genetics, immunology, internal medicine, endocrinology, emergency services and hepato-pancreato medicine consultations were also sought by a range of 13% to 19% of patients. The most frequently needed explorations were biological testing (86%), microbiology (78%), radiology (75%), functional testing (69%), ultrasound (54%), specialised imagery (41%) and ECG (29%). As for other care services, physiotherapy (63%), injections (45%) and nursing care (32%) were the most frequently used, followed by dental care, glasses and surgery (by a range of 12% to 28% of patients). Hospitalisation occurred in 62% of patients for an averaged total duration of 29 days.

The importance of home-based care was not investigated in the survey and is very important for the CF patients … more than all the intravenous antibiotic treatments and the physiotherapy treatments.'
Giorgio, parent of a child with CF, Italy

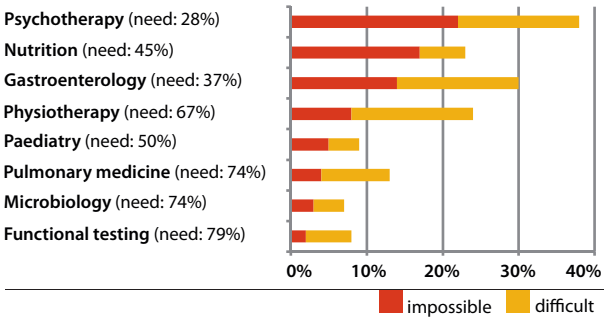

Figure 5 Need for and access to eight representative medical services for CF

ACCESS TO MEDICAL SERVICES

Lack of access to medical services in 7% of situations overall for CF patients

Psychotherapy (22%), nutrition (17%) and gastroenterology (14%) consultations were the most frequently impossible to access for CF patients. A lack of referral was the most frequent cause for impossible access to psychotherapy (52%), gastroenterology (48%), functional testing (43%) and pulmonary medicine (29%) services.

Unavailability of the service was reported as the main barrier to access for microbiology (62%), physiotherapy (50%) and nutrition (55%) services and was a significant barrier for psychotherapy (42%). Personal cost was a hurdle to access for pulmonary medicine (14%) consultations. Waiting time for obtaining an appointment was considered as a significant hurdle for access to pulmonary medicine (21%) consultations. Barriers to access related to the distance from the medical structure were mainly excessive distance for physiotherapy (46%), pulmonary medicine (29%), functional testing (29%), microbiology testing (23%), psychotherapy (21%) and nutrition (20%), and cost of the journey for pulmonary medicine (36%) and physiotherapy (32%). The inability to find anyone to go with was an additional barrier to access for physiotherapy services (25%).

Access to medical services was difficult in 9% of situations

Patients experienced difficult access to gastroenterology (16%), physiotherapy (16%) and psychotherapy (16%) services. The number of appointments for physiotherapy services was considered insufficient in 22% of situations. Personal cost was considered excessive for psychotherapy (32%) and gastroenterology (25%). The assistance of a professional for the journey to a medical structure was very infrequently reported overall (2%).

Satisfaction with medical services

Overall, 94% patients considered that medical services responded fully or partially to their expectations. The level of satisfaction varied slightly according to the kind of medical service, from 97% for microbiology to 87% for psychotherapy *(Figure 6)*.

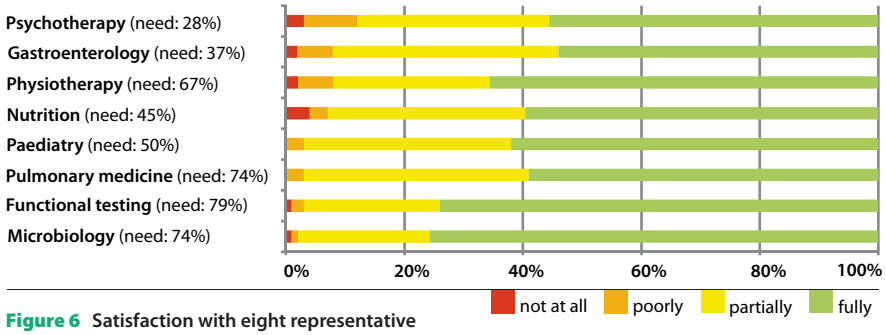

Figure 6 Satisfaction with eight representative medical services for respondents affected by CF

SOCIAL ASSISTANCE

Amongst the 26% of families needing social assistance 6% failed to meet with a social worker and 32% met one with difficulty. As compared to medical services, access to social assistance was more difficult, and the level of satisfaction with this assistance was lower *(Figure 7)*.

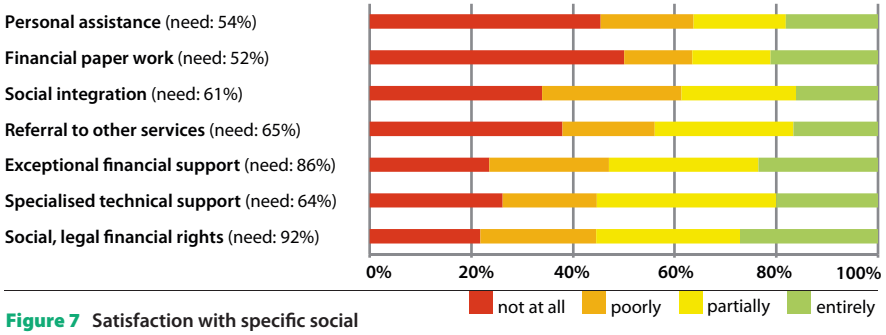

Figure 7 Satisfaction with specific social services for respondents affected by CF

REJECTION

Patients with CF experienced rejection by health professional as frequently (19%) as respondents overall for the 16 surveyed rare diseases (18%). The reluctance of health professionals to treat patients due to the complexity

of their disease was the main cause of rejection (81%) but difficulties in communication was reported by 13% of patients. The frequency and cause of rejection varied according to the patient's country of origin *(Figure 8)*.

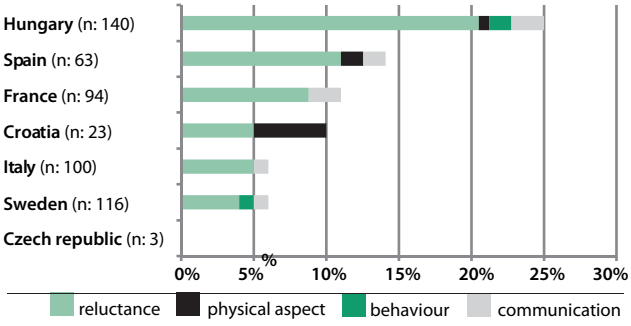

Figure 8 **Cumulated frequencies of causes of rejection by country (n: total number of respondents) in CF. As patients may have been rejected more than once for more than one reason, the total number of rejections exceeds the number of rejected respondents.**

CONSEQUENCES OF THE DISEASE

As a consequence of the disease, 10% of patients had to move house. Amongst these, families most frequently moved to a more adapted house (45%), but also to be nearer to disease specialists (43%) or to be closer to a relative (26%). As a consequence of their disease, a member of the family had to reduce or stop their professional activity to take care of a relative in 48% of situations. In 15% of situations, the patient had to stop work as a result of the disease.

Expectations Regarding **Centres of Expertise** for Rare Diseases

Expectations regarding Centres of Expertise differed somewhat for respondents affected by CF as compared to the overall opinion of survey participants. Respondents affected by CF considered the following functions provided by a Centre of Expertise as the four most essential:

- Coordinating the sharing of medical information on the patient between all professionals who care for him/her in the specialised centre
- Facilitating the follow-up of patients at different stages of their life by easing the passage from paediatric care to adult care, or from adult care to geriatric care
- Communicating with other specialised centres and professional networks to harmonise treatments and research at the national and European levels
- Coordinating the sharing of medical information between professionals of the specialised centre and local professionals, to facilitate the continuity of the patients' follow-up

As a disease diagnosed during the early childhood years, it is not surprising that facilitating the difficult transition from paediatric to adult medical care is considered so important.
Survey participants concerned with CF considered 'offering patients the option of grouping consultations or tests on the same day in the specialised centre,

and organising the appointments' as the fifth most essential function provided by a Centre of Expertise, reflecting the multidisciplinary needs of young patients. CF respondents more frequently expressed the importance of the following statement regarding the implementation of Centres of Expertise: 'Rather than concentrating all the expertise and competences in a single, national centre, sharing them between several centres would be preferable because it is more accessible to patients.'

Reactions to Results

The large number of medical needs goes hand in hand with the complexity of the disease. As the life expectancy of CF patients has increased, new medical needs, such as the management of diabetes, or assistance with family planning, have emerged. Frequent hospitalisations for CF are usually due to the need for antibiotic treatment. When possible, delivery of such treatment at home is preferred, as patients can remain close to family and overall costs can be reduced. In many countries in Europe, access to medical care has greatly improved with the establishment of specialised centres of care for CF. However, long wait times to obtain a consultation remain a barrier to access.

Patients are often refused physiotherapy services when physiotherapists find that their sessions are too demanding. Although psychological services are often offered in specialised centres of care, patients are required to pay for their own psychological services outside the centre if they are not satisfied with the particular psychologist on staff. In these cases, CF patients often forego psychological services.

Social services for CF patients are inadequate. The number of available social workers is insufficient and they lack the expertise about CF to properly address patients' needs. Many CF patients hesitate to seek social services as they assume that they are reserved for the most severe cases of illness or financial need. It is only once they find themselves in more extreme situations that they seek assistance. To avoid this unnecessary deterioration in patients' lives, social assistance should be offered systematically and should be as available as medical services in specialised centres. Sometimes, CF patients feel as though their healthcare providers are only interested in their lungs.