The Clinical Profile of a Young Visually Handicapped Population

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1. Introduction

This paper presents the results of a study done at the low vision clinic at the Institut Nazareth et Louis-Braille in Longueuil, Quebec. The Institute offers rehabilitation services and visual aids to eligible visually impaired persons in western Quebec and serves both a partially sighted and functionally blind population, as defined by Genensky[1,2]. A low vision examination is part of the Institute's admission procedure. Information derived from clinical files offers data on a complete population of visually impaired people, since it includes all levels of visual impairment.

The study comprises data from 514 cases, approximately one fourth of the population served by the Institute, and includes more than 150 variables. For this presentation, we have selected several results which characterize this specific population. To better understand the particular nature of this visually impaired population, a brief look at the provincial program for the visually handicapped is necessary.

The Quebec law stipulates that a person is considered visually handicapped when acuity in each eye is less than 6/21 (20/70) after appropriate correction, with the exception of visual aids, or when the visual field in each eye is less than 60 degrees in the horizontal or vertical meridians. Every person who meets this definition is eligible to receive services from the Ministry of Social Affairs rehabilitation program and the AMEO program, which sees to the distribution of mechanical, electronic and optical aids.

The Institut Nazareth et Louis-Braille is one of the five centers in Quebec which received accreditation for the application of these programs. The rehabilitation services are free, but the aids program is limited by some conditions. Some types of aids, like the long cane, are universal, while some others depend on the patient's age (under 36) or, since 1984, on the need of a particular aid at work or at school. All kinds of aids can be loaned. A more detailed description of these aids is presented by Couturier *et al.*[3].

The introduction of this medicare program was progressive. At first, only those under 19 years of age were eligible. Then the program was extended for those under 36, and finally to everyone at work or at school. A Quebecer who does not respond to these conditions can receive free rehabilitation services, but is not eligible for the AMEO program. However he may buy any aid he wants at a low price. As a consequence of the medicare regulation, the population seen at the Institut Nazareth et Louis-Braille is relatively young.

2. Method

In order to reduce errors in our population sample because of heredo-familial diseases, we have randomly selected a first file, and then systematically every tenth file in alphabetical order. The data considered in this study are limited to the year following admission.

3. Results

Demographic data are presented in Fig. 1. The age (average 32 years and 11 months) is the main characteristic of this population. As shown in the figure, more than half of the population is under 40 years old. This is noteworthy, since on the basis of CNIB's statistics[4] more than one half of the legally blind

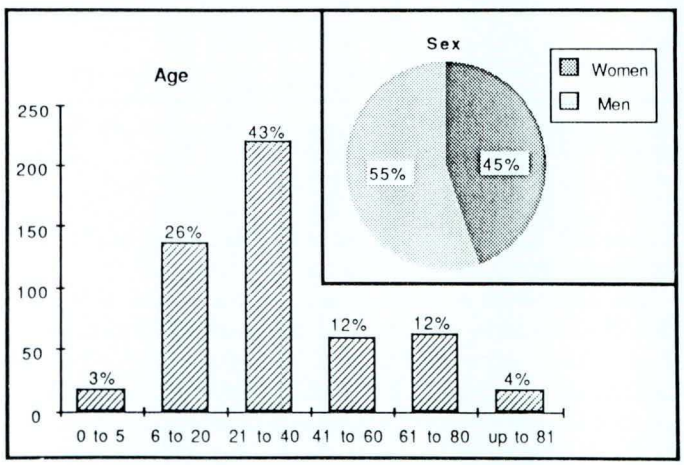

Figure 1. Demographic data (Age and Sex; Population N=514)

population in Canada is over 50 years old. We found a difference between sexes which has already been reported by Faye[5].

The classification of pathologies considering the type and

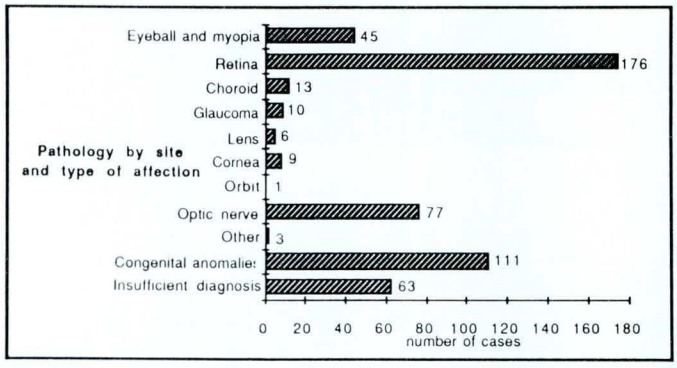

Figure 2. Causes of visual impairment (Population N=514)

location of the disorder is based on the World Health Organization's classification[6]. As shown in Fig. 2, the three main causes of visual impairment are retinal disorders, congenital anomalies and diseases of the optic nerve. When comparing these results with other studies[5,7,8], differences are noted (Fig. 3). The frequencies of the main retinal disorders of the present study are compared to those observed by Faye[5]. The differences in the frequencies of retinitis pigmentosa, macular degeneration and diabetic retinopathy in this study compared to that in Faye's study can be explained by the age difference between the two studies. This is why retinal disorders are seen in 34.24% of cases in the present study compared to 52.12% of cases in Faye's study.

The presence of an associated impairment is found in 7.7% of all cases. Another characteristic of our population is that one

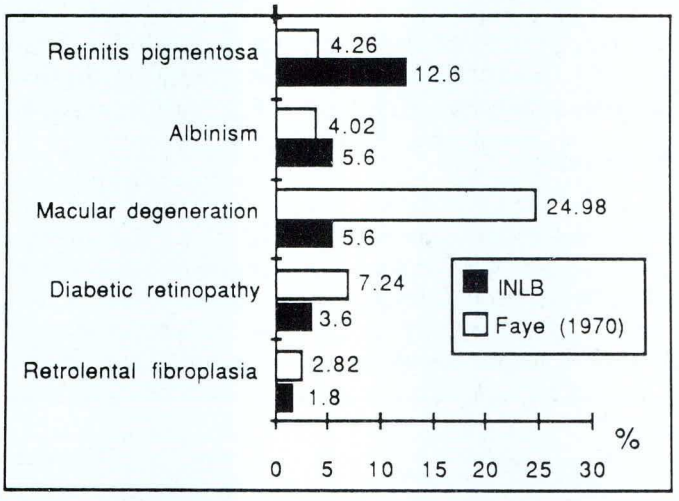

Figure 3. Main pathologies of the retina and comparison with the study of Faye (1970). Retinal pathologies are seen in 34.24% of cases in the present study and in 52.12% of cases in Faye's study.

functionally sighted eye is associated with a functionally blind fellow eye in 12.5% of all cases.

The distribution of the ametropia (both spherical and cylindrical) shows a more accentuated dispersion in our population than with a normal population[9] (Fig.4). The effect of emmetropization seems to be diminished in a visually impaired population. Another interesting fact concerning refraction is that visual acuity after refraction is significantly different from the entrance report's visual acuity recording. Mean acuity according to entrance report data is X = 0.1234 = 6/48 (20/160), while

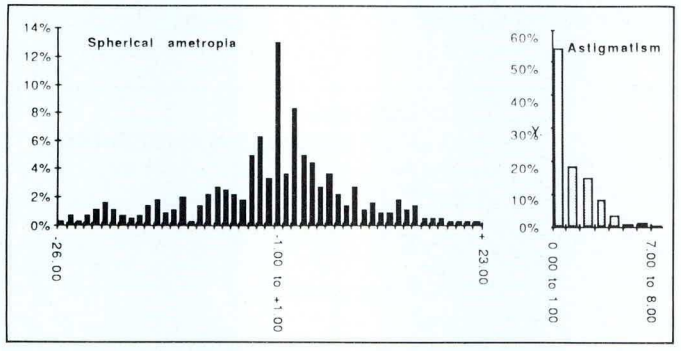

Figure 4. Refractive error distributions

mean acuity after refraction in the low vision clinic is X = 0.1534 = 6/38 (20/125) (T = 4.35 p<0.001 N=299). As mentioned by Faye, the first thing to do for visually impaired people

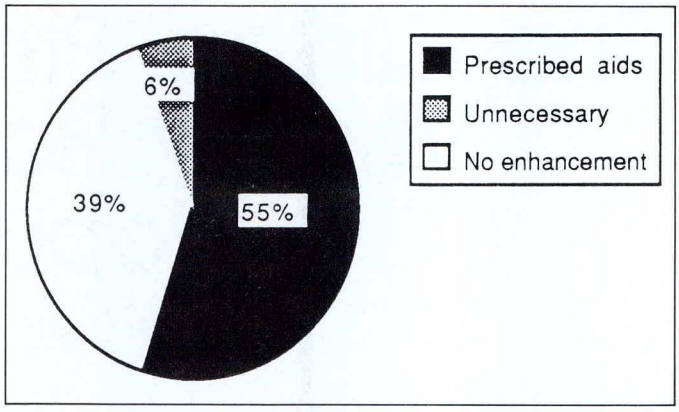

Figure 5. Frequency of prescription of visual aids. Total population (N=514)

is refraction.

The frequency of visual aids prescription is illustrated in Fig. 5. Fifty-five percent of all cases received at least one aid, 39% could not obtain any benefit from them or refused them, while 6% were functional without any visual aid. The percentage of visual aids prescription is lower than the one usually reported[5,10]. This difference can be explained by the fact that the population in the other study was restricted mostly to a functionally sighted population.

Aids for distance vision are prescribed in 36.4% of all cases while near vision aids are prescribed in 46% of all cases. The handheld telescope is the most frequent distance aid prescribed, while the microscope is the most frequent near vision aid used (Fig. 6).

The mean magnification for distance aids is 6.30X. The mean effective magnification, derived from the ratio between visual acuity with and without aid, is 6.38X. The paired T-test between these two variables is not significant at the 5% level; the null hypothesis has to be accepted (T=1.91, p=0.58, N=183). In the same way, the mean magnification for near vision aids is 5.98X while theoretical magnification is 6.083X. The paired T-test is not significant and the null hypothesis has to be accepted (T=0.13, p=0.9, N=218). These two computations have been

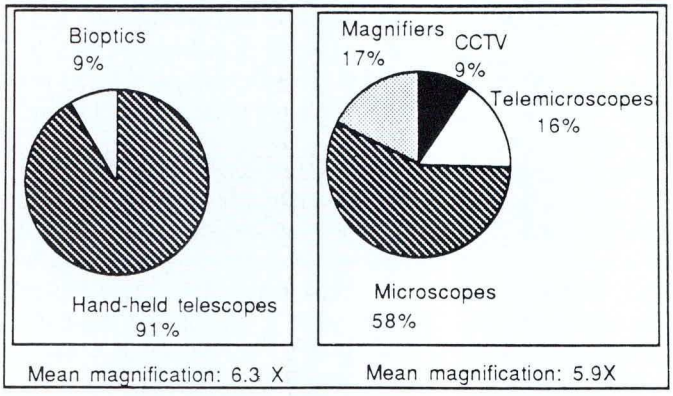

Figure 6. Type of aids prescribed.

done to verify the validity of the formula M=required VA/VA[11]. In both cases, the theoretical calculation of the magnification was useful.

The different levels of impairment based on the WHO's classification[6,12] were determined (Fig.7). Two main fields of impairment are considered: level of visual acuity and the degree of the visual field. The worst level of impairment, between acuity and field readings of the better eye, determine the actual level.

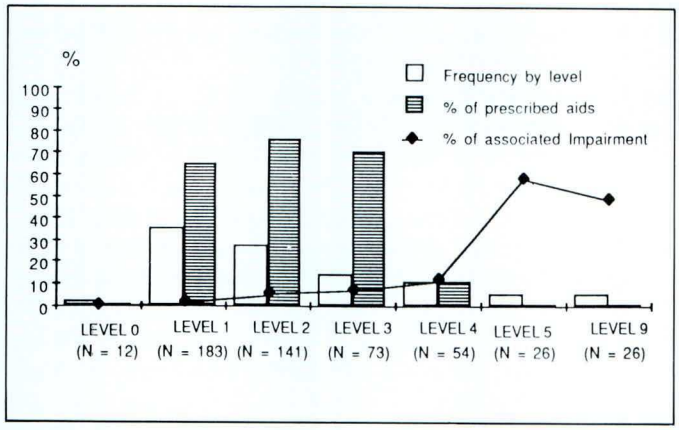

Figure 7. Frequency distribution by level of impairment.

Results show that 2.3% of the patients are not eligible for rehabilitation services, 35.6% are visually impaired without being legally blind, 27.4% of all cases are at level 2, 14.2% are at level 3, 10.5% are at level 4, 5% at level 5 and 5% at level 9. In levels 1 to 5, more than 50% of all people are under 40 years old. At level 9, more than half of the cases are under 10 years old.

The percentage of prescribed aids in each level of impairment is also presented (Fig. 7). The rate of attribution of aids in categories 1 to 3 varies between 65% and 75%. A 10% rate of optical and electro-optical aids is still found at level 4. According to Genensky's classification of impairment[1,2] there is a part of the population at level 4 who are functionally sighted. These people are probably the ones with a severe visual field impairment. Another particularity of our population is the growing occurrence of associated impairment, along with the visual impairment, as shown by the curve of Fig. 7. More details about the clinical management of the different categories of impairment are presented by Couturier *et al.*[3].

Facts about the use of the WHO's classification of impairment in general eye care practice are discussed. There seems

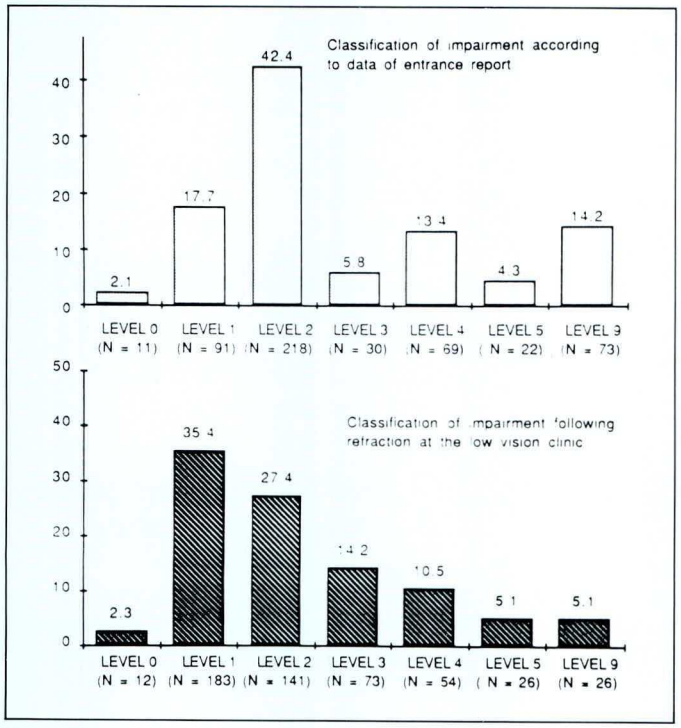

Figure 8

to exist an excessive number of cases in the legally blind categories (Fig. 8). Methods and charts generally used to measure visual acuity are not suited for a person who is visually impaired. Shortcuts for visual acuity measurements such as "count fingers", "hand movement" and so on, are too numerous and influence excessively the number of individuals in levels 4 and 9.

Some entrance reports do not include any quantified measure of visual acuity. However, acuity is measured through a low vision routine (Table 1). The study shows that although 6 eyes were considered as "no light perception", visual acuity obtained at the clinic was shown to vary between 6/2000 (20/6666) and 6/105 (20/350). Fourteen eyes classified as "light perception" were shown to have a visual acuity varying between 6/240 (20/800) and 6/60 (20/200). Four eyes classified as "light projection" obtained a measurement between 6/540 (20/1800) and 6/18 (20/60). The most frequent unquantified visual acuities are "count fingers" and "undetermined". In the first case, the visual acuity measured is between 6/240 and 6/30 (20/800 and 20/100), which excludes the value generally associated with "count finger", 6/360 (20/600). In the second case, "undetermined" readings were noted through a visual acuity range of 6/120 to 6/12 (20/400 and 20/40).

Table 1

Comparison of visual acuity readings between entrance report unquantified data (left) and low vision clinic evaluation data (right).

No light perception	6	0.003 ≥V.A.≥ 0.057 6/2000≥ V.A.>6/105
Light perception	14	0.041≥V.A≥0.1 6/240≥V.A≥6/60
Light projection	4	0.0417≥V.A.≥0.05 6/240≥V.A≥6/120
Hand movement	12	0.0111≥V.A.≥0.333 6/540≥V.A.≥6/18
Count fingers	74	0.0417≥V.A.≥0.2 6/240≥V.A.≥6/30
Undetermined	74	0.0476≥V.A.≥0.5 6/120≥V.A.≥6/12

In conclusion, the data shown here are varied and numerous. The purpose is to present some epidemiological facts about a young visually impaired population, functionally sighted and functionally blind, and a view of the services received by this population in a low vision clinic. The importance of computation of theoretical magnification in a low vision routine is stressed. Some facts about the classification of visual impairment from reports of general eye care practitioners raise the question that too many individuals may be considered as legally blind. The need for standardized methods to measure visual acuity in general eye care practice is brought out. These methods would impact on the quality of refraction and the appropriateness of the level of impairment in which the individual is classified.