

Visual impairment, rehabilitation and International Classification of Functioning, Disability and Health

Deficiência visual, reabilitação e Classificação Internacional de Funcionalidade, Incapacidade e Saúde

Marissa Romano da Silva¹, Maria Inês Rubo de Souza Nobre², Keila Monteiro de Carvalho³, Rita de Cássia Letto Montilha²

ABSTRACT

Objective: To describe the characteristics of people with visual impairment who participated in the Visual Rehabilitation Groups, according to the ICD-10 and the International Classification of Functioning, Disability and Health (ICF). **Methods:** Quantitative, cross-sectional survey, developed in a university rehabilitation research center between October and December 2012. The users from the Visual Rehabilitation Groups were invited; 13 of them agreed to participate. We performed an occupational therapy evaluation – with anamnesis, performance evaluation and functional vision assessment – an analysis of medical charts and patient description with the use of the ICF. **Results:** The major causes of visual impairment were diabetic retinopathy, glaucoma, optical neuritis and keratoconus. Some functions and structures of the body, performance and capabilities in activities and participation, environmental factors facilitators or limiters were highlighted in this study, allowing the description of the characteristics of each participant through the functionality and the improvement of the therapeutic planning. Assistive technologies, optical and non-optical aids used and their everyday benefits were presented. **Conclusion:** Visual loss, at any level, led to functional impairments, limiting and restricting the participation and performance in everyday activities, interfering with the individuals' independence, autonomy and quality of life. However, the use of optical aids, non-optical aids and environmental adaptations proved to be beneficial for increasing the functionality, showing the influence of external factors on the performance. Knowing and recognizing the existence of diversities within the visual impairment universe allows us to understand who the treated individual is, avoiding the generalization by the visual condition. The ICF showed to have a fundamental role in this context.

Keywords: International Classification of Functioning Disability and Health; International Classification of Diseases; Rehabilitation; Blindness; Low vision; Activities of daily living

¹Masters in Health, Interdisciplinary and Rehabilitation Program, Faculdade de Ciências Médicas, Universidade Estadual de Campinas, Campinas (SP), Brazil;

²Centro de Estudos e Pesquisas em Reabilitação “Prof. Dr. Gabriel O.S. Porto”, Faculdade de Ciências Médicas, Universidade Estadual de Campinas, Campinas (SP), Brazil;

³Department of Ophthalmology, Faculdade de Ciências Médicas, Universidade Estadual de Campinas, Campinas (SP), Brazil.

The authors have no public and private financial support, or financial interest

Received for publication 17/06/2014 - Accepted for publication 13/07/2014

RESUMO

Objetivo: Descrever as características das pessoas com deficiência visual participantes de Grupos de Reabilitação Visual, segundo a CID-10 e a Classificação Internacional de Funcionalidade, Incapacidade e Saúde (CIF). **Métodos:** Pesquisa quantitativa de corte transversal, desenvolvida em um centro universitário de pesquisas em reabilitação entre outubro e dezembro de 2012. Usuários de Grupos de Reabilitação Visual foram convidados, sendo 13 os que aceitaram participar. Foi realizada avaliação de terapia ocupacional – com anamnese, avaliação de desempenho e avaliação funcional da visão – consulta aos prontuários e a classificação dos participantes utilizando a CIF. **Resultados:** As principais causas de deficiência visual foram retinopatia diabética, glaucoma, neurite óptica e ceratocone. Algumas funções e estruturas do corpo, desempenho e capacidades em atividades e participação, fatores ambientais facilitadores ou limitadores foram destacados neste estudo, possibilitando descrever as características de cada participante por meio de sua funcionalidade e auxiliando no planejamento terapêutico. Tecnologias assistivas, auxílios ópticos e não ópticos utilizados e seus benefícios cotidianos foram apresentados. **Conclusão:** A perda visual, em qualquer nível, levou a prejuízos funcionais, limitando e restringindo a participação e o desempenho em atividades cotidianas, interferindo na independência, autonomia e qualidade de vida dos sujeitos. Entretanto, o uso de recursos ópticos, não ópticos, auxílios e adaptações ambientais mostraram-se benéficos para a ampliação da funcionalidade, evidenciando a influência de fatores externos no desempenho do indivíduo. Conhecer e reconhecer a existência da diversidade dentro do universo da deficiência visual possibilita entender quem é o sujeito atendido, evitando a generalização pela condição visual, tendo a CIF papel fundamental nesse contexto.

Descritores: Classificação Internacional de Funcionalidade, Incapacidade e Saúde; Classificação Internacional de Doenças; Reabilitação; Cegueira; Baixa visão; Atividades cotidianas

INTRODUCTION

Current estimates of the World Health Organization reveal that there are 314 million visually impaired people in the world – 269 million of these have subnormal vision and 45 million are blind⁽¹⁻³⁾, including uncorrected refractive errors. Etiologies are related to biological and contextual factors, mostly preventable, treatable and curable^(2,4-5), associated to nutritional and infectious factors, lack of available technology, tobacco use, ultraviolet radiation exposure, vitamin A deficiency, high body mass index and metabolic disorders^(1-2,5). The main causes of visual impairment in the world are uncorrected refractive error, cataracts, age-related macular degeneration, diabetic retinopathy, trachoma and corneal opacity^(1-3,5-6).

Vision is an afferent which is able to promote integration with other sensory information. It is a continuous stimulus that enables self-directed and intentional motor conducts, critical to locate and identify distant objects that cannot be captured by other senses, understand spatial relations, the position of the body in relation to space, capture effectively and quickly the environment in safe and confident manner, maintaining proper body posture, among other functions⁽⁷⁻⁹⁾.

Visual loss causes a sensory imbalance, to which the human body itself is not prepared to face, requiring adaptation and support⁽⁷⁾. Thus, any visual impairment affects the individual's health in all its aspects and brings it to functional impairments, generating interference in quality of life⁽⁹⁻¹¹⁾. Activities ranging from independent mobility inside and outside the house, carrying out basic and instrumental daily actions such as bathing, dressing, going to the grocery store or the bank, as well as to social activities, leisure and work, all of them may represent impairment in the daily life of the visually impaired⁽¹¹⁻¹³⁾. Along with the individual limitations there are the physical and social environmental factors that may constitute, respectively, architectural and attitudinal barriers.

Rehabilitation is inserted in this context which can be defined as a process that is built according to the individuals' constant identification of needs and demands, involving their current health condition, interests, context and expectations. Actions in rehabilitation should include the assistance of a

multispecialty team in order to provide timely and complete support to individuals with disabilities^(2,11,14-15). According to the experiences of Lamoureux et al.⁽¹²⁾, Aciem e Mazzotta⁽¹³⁾ e Bittencourt et al.⁽¹⁶⁾, the rehabilitation of the visual impairment has shown to be effective in the improvement of the users' quality life in the services studied.

To assist in this process, the International Classification of Functioning, Disability and Health (ICF) is to establish tasks as a standardized language on health and its conditions, enabling scientific basis for understanding health and its correlated states, comparing health actions on the same subject, helping in the decision making for the individualized rehabilitation process⁽¹⁷⁾. The ICF puts functioning and disability under new perspectives, recognizes disability as a condition not of a minority but as an inherent human experience. Considering the strong influence of the context, it comprehends the relationship of health and environment as dynamic, which may give rise to changes in the health status of the subject. Moreover, it changes the focus in the disease classification since it favors the classification of the impacts of this disease on the individuals' lives⁽¹⁷⁾. The ICF is a milestone in legitimizing the Social Model in health and human rights, enabling communication between the Biomedical and Social Models.

The university research center in rehabilitation involved in this research works on the rehabilitation of the visually impaired. One of the modalities of assistance which are practiced concerns the Visual Rehabilitation Groups, which are proposed to discuss immediate issues related to disability and rehabilitation, enabling participants to share their difficulties and strategies in solving them.

This research was conducted with the aim of describing the characteristics of people with visual impairments, participants in the Visual Rehabilitation Groups, according to the International Classification of Diseases, Tenth Revision (ICD-10) and the ICF.

METHODS

This is a quantitative cross-sectional research, developed in a university research center in rehabilitation.

To participate in the study, the subjects should have the ICD-10 corresponding to visual impairment⁽¹⁸⁾, aged over 18

years and attending the Visual Rehabilitation Group of a university research center. As exclusion criteria is the non acceptance and not signing the consent form.

The users inserted in the Visual Rehabilitation Groups (total = 19), from october to december 2012 were invited, with the elucidated objectives and procedures of the research. Thirteen people agreed to participate in this study.

After the acceptance of those who attended, it was asked on a date and time for signing the consent form and the evaluation of the occupational therapy. At this time, the medical records of each participant were consulted as source of data on the cause of the visual loss, visual acuity and other information related to the eye health. Evaluation of the occupational therapy comprising history, performance evaluation and functional vision assessment was performed.

Such procedures which lasted about 40 minutes were videotaped and analyzed by two examiners, and described using the International Classification of Functioning, Disability and Health (ICF).

The ICF belongs to the family of international classifications developed by the WHO which encompasses aspects of human health and components related to welfare. It describes them in terms of health domains (such as seeing, hearing, and walking) and health-related fields (such as transportation, social interaction). It is proposed to describe situations related to the human functioning and restrictions, as an organizing structure of information in a model that can be "significant, integrated and accessible" ⁽¹⁷⁾.

This classification is divided into two sections, part 1 refers to the functionality and disability and part 2 concerns contextual factors. Each one of the parts is subdivided into two components, which receive specific alphanumeric codes in order to be differentiated: part 1 includes the functions of the body (letter b for *body*), Body Structures (letter s for *structure*) and activities and participation (letter d for *domain*), while part 2 covers the environmental factors (letter e for environment) and personal factors ⁽¹⁷⁾.

The functions and structures of the body relate to physiological functions and anatomical parts of the body, respectively. Problems in the functions and/or structures of the body are considered impairments. Activities and participation include, in this order, the execution of a task by the individual

and his involvement in everyday situations. Difficulties in implementing the activities are called limitations while problems in performing these activities are called participation restrictions. Finally, environmental factors include the physical, social and attitudinal environment in which individuals are placed. For the ICF, all these components interact dynamically, considering functioning, disability and health as an interactive and evolutionary process ⁽¹⁷⁾.

The components of the classification are followed by numerical codes, the first is representative of the number of the chapter (one digit), followed by the second level (two digits) and the third and fourth levels (one digit each). The codes are only complete when adding the qualifier, which indicates the magnitude of the issue. The qualifiers are present after the period (or delimiter). Without the qualifier number, the codes of the ICF have no meaning. The components of part 1 (Body Functions and Structures, Activities and Participation) are qualified by the same general range of numbers (0-4). For the Functions and Structures of the body the qualifier is the magnitude of the impairment. The Structures of the body receive three different levels of qualifiers, the first qualifier for the degree of the commitment generated (0-4), the second corresponds to the nature of structural change (0-7) and finally brings the third location of this change (0-7) (table 1). For the component Activities and Participation are the constructs of this Performance and Capacity. The Performance (first qualifier) is what the subject does in his usual environment, while capacity (second qualifier) is what the subject is able to do in his likely maximum level of functionality without assistance. The third qualifier refers to the level of the subject's ability to perform that activity with assistance. Finally, for the Environmental Factors, qualifiers can be called barriers or facilitators, depending on the effects of that factor in the subject's life. Any barriers as facilitators have the same numerical scale (0-4), but the separation between the code and the domain qualifier takes place by means of a period (.) for barriers and a plus sign (+) for facilitators.

After classification, the results of the participants were described in tables and charts with frequencies of ophthalmic diagnoses, limitations, restrictions, physical and attitudinal environmental barriers ⁽¹⁷⁾.

The study was approved by the Ethics Committee on Research by the ruling n° 143.693/2012.

Table 1
Structures of the body

First qualifier	Second qualifier	Third qualifier
xxx.0 NO Impairment	0 No change in the structure	0 More than one region
xxx.1 LIGHT Impairment	1 Total absence	1 Right
xxx.2 MODERATE Impairment	2 Partial absence	2 Left
xxx.3 SEVERE Impairment	3 Additional part	3 Both sides
xxx.4 COMPLETE Impairment	4 Abnormal dimensions	4 Front part
	5 Discontinuity	5 Back part
	6 Deflected position	6 Proximal
	7 Qualitative changes in the structure, including accumulation of fluid	7 Distal

Source: WHO, 2003

RESULTS

The sample consisted of 13 participants, 54% were female, mean age of 44 years (± 18.42), and a large share of it in relation to the employment condition is off work (62%). The main causes of visual impairment which were presented were diabetic retinopathy, glaucoma, keratoconus and optic neuritis (15% each). With regard to the type of visual impairment, 77%, presented low vision, most of them were acquired (92%) (table 2).

Table 2
Sample characterization

	n=13	
	f	%
Gender		
Female	7	54
Male	6	46
Average age	44 ($\pm 18,42$)	
Marital status	6	46
Married	5	38
Single	1	8
Divorced	1	8
Widow/Widower		
Work Conditions		
On sick leave	8	62
Employed	2	15
Retired	2	15
Unemployed	1	8
Ophthalmic Diagnoss		
Diabetic retinopathy	2	15
Glaucoma	2	15
Optic neuritis	2	15
Keratoconus	2	15
Retinitis pigmentosa	1	8
Macular chorioretinitis	1	8
Age-related macular degeneration	1	8
Central serous maculopathy	1	8
Cortical	1	8
Visual Impairment		
Acquired	12	92
Congenital	1	8
Visual Condition (CID-10)		
H54.0 Blindness in both eyes	3	23
H54.1 Blindness, one eye, low vision in the other	5	38,5
H54.2 Subnormal vision in both eyes	5	38,5

According to the ICD-10, 23% attendees are blind in both eyes (H54.0), 38.5% are blind in one eye and low vision in the other (H54.1) and 38.5% with low vision in both eyes (H54.2) (table 3).

According to the causes of visual impairment, the most affected structures of the eyeball (s220) were: retina (s2203), structure of the cranial nerves (optic nerve, optic tract) (s1106) and cornea (s2201) (table 4).

Table 3
Number of participants by gender, according to visual impairment

Gender	H54.0 ^a		H54.1 ^b		H54.2		Total	
	f	%	f	%	f	%	f	%
Female	1	8	3	23	3	23	7	54
Male	2	15	2	15,5	2	15,5	6	46
Total	3	23	5	38,5	5	38,5	13	100

^aH54.0: Blindness in both eyes; ^bH54.1: Blindness, one eye, low vision in the other; ^cH54.2: Subnormal vision in both eyes

Table 4
Ophthalmologic diagnosis and body structure changes, according to the ICF

Ophthalmologic Diagnosis	Body structure	ICF	n=13	
			f	%
Diabetic Retinopathy	Retina	s2203	2	46
Retinitis Pigmentosa	Retina	1		
Macular Chorioretinitis	Retina	1		
Age-related macular degeneration	Retina	1		
Central serous maculopathy	Retina	1		
Cortical	Optic tract	s1106	1	23
Optic neuritis	Optic nerve	2		
Keratoconus	Cornea	s2201	2	15,5
Glaucoma	Eyeball	s220	2	15,5

With regard to body functions by the ICF classification, the monocular acuity of farsighted vision (b21001) for the right eye (RE) presented 1 subject with moderate disability (.2), 5 individuals with severe disabilities (.3) and other 7 people with complete deficiency (.4), while for the left eye (LE) 7 participants were classified with moderate disability (.2), 3 with severe disabilities (.3) and 3 with complete deficiency (.4) for this domain. For binocular acuity of short-sighted vision (b21002), 1 participant presented no difficulty (.0), another subject presented mild disability (.1), 6 subjects showed moderate disability (.2) and 5 presented complete deficiency (.4). Other body functions related to vision are described in table 5 as functions of the visual field (b2101), light sensitivity (b21020), color vision (b21021), contrast sensitivity (b21022) and quality of the visual image (b21023).

The analysis of the data related to the component activities and participation, the tasks that are highlighted in this study showed higher difficulty within the repertoire of activities of the participants or significant change in the distribution of subjects compared to the performance and the ability to perform each task, with and without assistance. These activities include the areas of Reading (d166) and the accomplishment of the daily chores (d640), and the categories of walking on different surfaces (d4502) and socialization (d9205).

In fields that refer to environmental factors, 4 participants considered the immediate family (e310), extended family (e315) and friends (e320) and their attitudes (e410, e415, e420), as complete facilitators (+4) of process of acceptance of disability, inclusion in the Visual Rehabilitation service and resumption of the daily activities. However, the strangers' individual attitudes (e445) to 9 participants are deemed social barriers such as light

(.1) to moderate (.2). For a participant (S₁₂), the strangers' attitudes represent complete barriers (.4), preventing her from leaving her residence to perform certain activities in the community.

Products and assistive technology for mobility and personal transportation in internal and external environments (e1201) are often used by 5 people and are considered complete facilitators (e1201 +4) for 4 participants. In the case of visual impairment, this device is the white cane. The cane was presented to 8 other participants and they were trained in groups of visual rehabilitation at a university research center, concerning its correct and safe use since they do not use it daily.

Products and assistive technology for communication (e1251), representing specialized writing devices, hardware and software, glasses or contact lenses are used by all the participants to assist in transmitting and receiving information. In addition, all participants reported that they benefit from products and technology used in designing, building and construction (e150), mainly in the categories of entering and exiting public buildings (e1500), such as ramps and level thresholds, and direction, guidance course and designation of places (e1502), using written signs or in Braille signs and embossed surface of the floors.

The intensity of light (e2400) is identified by 8 participants as a barrier such as from moderate (.2) to complete (.4) limiting the involvement and performance in the daily activities. As for the quality of light (e2401), 11 participants reported as a facilitator from moderate (+2) to complete (+4), enabling them to fulfill their activities accurately and safely.

Regarding non-optical devices, all participants reported using them in everyday life, the most cited: light control, use of contrast, aid to writing and electronic magnification, for carrying out the activities, especially reading. Three participants who are blind use a writing guide for signing their names. As for optical devices, 6 participants use these aids. Out of these, 4 participants use the aid for near and 5 use it for far sight.

It is possible to illustrate the CIF rankings in visual impairment through S₁ (table 5). With this example there is an attempt to guide the understanding and comprehension of the ICF domains and their practical applicability.

The first participant, JVC, 67, is married, 3 daughters and, on sick leave, presents the ophthalmic glaucoma diagnosis and ICD-10 of blindness in both eyes (H54.0). According to the ICF, J. presents complete deficiency in all the Functions of the body (.4), since it is a case of blindness. The structure of the body is most affected, according to the diagnosis of glaucoma, the eyeball (s220.473) completely affected (.4) with a qualitative change in the structure, including accumulation of fluid (7), in both eyes (3). Regarding the activities and participation for the activity of reading (d166) J. presents complete constraint (.4) and total participation restrictions (.4). Without the aid of assistive technology, however, when added to the task of using external resources, the participant begins to perform the activities with less limitations (d166.443). In the activity walking on different surfaces (d4502), the participant has considerable limitation (.3) and restriction (.3), but when there is the use of an aid for wandering the performance comes to moderate difficulty (d4502.332). For the activity accomplishing the daily chores (d640) she shows complete limitation (.4), severe restriction (.3), but with the use of aids she shall perform such activities with slight difficulty (d640.431). Lastly, for the activity of socialization (d9205), J. shows severe difficulty (.3), with little restriction (.1), and after the use of resources, her limitation ceases to exist

(d9205.310). For the domains related to environmental factors, S1 is aided by the white cane daily and benefits from this feature completely (e1201+4), while products and assistive technology for communication are used by her (as specialized writing devices, hardware and software), but they facilitate her daily activities moderately (e1251+2). Products and technology used in designing, building and construction for entering and exiting public buildings (e1500), such as ramps and level thresholds are considerable facilitators (e1500+3), enabling her to transit in public buildings with higher security, independence and autonomy. Products and technology used in design, architecture and construction for direction indication, route guidance and designation of places (e1502), using cards in Braille represent for this person, at the time of the evaluation a moderate facilitator (e1502+2) since she has not mastered Braille yet. The intensity of light (e2400) and Quality of light (e2401) for S1 are not considered barriers or facilitators due to their visual condition: blindness in both eyes. J. considers the immediate family (e310), extended family (e315), Friends (e320) and their attitudes as complete facilitators in her everyday life. However, she identifies the strangers' Individual attitudes (e445) as moderate barriers, discouraging both engagement and conducting social activities.

DISCUSSION

This research was conducted with the aim of describing the characteristics of people with visual impairment, rehabilitation group participants, according to the ICD-10 and the ICF. After assessing thirteen participants, and following the ICF's classification, it was possible to identify the causes of visual impairment, the functions and structures of the body with disabilities, the main limitations and constraints faced by these people, the type of disability according to the ICD-10 the frequency of gender, average age, among other characteristics of this population.

It was found that the prevalence of low vision in relation to blindness is compatible with national and international findings (1-3,5-6,19-22). Two major eye diseases found in this study (glaucoma and diabetic retinopathy) are the causes of visual impairment highlighted in Brazilian and global studies with several populations (3,6,19-21,23-26). While glaucoma and age-related macular degeneration are the major causes of visual impairment in subjects from 50 years old on, Brazilian studies highlight these diseases in this age group (4,20,23).

According to the WHO (6), the number of individuals over 50 years old exceeds the visually impaired other age groups. However, there is the small number of people over this age inserted in the Visual Rehabilitation Groups (n = 3) and that may be the cause of such low demand for health services. The group of people, mostly elderly, with high predisposition to acquire diseases and high need for the access to the health services, is not being assisted due to low demand, either by distance from places of care, poor financial conditions or inadequate and little stimulating support from the family (4,27-28).

The architectural and attitudinal barriers found in cities as they can be seen in the social nucleus may discourage the subject to seek services. The search for rehabilitation is delayed if the network does not encourage support, if the barriers are limiting and if there is not easy access to the health care services, to all of these there is the visual impairment itself, which is limiting and imposes restrictions as identified in this study (28). In a study by

Table 5
Characteristics of the subjects according to ophthalmologic diagnosis, ICD-10 and ICF

Diagnosis	ICD-10	Body functions	Body structures	ICF Activities and participation	Environment factors	
S ₁ Glaucoma	H54.0	b21001.4 (RE*) b21001.4 (LE**) b21002.4 b2101.4 b21020.4 b21021.4 b21022.4 b21023.4	s1106.423 s 220.473	d166.443 d4502.332 d640.431 d9205.310	e1201+4 e1251+2 e1500+3 e1502+2 e2400.0 e2401+0 e310+4 e315+4 e320+4 e410+4 e415+4 e420+4 e445.2	J.V.C., female, 67 years old, married, 3 daughters, on sick leave
S ₁ Glaucoma	H54.0	b21001.4 (RE) b21001.4 (LE) b21002.4 b2101.4 b21020.4 b21021.4 b21022.4 b21023.4	s1106.423 s220.473	d166.443 d4502.321 d640.221 d9205.220	e1201+4 e1251+1 e1500+2 e1502+1 e2400.0 e2401+0 e310+4 e315+4 e320+4 e410+4 e415+4 e420+4 e445.0	A.M.S., male, 74 years old, widower, 7 children, retired
S ₃ Optic Neuritis	H54.0	b21001.4 (RE) b21001.4 (LE) b21002.4 b2101.3 b21020.3 b21021.3 b21022.3 b21023.3	s1106.423	d166.432 d4502.320 d640.221 d9205.332	e1201+4 e1251+2 e1500+3 e1502+4 e2400.3 e2401+3 e310+3 e315+3 e320+2 e410.1 e415+3 e420+2 e445.2	V.V.S., male, 47 years old, divorced, 3 daughters, on sick leave
S ₄ Diabetic retinopathy	H54.1	b21001.4 (RE) b21001.2 (LE) b21002.2 b2101.1 b21020.1 b21021.0 b21022.0 b21023.2	s2203.273	d166.221 d4502.110 d640.310 d9205.100	e1201+3 e1251+4 e1500+3 e1502+4 e2400.2 e2401+4 e310+4 e315+4 e320+3 e410+4 e415+4 e420+3 e445.0	J.M.R., male, 31 years old, single, 1 son, on sick leave

Diagnosis	ICD-10	Body functions	Body structures	ICF Activities and participation	Environment factors	
S ₅ Diabetic retinopathy	H54.1	b21001.4 (RE) b21001.2 (LE) b21002.2 b2101.0 b21020.0 b21021.0 b21022.0 b21023.2	s2203.273	d166.210 d4502.210 d640.110 d9205.310	e1201+1 e1251+4 e1500+1 e1502+3 e2400.2 e2401+4 e310+4 e315+4 e320+4 e410+4 e415+4 e420+4 e445.1	R.C.G., female, 29 years old, single, pedagogue
S ₆ Retinitis pigmentosa	H54.1	b21001.4 (RE) b21001.2 (LE) b21002.2 b2101.2 b21020.0 b21021.2 b21022.3 b21023.1	s2203.411(RE) s2203.222(LE)	d166.221 d4502.320 d640.110 d9205.300	e1201+1 e1251+2 e1500+1 e1502+3 e2400.2 e2401+3 e310+4 e315+3 e320+2 e410+4 e415+3 e420+2 e445.2	E.A.A., female, 34 years old, single, 1 son, cleaner
S ₇ AMD	H54.1	b21001.4 (RE) b21001.2 (LE) b21002.2 b2101.2 b21020.0 b21021.0 b21022.1 b21023.2	s2203.223	d166.311 d4502.221 d640.110 d9205.200	e1201+0 e1251+3 e1500+3 e1502+3 e2400.1 e2401+3 e310+4 e315+3 e320+2 e410+4 e415+4 e420+2 e445.0	B.P., female, 83 years old, single, retired.
S ₈ Optic neuritis	H54.2	b21001.3 (RE) b21001.3 (LE) b21002.4 b2101.2 b21020.3 b21021.0 b21022.2 b21023.3	s1106.323	d166.331 d4502.321 d640.211 d9205.332	e1201+4 e1251+2 e1500+4 e1502+4 e2400.4 e2401+3 e310+4 e315+4 e320+3 e410+4 e415+4 e420+3 e445.1	H.M.V., male, 33 years old, married, 1 daughter, on sick leave

Diagnosis	ICD-10	Body functions	Body structures	ICF Activities and participation	Environment factors	
S₉ Macular C chorioretinitis AO	H54.2	b21001.2(RE) b21001.2 (LE) b21002.0 b2101.2 b21020.0 b21021.0 b21022.0 b21023.1	s2203.223	d166.110 d4502.110 d640.100 d9205.000	e1201+0 e1251+4 e1500+2 e1502+3 e2400.0 e2401+4 e310+4 e315+4 e320+4 e410+4 e415+4 e420+4 e445.2	F.S.A., female, 29 years old, married 1 son, unemployed
S₁₀ Central serous maculo pathysequel	H54.2	b21001.3 (RE) b21001.3 (LE) b21002.4 b2101.3 b21020.2 b21021.0 b21022.2 b21023.3	s2203.373	d166.331 d4502.320 d640.221 d9205.332	e1201+0 e1251+4 e1500+1 e1502+3 e2400.4 e2401+3 e310+4 e315+4 e320+4 e410+4 e415+3 e420+3 e445.2	D.C.F., male, 43 years old, married, 2 daughters, on sick leave
S₁₁ Keratoconus	H54.2	b21001.3 (RE) b21001.2 (LE) b21002.2 b2101.0 b21020.2 b21021.0 b21022.1 b21023.2	s2201.263	d166.110 d4502.220 d640.321 d9205.320	e1201+1 e1251+4 e1500+2 e1502+4 e2400.3 e2401+4 e310+4 e315+4 e320+3 e410+4 e415+4 e420+3 e445.2	R.D.A.A., male, 48 years old, single, on sick leave
S₁₂ Keratoconus	H54.2	b21001.3 (RE) b21001.2 (LE) b21002.1 b2101.0 b21020.1 b21021.0 b21022.1 b21023.3	s2201.263	d166.110 d4502.221 d640.211 d9205.310	e1201+2 e1251+4 e1500+3 e1502+4 e2400.2 e2401+4 e310+4 e315+4 e320+3 e410+4 e415+4 e420+3 e445.4	

Diagnosis	ICD-10	Body functions	Body structures	ICF		
				Activities and participation	Environment factors	
S ₁₃ Cortical	H54.2	b21001.3(RE)	s1106.452	d166.220 d4502.220 d640.110 d9205.221	e1201+0	M.V.C.B., female, 33 years old, married, pregnant, on sick leave
		b21001.3(LE)			e1251+4	
		b21002.2			e1500+3	
		b2101.2			e1502+3	
		b21020.0			e2400.1	
		b21021.0			e2401+2	
		b21022.0			e310+4	
		b21023.3			e315+4	
					e320+4	
					e410+4	
	e415+4					
	e420+3					
	e445.2					

(* RE: right eye; (**) LE: left eye

Douglas et al. ⁽²⁹⁾, the social and individual barriers found in the sample population prevented considerably the frequent outing of these people from their homes, the public transport was identified during the study as a major barrier in the subjects' daily basis activities, besides the challenge to create awareness among the visual impaired population who sees the restraints of mobility as inherent to their condition, thus failing to access the health services.

The visual functions with disabilities which were here presented implicated, at various levels, the activities and participation of the users, either under limiting or even disabling forms, these implications were also identified in studies of Marback, Temporini & Kara-Júnior ⁽¹¹⁾ and Aciem & Mazzotta ⁽¹³⁾. However, from the analysis of the obtained results it can be seen that the use of optical and non-optical devices were shown to be an effective aid for increasing the functionality with improved performance and participation in the daily activities and they can lead to increased self-esteem and social participation, as evidenced in other national and international researches ^(13,24,30-32). In the research conducted by Carvalho et al. ⁽²³⁾, the optical devices prescribed for the visually impaired old people, after the assessment and knowledge of the visual category of each individual, their individual needs and aspects of their daily life, they helped in improving the functional performance and were recognized by the elderly as valid resources for managing their everyday activities.

The findings of this study allow us to highlight the Basic Activities of Daily Life (ADLs), such as functional communication (d166), functional mobility (d4502) and socialization (d9205), were more implicated in this group of participants, than the Instrumental Activities of Daily Living such as household chores (d640). Although ADLs are less complex activities – in relation to required skills, the participants at the time of the survey are in the beginning of the rehabilitation process.

Owsley et al. ⁽³³⁾, during the tracking of the vision rehabilitation services in the United States and the characteristics of the population assisted, found that reading is a performing task that is more compromised, about 85.9% of assisted subjects presented difficulty in reading, so as in this study, in which 76.92% presented impairment in the reading performance from moderate (.2) to complete (.4). When it comes to mobility (41.2%)

and household chores (39.1%), these activities are shown as difficult to implement, though less prominently ⁽³³⁾.

The performance data of socialization, in which 7 people reported severe difficulty and 1 person complete difficulty in social performance (d9205), meets Cunha's and Enumo's speech ⁽⁸⁾, which argues that deficiency leads to social losses. For other participants evaluated and ranked, social environmental factors are not barriers to their acceptance and engagement in activities, but facilitators. On the other hand, there are physical environments that are not prepared to receive the visually impaired, causing limitations and restrictions on the participation of people in public and private environments, creating real barriers, interfering with the right to come and go, and as mentioned previously, discouraging the access to and search for health services ^(4,27-29).

The context of the health network, which is highlighted here, refers to the rehabilitation of the visual impaired. The rehabilitation goes beyond empowering, training or presenting resources, techniques and strategies to the individuals in dealing with their environment. It aims to take actions to facilitate and promote their social inclusion and integration, enabling the individuals to perform daily with autonomy, independence and quality of life. Visual rehabilitation groups stand for sources of experience for the participants, legitimizing capabilities, the possibilities for action, assisting in the reconstruction of their personal and social identities ⁽¹³⁾. It is important to highlight that the family members participate actively in some meetings, so they are constantly guided and kept close. The rapprochement of the family during the rehabilitation process is essential for the engagement, attendance and stimulation of the visually impaired.

The visual loss at any level, studied in this research, was the cause of the functional impairment, regarding the independence of the activities in the daily living and, consequently, the quality of life of the individuals. In order to enable the participants to reach their maximum functionality and their well-being it is crucial in the habilitation and rehabilitation care process to count on a multi-skilled team and knowledge in order to encompass the individual as a whole being and rehabilitate him effectively ^(2,11-15,33). This wide and global approach is carried out at the research center as well as in the approach of the Visual Rehabilitation Group from the assessment until the discharge process. This

approach leads the therapeutic goals to be plotted according to the user's individual needs in all aspects and his rehabilitation is closely monitored and is planned properly.

The archaic concept of disability as irreversible condition and applied to small groups that should be medicalized and rehabilitated to bring the individual to the maximum of the expected standard of functionality, brings forth - and still does - discrimination and segregation.

In order to educate society that disability is inherent to the human diversity, constant actions are required and performed. Another significant struggle within the universe of disability refers to the different forms of limitations and the constraints that are usually faced. Impaired people experience their disabilities in different ways; they perform and participate in their daily activities on their own terms due to their personal factor, preferences, settings, facilitators, barriers, different history and culture. The lack of understanding that the same deficiency leads to various restrictions and limitations for each person who experiences it may lead to misconceptions, myths and prejudices in several areas, whether educational, legislative, financial, technological. It is precisely the importance of researching on the diversity within human diversity, i.e., within the peculiarities of the visual impairment, which are based on the rehabilitation process. It is this diversity that is the source of action in health. To research the diversity is to seek forms of intervention based on the needs and individualized demands.

An example of diversity within the universe of visual impairment can be seen in Table 5. The S_3 individual, considered blind in both eyes (H54.0), compared to S_1 and S_2 , both with blindness in both eyes by the ICD-10, has less limiting and restrictive functional responses related to the visual impairment. When the same individual (S_3) is compared to S_8 and S_{10} , considered visually impaired with low vision in both eyes (H54.2), his performance and ability to perform daily activities is similar or slightly lower. These different responses within this universe allow the understanding about the individual who is assisted by the clinic such as his singularities. It is extremely important to plan the rehabilitation conduct preventing the generalization by the visual condition. The ICF has an essential role in this context, since it comes to discuss, extend and articulate the concepts about disability.

Used as a tool in this study, the ICF proved to be a suitable tool for classifying visual disabilities that should be incorporated into the professional practice in the health field in order to guide actions centered on the needs of the individual with low vision or blindness, to turn the rehabilitation process individualized and effective. It is suggested that the ICF does not guide actions alone, but combined with other standardized structured and semi-structured assessment and mainly with the observation and approach to the subject assisted to improve strategic interventions that may be conducted.

CONCLUSION

The visual loss, at any level, led to functional impairments, limiting and restricting the individuals' participation and performance in the daily activities interfering with their independence, autonomy and their quality of life. However, the use of optical resources, non optical, aids and environmental adaptations proved to be beneficial for increasing the

functionality, showing the influence of external factors on the individual's performance.

Knowing and recognizing the existence of diversity within the universe of visual impairment allows the understanding who the assisted subject is, avoiding the generalization by the visual condition. From this research it was possible to describe the characteristics of each individual diagnosed with visual impairment according to the ICD-10, and classify him according to the ICF. This process showed that the classification in the ICF favors the rehabilitation conduct since it covers the individual in his particularities and context, reaching his individual sphere that is embedded in a socio-cultural context historiography, based in unique and complex needs.

REFERENCES

1. World Health Organization. Vision 2020 – The Right to Sight: Global initiative for the elimination of avoidable blindness – Action plan 2006-2011 [Internet]. 2007 [cited 2012 Oct 13]. Available from: http://www.who.int/blindness/Vision2020_report.pdf.
2. World Health Organization. Action Plan for the Prevention of Avoidable Blindness and Visual Impairment - 2009-2013 [Internet]. 2010. [cited 2012 Oct 10]. Available from: http://www.who.int/blindness/ACTION_PLAN_WHA62-1-English.pdf.
3. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *Bull World Health Org.* 2008; 86(1):63-70.
4. Salomão SR, Mitsuhiro MR, Belfort Jr R. Visual impairment and blindness: an overview of prevalence and causes in Brazil. *An Acad Bras Ciênc.* 2009; 81(3):539-49.
5. World Health Organization. Visual impairment and blindness [Internet]. Updated October 2013. [cited 2012 July 20] Available from: <http://www.who.int/mediacentre/factsheets/fs282/en/>.
6. World Health Organization. Global data on visual impairment 2010. [Internet]. WHO; 2012. [cited 2012 Oct 10]. Available from: <http://www.who.int/blindness/Globaldatafinalforweb.pdf>.
7. Sanchez PA. Deficiências visuais e psicomotricidade: teoria y práctica. Madrid: Organización Nacional de Ciegos Españoles, Sección de Educación, 1994.
8. Cunha AC, Enumo SR. Desenvolvimento da criança com deficiência visual (DV) e interação mãe-criança: algumas considerações. *Psicol Saúde Doenças.* 2003;4(1):33-46.
9. Mancini MC, Braga MA, Albuquerque KA, Ramos TM, Chagas PS. Comparação do desempenho funcional de crianças com visão subnormal e crianças com desenvolvimento normal aos 2 e 6 anos de idade. *Rev Ter Ocup Univ São Paulo.* 2010;21(3):215-22.
10. West SK, Rubin GS, Broman AT, Muñoz B, Bandeen-Roche K, Turano K. How does visual impairment affect performance on tasks of everyday life? *Arch Ophthalmol.* 2002;120(6):774-80.
11. Marback R, Temporini E, Kara-Júnior N. Emotional factors prior to cataract surgery. *Clinics.* 2007;62(4):433-8.
12. Lamoureux EL, Pallant JF, Pesudovs K, Rees G, Hassell JB, Keeffe JE. The effectiveness of low-vision rehabilitation on participation in daily living and quality of life. *Invest Ophthalmol Vis Sci.* 2007; 48(4):1476-82.
13. Aciem TM, Mazzotta MJ. Autonomia pessoal e social de pessoas com deficiência visual após reabilitação. *Rev Bras Oftalmol.* 2013; 72(4):261-7.
14. Steiner WA, Ryser L, Huber E, Uebelhart D, Aeschlimann A, Stucki G. Use of the ICF model as a clinical problem-solving tool in physical therapy and rehabilitation medicine. *Phys Ther.* 2002; 82(11):1098-107.
15. Sampaio MW, Haddad MA. Avaliação oftalmológica da pessoa com baixa visão. In: Sampaio MW, Haddad MA, Costa Filho HA, Sialyly MO. Baixa visão e cegueira: os caminhos para a

- reabilitação, a educação e a inclusão. Rio de Janeiro: Cultura Médica; Guanabara Koogan; 2010. p. 45-50.
16. Bittencourt ZZ, Montilha RC, Gasparetto ME, Temporini ER, Carvalho KM. Diabetic retinopathy and visual disabilities among patients in a rehabilitation program. *Rev Bras Oftalmol.* 2011;70(6):342-8.
 17. Organização Mundial da Saúde. CIF: Classificação Internacional de Funcionalidade, Incapacidade e Saúde. Tradução: Centro Colaborador da Organização Mundial da Saúde para a Família de Classificações Internacionais. São Paulo: EDUSP; 2003.
 18. Organização Mundial da Saúde. Classificação Estatística Internacional de Doenças e Problemas Relacionados à Saúde: CID-10 Tenth review. Translation: Centro Colaborador da Organização Mundial da Saúde para a Classificação de Doenças em Português. 3a ed. São Paulo: EDUSP; 1996.
 19. Resnikoff S, Pascolini D, Etya'Ale D, Kocur I, Pararajasegaram R, Pokharel GP, Mariotti SP. Global data on visual impairment in the year 2002. *Bull World Health Organ.* 2004; 82(11):844-51.
 20. Schellini SA, Durkin SR, Hoyama E, Hirai F, Cordeiro R, Casson RJ, et al. Prevalence and causes of visual impairment in a Brazilian population: The Botucatu Eye Study. *BMC Ophthalmology.* 2009;9:8.
 21. Resnikoff S, Keys TU. Future trends in global blindness. *Indian J Ophthalmol.* 2012; 60(5):387-95.
 22. Dandona L, Dandona R. What is the global burden of visual impairment? *BMC Medicine.* 2006; 4:6.
 23. Carvalho KM, Monteiro GBM, Isaac CR, Shiroma LO, Amaral MS. Causes of low vision and use of optical aids in the elderly. *Rev Hosp Clín Fac Med São Paulo.* 2002;59(4):157-160.
 24. Rosenberg EA, Sperazza LC. The visually impaired patient. *Am Fam Physician.* 2008; 77(10):1431-6.
 25. Weih LM, VanNewkirk MR, McCarty CA, Taylor HR. Age-specific causes of bilateral visual impairment. *Arch Ophthalmol.* 2000; 118(2):264-9.
 26. Yau JW, Rogers SL, Kawasaki R, Lamoureux EL, Kowalski JW, , Chen SJ, Dekker JM, Fletcher A, Grauslund J, Haffner S, Hamman RF, Ikram MK, Kayama T, Klein BE, Klein R, Krishnaiah S, Mayurasakorn K, O'Hare JP, Orchard TJ, Porta M, Rema M, Roy MS, Sharma T, Shaw J, Taylor H, Tielsch JM, Varma R, Wang JJ, Wang N, West S, Xu L, Yasuda M, Zhang X, Mitchell P, Wong TY; Meta-Analysis for Eye Disease (META-EYE) Study Group. Global prevalence and major risk factors of diabetic retinopathy. *Diabetes Care.* 2012; 35(3):556-64.
 27. Sawyer DO, Leite IC, Alexandrino R. Perfis de utilização de serviços de saúde no Brasil. *Ciênc Saúde Coletiva.* 2002;7(4):757-76.
 28. Temporini ER, Kara-Júnior N, Kara-José N, Holzchuh N. Popular beliefs regarding the treatment of senile cataract. *Revista de Saúde Pública.* 2002; 36(3):343-9.
 29. Douglas G, Pavey S, Corcoran C, Clements B. Evaluating the use of the ICF as a framework for the interviewing people with a visual impairment about their mobility and travel. *Br J Visual Impairment.* 2012;30(1):6-21.
 30. Lucas MB, Leal DB, Tavares SS, Barros EA, Aranha ST. Condutas reabilitacionais em pacientes com baixa visão. *Arq Bras Oftalmol.* 2003; 66(1):77-82.
 31. Montilha RC, Temporini ER, Nobre MI, Gasparetto ME, Kara-José N. Utilização de recursos ópticos e equipamentos por escolares com deficiência visual. *Arq Bras Oftalmol.* 2006;69(2):207-11.
 32. Haddad MA, Sampaio MW, Haddad M, et al. Auxílios para baixa visão. In: Sampaio MW, Haddad MA, Costa Filho HA, Sialy MO. Baixa visão e cegueira: os caminhos para a reabilitação, a educação e a inclusão. Rio de Janeiro: Cultura Médica; Guanabara Koogan; 2010. p.113-39.
 33. Owsley C, McGwin Jr G, Lee PP, Wasserman N, Searcey K. Characteristics of low-vision rehabilitation services in the United States. *Arch Ophthalmol.* 2009;127(5):681-9.

Corresponding of author:

Rua Primo Chiorlin, nº 80
 CEP: 13105-556 – Campinas (SP), Brazil
 E-mail: marissaromano.to@gmail.com