
A leitura de pessoas com baixa visão adquirida sob o processo de reabilitação*

Reading of people with acquired low vision under the rehabilitation process*

La lectura de personas con baja visión adquirida en el proceso de rehabilitación*

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Resumo

Objetivo: determinar como sujeitos com baixa visão adquirida que participaram do processo de reabilitação utilizam a leitura em sua vida diária. **Método:** A investigação foi realizada através de pesquisa descritiva e transversal. A população foi composta por sujeitos com baixa visão adquirida que participaram do Programa de adultos e adolescentes de Reabilitação do CEPRE /FCM /Unicamp em 2008. Foi aplicado um questionário por entrevista, desenvolvido por pesquisa exploratória. **Resultados:** População constituída por 30 sujeitos. Verificou-se que a maioria dos indivíduos (75,2%) declarou não ser capaz de compreender o texto na primeira vez em que lê, mas apenas 68,7% da população declarou ter a necessidade de ler o texto novamente. Os motivos que levaram 30,0% dos indivíduos a abandonar a leitura foram a dificuldade de ver e a fadiga ocular. **Conclusão:** O abandono de atividades de leitura e a dificuldade para entender o texto, justificam a necessidade de enfatizar o trabalho de leitura durante o processo de reabilitação.

Palavras-chave: baixa visão, leitura, auxílios ópticos e não ópticos, reabilitação.

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Abstract

Aim: to determine how subjects with acquired low vision that participated in the rehabilitation process used reading in their daily life. **Method:** Investigation was performed through descriptive and transversal survey. Population was composed of 30 subjects with acquired low vision that underwent the Adults and Teens Rehabilitation Program of Cepre/FCM/Unicamp in 2008. A questionnaire was applied through interview, resulting from exploratory survey. **Results:** Most subjects (75,2%) declared they are not able to comprehend the text on the first reading, but only 68,7% of this population declared having the need to read the text again. The reasons why 30,0% of the subjects abandoned the reading were the difficulty of seeing and the eyestrain. **Conclusion:** The abandon of reading activities and the difficulty in understanding the text to be read, justify the need to emphasize the work on reading during the rehabilitation process.

Keywords: low vision; reading; optic and non-optic aids; rehabilitation.

Resumen

Objetivo: determinar como sujetos con baja visión adquirida, que participaron de un proceso de rehabilitación, utilizan la lectura en su vida diaria. **Método:** La investigación se realizó mediante estudio descriptivo y transversal. La población estaba compuesta por personas con baja visión adquirida que participaron del Programa de Rehabilitación para adultos y adolescentes del CEPRE/FCM/UNICAMP, en el año 2008. Se aplicó un cuestionario desarrollado para investigación exploratoria. **Resultados:** La población era de 30 sujetos. Se encontró que la mayoría de los sujetos (75,2%) declaró no ser capaz de comprender el texto en la primera lectura, y 68,7% de esta población declaró tener la necesidad de leer el texto de nuevo. Las razones que llevaron a 30,0% de los sujetos a abandonar la lectura era la dificultad de ver y la fatiga visual. **Conclusión:** El abandono de las actividades de lectura y la dificultad para comprender el texto a ser leído, justifican la necesidad de enfatizar el trabajo de lectura durante el proceso de rehabilitación.

Palabras claves: baja visión, lectura, ayuda óptica y no óptica, rehabilitación.

1 - Introduction

Language is one of the ways to communicate and express feelings, ideas, actions and hence, our vision of the world. It is an interlocution process that is performed in social practices of distinct groups, in different moments of their history. It is an activity and a mental operation that imply sense construction¹.

During reading, the information extracted from a printed page, when it comes to word decoding and recognition together with text understanding, is analyzed and compared to the information previously stored. Thus, for a deep understanding of the text, the reader spontaneously formulates two types of inferences: literal inferences, relating ideas inside or between sentences and implicit inferences,

connecting ideas to complete information that is not explicit, incorporating knowledge and previous experience².

Reading literacy influences the performance of oral language and writing development, enriches the vocabulary, increases the level of information and knowledge, develops critical thinking, and arouses curiosity, sensitivity and reasoning. In a broad sense, it is linked to the idea of attributing meaning. As conception, reading integrates the notion of ideology, a way of seeing the world³.

Reading is an adequate instrument in the procedures of evaluation and rehabilitation, and the reading of texts subsidizes not only the quantitative evaluation, but also adaptation aids through the number of words read correctly⁴.

The relationship between visual function and reading strategy used by low vision subjects have been intensely studied in the last years, and the importance of its comprehension for rehabilitation strategies optimization is clear⁵.

Furthermore, the reading ability has been included as a pardon of sight measurement, and it has showed itself to be more sensitive in detecting reading problems, than the traditional measure of visual acuity, when tables with isolated optotypes are used⁶.

Reading capacity is determined, on one hand, by the spatial resolution of the retina and, on the other hand, by the minimum visual perception area. Besides, reading requires the integrity of the visual system and upper cortical visual functions. Letter recognition requires only a limited area of the visual field; word recognition requires a larger area and fluent reading requires availability of additional areas of the visual field right to the fixation point for saccadic ocular movement orientation⁷.

The sensory system, especially vision and hearing, provides the largest number of receptors for language development. Subjects with low vision may have difficulty in integrating these systems, thus compromising visual discrimination, organization, tracking and memory⁷.

According to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) of the World Health Organization (WHO), a person is considered to have low vision if their visual acuity with optical correction in the better eye is between 20/70 (0.3) and 20/400 (0.05) or if their visual field is less than 20th in the better eye with best correction possible optical⁸.

Low vision is characterized by a significant change in the functional capacity of the vision, due to associated or isolated factors, such as significant low visual acuity, important visual field reduction, changes to the color vision and/or sensitivity to contrast that interfere with or limit visual performance⁹.

It is important to mention that even using the best correction, subjects keep presenting low vision and the use of regular glasses not always provides quantitative improvement to this population, but, in general, it provides qualitative improvement. Quantitative improvement lets the individual with low vision see objects, symbols or smaller letters,

while qualitative improvement lets the individual see objects, symbols and letters from the same size, but with higher quality and sharpness⁹.

The development of visual efficiency is conceived as a learning process, in which the individual will learn to use his residual vision with the resources of assistive technology which will be able to benefit him or her in this development¹⁰.

In educational approach, low vision is characterized as a severe loss of vision that cannot be corrected by clinical or surgical treatment or with conventional glasses. It can also be described as any degree of weakening causing visual functional disability and decreasing performance visual. However, the functional capacity is not only related to visual factors, but also the reactions of people to visual loss and environment factors that interfere with performance¹¹.

It appears that professionals were and are still being able to foster such resources to low vision subjects during the rehabilitation process¹².

The alternative use of assistive technology resources, added to activities to carry out pre-set according to the individual needs, promotes a big difference, leading the subject with low vision to achieve the maximum degree of efficiency in the use of residual vision. Thus, they get sharper images to the brain and therefore will be better interpreted. The use of assistive technology resources (optical and non-optical features) in conducting the activities of reading and writing will provide better visual performance for people with low vision and thus meet their needs¹.

Rehabilitative action, which intends to intermediate the learner's relationship with reading should include activities that allow to work with the language in real situations of everyday use, encouraging the most varied social practices. Such actions can extend beyond the medical office's space².

Considering reading as an important social, economic and cultural inclusion factor, it is understandable the subject's search for the rehabilitation in the use of reading related skills. Professionals working in the low vision area often come across the shortage of reading material that attend the low vision subjects needs, as well as material related to the structure itself in linguistic: phonetic, morphologic and syntactic complexity¹³.

Considering all of these aspects, the aim of this was to determine how subjects with acquired low vision going through the rehabilitation process use reading in everyday life.

2 – Method

Investigation was performed through descriptive and transversal survey, being approved by the Research Ethics Committee from Faculty of Medical Sciences under the number 091/2008.

Population was non-probabilistic, obtained according to data collection viability and ease of user access criteria, consisting of subjects with acquired low vision, who attended the “Teens and Adults with Visual Deficiency Rehabilitation Program of Center of Studies and Research in Rehabilitation ‘Prof. Dr. Gabriel Porto’ (Cepre)”, in Faculty of Medical Sciences of State University of Campinas. The inclusion criteria adopted were: being a teenager or adult with acquired low vision, being alphabetized and having participated in the Rehabilitation Group of CEPRE in the second semester of 2008 academic year.

To construct the data collection instrument, an exploratory study of contextual and qualitative nature was used¹³. The selected variables were: personal characteristics; reading in everyday usage with or without optical and non-optical aids; types of optical and non-optical aids used; purpose of the use of reading; frequency of use after visual loss. A questionnaire was prepared, structured and applied through survey.

After data collection, open questions were categorized and grouped; closed questions were

quantified and tabulated. Answers were analyzed statistically with the software EPI INFO v.6.0.

3 – Results

Population was composed of 30 subjects with acquired low vision (acuity of 20/200 to 20/400, classified as severe low vision). Among subjects, 60,0% belonged to the male gender category and 40,0% belonged to the female gender category, and age varying between 18 and 73 years, with an average of 38 years.

Related to education, 33,5% of the subjects that attended the study reported that they haven’t completed elementary school, 20,0% haven’t completed high school, 16,6% completed high school, 23,3% completed elementary school and 6,6% have college education.

The age when the eye condition started to appear varied from 10 to 69 years, being 29 years the average age. The participation time in CEPRE’s Rehabilitation Group varied from 1 to 8 month.

Seventy percent (70%) of subjects who responded to the survey said they make use of reading and 57,1% of them reported using it daily. Among the main purposes for the use of reading, 85,7% mentioned to seek interesting information.

Table 2 presents the types of material / equipment that are most used by subjects of this study in reading activities, with prominence in the reading of newspapers and magazines (61,9%), followed by reading on the computer. Regarding the use of optical aids in reading activities, 12 subjects (57%) reported that they usually use optical aids, with prominence in the use of glasses, hand magnifier and support magnifier (Table 3).

Table 2 – Types of materials / equipment used for reading. Subjects of the Rehabilitation Program for Adolescents and Adults with Visual Impairment. Cepre-FCM-Unicamp. Campinas-SP. 2008.

Types of materials / equipment *	n=21	
	f	%
Newspaper, magazines	13	61,9
Computer	7	33,3
Bible / study material	6	28,5
Books	6	28,5
Posters	1	4,7

*Multiple answers

Table 3 – Use of optical aids and no optical aids for readability. Rehabilitation Program for Adolescents and Adults with Visual Impairment. Cepre-FCM-Unicamp. Campinas-SP. 2008.

Optical Aids	f	%
		n=21
Declare use	12	57,1
Declare not use	9	42,9
Types of optical aids		n12
Glasses	9	75,0
Manual magnifying glass/ support	3	25,0
n=21		
No optical aids / computer	f	%
Declare use	21	100,0
Types of non optical aids*		
Magnification of letters	16	76,0
Approximation of the objects in the eyes	10	47,6
Accessibility features of computer	9	42,8
Contrast	4	19,0
Best Print Quality	3	14,2

*Multiple answers

To assist reading, the most non-optical resources cited were text approximation and bringing the objects to the eyes (54,5%), followed by the use of amplified material (36,5%), as presented in Table 3.

Table 4 presents the reasons why subjects with low vision abandoned reading, highlighting the

fact that they could not see anymore. Table 5 shows that most subjects (76,2%) that use reading, have declared not being able to understand the text at the first time it was read, alleging motives of letter scrambling (62,5%) and eyestrain (37,5%).

Table 4 – Reasons for not using the reading after the appearance of visual problem. Subjects of the Rehabilitation Program for Adolescents and Adults with Visual Impairment. Cepre-FCM-Unicamp. Campinas-SP. 2008.

		n=09
Reasons for not using the reading *		
Can no longer see	9	100,0
Because they feel eyestrain	3	33,3

*Multiple answers

Table 5 – Text comprehension in reading after the onset of the visual problem: Need to read more often. Subjects of the Rehabilitation Program for Adolescents and Adults with Visual Impairment. Cepre-FCM-Unicamp. Campinas-SP. 2008.

Comprehension	<i>f</i>	%
		n=21
Declare not have	16	76,2
Declare have	5	23,8
		n=16
Need to read more often		
Declare have	11	68,7
Declare not have	5	31,3
		n=16
Reasons to read the text more often *		
Letters shuffle	10	62,5
Present eye strain	6	37,5
		n=05
Reason to read the text only once *		
Understand at first reading	5	100,0
Feel no need to read more often	5	100,0

*Multiple answers

4 – Discussion

The art of rehabilitation consists on turning a visual disturbance into the smallest disadvantage possible. It requires a team work, with different, but interrelated professionals, complementing the knowledge and ability of each area¹⁴.

The improvement of the eye condition in adult age comes from changes in the subjects' daily activities. The tasks that were easily performed before, are developed in a harder way, or even aren't performed at all anymore, after the visual loss. Reading also requires a higher complexity degree, since it is an activity performed essentially with the help of visual function. After the loss it can present moderate or severe impairment, which allows understanding the subjects' complaints.

The equating of visual impairment is complex and requires actions to promote ocular health, prevention measures, clinical resources with surgical indication in some cases, optic and non-optic aids, habilitation and rehabilitation performed by interdisciplinary team¹⁶.

Age variation was between 18 and 73 years, being 38 years the average. In a survey about the usage of optic aids and other equipment, made with students that have visual impairment¹⁴, the average

age found was 32,2 years, similar to the one verified in this study and the predominant gender was male, corroborating with our data (60,0% of men, 40% of women).

Regarding the beginning of the ophthalmologic impairment, there was a variation between 10 and 69 years, with an average age of 29 years. A study made in CEPRE/FCM/UNICAMP¹⁵ showed an average age of 27,9 years, a number close to the one found in this study.

It can be assumed that subjects with acquired low vision try to maintain ordinary activities, such as reading, but by facing the challenges and lack of adequate orientation, they end up having difficulties, decreasing its use, restricting their independency and needing professional aids to fulfill such condition.

Despite the lack of adequate material and visual difficulty found by subjects with low vision to read, 53,7% of subjects reported reading daily. It can be assumed that such subjects, by being part of the rehabilitation group, felt motivated to use the assistive technology resources in performing the reading activities through the approach used by all professionals team related to residual vision use⁶ (Table 1).

Table 1 – Use, frequency and purpose of reading after the appearance of visual problem. Subjects of the Rehabilitation Program for Adolescents and Adults with Visual Impairment. Cebre-FCM-Unicamp. Campinas-SP. 2008.

Use of reading*	f	%
		n=30
Use reading	21	70,0
Don't use reading	9	30,0
Frequency of reading		n=21
Daily	12	57,1
Once a week	7	33,5
Once a month	1	4,7
Rarely	1	4,7
Purpose of the use of reading*		n=21
To search for information that matters	18	85,7
To perform activities of daily living	4	19,0
When someone asks you to read	2	9,5
When there's no one to read for him/her	1	4,7

*Multiple answers

Table 2 presents the results of the types of material/equipment used for reading. Newspapers and magazines excerpts, such as news headlines, are shown in increased size, which facilitates section identification or news to be read; as well as the computer that facilitates residual vision use and enlargement of the material to be read by its unique characteristics, such as: vertical screen position, the access to adaptations and the subjects' possibility of finding quickly the focal distance for reading.

As mentioned, the computer resources which are currently available for people with low vision work through visual and sound interfaces, providing visual enlargement and modification of the original image and vocalization of information through synthesized voice. The option of using a resource will depend on the state of the subject's visual function, of his/her personal preferences and the material that he/she wants to access, like in this study. Generally, one single resource is not enough to fulfill all reading needs of an individual, since nowadays information is conveyed in many ways¹⁶.

Most subjects (57,1%) have declared they use optic aids in performing the activity of reading

in everyday life (Table 3). When indicated, the prescription of such aids to people with low vision is highly necessary because of the reasons presented, but, what is observed is that they are not always available, due to the small number of specialized services supplied to this population, due to the social-economic situation that prevents the acquiring of the resources and the lack of training and orientation to use them. In a research¹⁷ about the use of optic aids in reading activity, a significant improvement was found in the reading of students that used optic aids, compared to the ones that didn't use such aids.

The objective is, through optic and non-optic aids, to enlarge the image focused on the retina, and to improve the ambient conditions for a better visual resolution¹³. These aids fulfill the low vision individual's needs in the situations in which the printed material has insufficient font size, providing maximization of visual performance, autonomy and independency.

Therefore, there is a need for rehabilitation programs that teach and encourage low vision subjects to use their optical aids to achieve

quantitative and qualitative improvement in their visual performance.

In general, subjects with visual impairments feel improving their reading with the use of optical aids, not only because it allows them to see smaller sizes of letters, but because it favors the realization of a more continuous and expeditious reading¹⁸.

The alternatives of assistive technology resources added to the performance of predetermined activities according to the individual needs, promote a big differential, leading the low vision subject to achieve maximum efficiency in using residual vision. That way, the brain gets sharper images, and can better interpret them.

Analyzing the concept of reading and the complexities inherent in the process, the reading of texts in the evaluation and training of low vision subjects comes as a strategy capable of determining quantitatively (reading speed) and qualitatively the adaptation in the use of optic aids⁹.

A study made in England⁵ showed the importance of monitoring the optic aids adaptation. One hundred sixty eight low vision subjects, who had the prescription of such aids associated to the use of non-optic aids, were studied. After a six month intervention period, 88,0% of the subjects showed significant improvement, being able to read printed newspapers letters. Equal to this study, the number of subjects using optical aids increased after the rehabilitation.

It is known¹⁸ that the use of optic aids can improve the low vision subject's self-esteem. Among the benefits of using this aids, it is emphasized: the sense of independency (when the subject can have access to the reading of printed material in daily environment, he becomes independent); the sense of responsibility (by acquiring the real visual information, he realizes his potential, and feels responsible and safe to see in other situations); improvement of ambient identification; the sense of competency (because the subject has visual control over the environment) and the feeling of greater pleasure for visual quality.

In order to facilitate and promote the frequent use of optic aids, the subject must use it always, in tasks that interest him; the period must be serialized and short, thus avoiding physical and visual fatigue¹⁹.

In this research, it was found (table 3) that to perform reading activities, the most quoted non-optic aids used by the subjects were the

approximation of the objects to the eyes (75,0%) and the use of enlarged characters (50,0%). It is noteworthy that the approximation of material to the eyes also provides material enlargement and it is a resource whose use must be stimulated but, it is not always used because of the myth that the approximation of texts and objects to the eyes can be harmful and speed up the ocular disease process.

The subjects in this research didn't indicate the use of contrasting materials as a strategy to improve visual performance in reading activities, despite the fact that they used such resource in the texts selected by professionals. The study²⁰ demonstrated that some low vision subjects presented better reading performance when the used material had negative printing (white letters in a black background), preference given to abnormal light dispersion in eyes with mean opacity^{20,21}.

Checking the results from Table 1, most subjects (87,5%) reported using reading to seek information that was interesting to them. Subjects with low vision that use vision as a social function, extend that use to the performance of daily activities, to the reading and writing activities, in long and short distance situations and in social activities that are contextualized in the lives of these subjects.

The processing of reading is a fundamental activity in people's everyday life in our modern society. Reading makes possible to build our own human knowledge, once it provides access to all knowledge accumulated by mankind for means of writing. It is a complex process and through it an utterance and graphical information can be drawn in order to understand it and rebuild its meaning³.

The subjects' goal in a process of communication is the search for understanding about certain meanings present in the individual subjectivity, besides being understood by the speaker, taking into consideration what is expected to be transmitted and what is expected as an answer²².

The relationship between visual function and reading strategy used by low vision subjects have been intensely studied in the last years, and the importance of its comprehension for rehabilitation strategies optimization is clear²³.

Considering the complexity involved in reading, this must be measured in continuous texts with several lines, because these are the conditions found in newspapers, books, prescribing

information, etc. Such texts must be standardized as to size, understanding and syntax difficulty, and word frequency so that the obtained results can be correctly interpreted²⁴.

Since the implementation of reading activities represents the desire of most low vision subjects, it is important, in the rehabilitation process, that word and texts be used, because word and text recognition requires the use of a larger area of the retina. It is useful to ask the subject that he/she begins to read printed texts with enlarged types, so that he/she can read easily, and reading gets more interesting¹⁰.

The reading starts with the eyes and consists of two components: decoding and understanding. The decoding refers to the processes of recognition of written words, while the understanding is defined as the process by which words, sentences or texts are interpreted³.

An important part (43,0%) of the subjects in this study (Table 1) reported not use reading with the same frequency as before the ophthalmologic problem appeared.

All the subjects that have answered informed they abandoned the reading after the appearance of the visual problem (Table 4), justified by the fact of not seeing anymore, and also because of the eye strain during reading activities. The quoted reasons could be minimized by using optic and non-optic aids and adequate adaptation, since one of the main goals of a rehabilitation program for people with low vision is to make the subjects improve visual residue efficiency, providing comfort to them²⁵. The participation in a rehabilitation program can minimize the negative aspects of residual vision use, such as difficulty in seeing and eye strain¹⁵.

Related to text understanding, most subjects (76,2%) answered not having comprehension of the text in the first time they read, because of scrambled letters (62,5%) or eye strain (37,5%). Among those 76,1% of subjects, 68,7% declared having the need to read the text more than once to understand it (Table 5).

The levels of low vision people's reading comprehension are good, even though the reading is slow and repetitive. The repeated reading of the text for these subjects is necessary since the final goal of reading is the text understanding¹³.

Reading comprehension requires cognitive skills such as drawing inferences, and language such as knowledge of vocabulary, syntax and also

good visual conditions, so that the symbol arrives to the brain properly²⁶.

To check the limiting reading factors of low vision subjects, the team professionals can use the combination of reading speed, text understanding and ocular movement control²⁷.

Reading use or re-learning in the visual rehabilitation process may become a bigger motivation for the user enjoy it with greater pleasure and frequency. This resource would aim, as a result, a greater autonomy by the subject with visual impairment, helping him/her to perform everyday reading and writing tasks that otherwise would be performed by other people.

5 – Conclusion

The participants of this study reported they use reading, mainly to get information about subjects that are interesting to them. A portion of the subjects with low vision that participated in this study reported not using reading with the same frequency as before the appearance of the eye condition. The abandon of reading activities and the difficulty to understand the text to be read justify the need to emphasize the work with reading during the rehabilitation process.

The majority of the study population had little schooling what possibly influenced the little use they make of reading and writing in their daily activities.

A little understanding about reading can be extended to other activities, such as understanding speech. Some explanations made in the rehabilitation group may not have been understood and have not been put into practice, thus reducing the use of optical or non-optical aids, for example.

The re-learning of reading in a rehabilitation process can allow bigger motivation for the individual to enjoy it with greater pleasure and frequency. This resource seeks greater autonomy for the individual with visual impairment, helping him to perform daily reading tasks.

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