



## Assessment of the virtual guide on eye self-examination in the context of HIV/AIDS\*

*Avaliação de cartilha para o autoexame ocular no contexto do HIV/aids*

*Evaluación de la cartilla para el autoexamen ocular en el contexto del VIH/Sida*

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### ABSTRACT

**Objective:** To analyze the efficacy of a virtual guide with a view to promoting eye health. **Methods:** Cross-sectional study carried out with 130 HIV/AIDS patients from an ambulatory unit between May and August/2010. The data was collected through interviews and observation, using three forms that addressed the socioeconomic profile, understanding and performing the virtual guide eye self-examination. Data were analysed using descriptive statistics,  $\chi^2$  and Fisher-Freeman-Halton tests. It was considered statistically significant  $p < 0.05$ . **Results:** The virtual guide was positively evaluated in the categories of understanding and adequacy of text illustrations. There was statistically significant difference between the tests performed with this virtual guide ( $p = 0.036$ ). Comparing the results obtained by participants and researchers, we observed similarities in the findings ( $p > 0.140$ ), excepting only the evaluation of the right eyelid. **Conclusion:** The virtual guide helped developing proper eye self-exam, enabling people to notice alterations in their eyes. **Keywords:** Evaluation studies; Education technology; Health promotion; HIV infections; Eye health

### RESUMO

**Objetivo:** Analisar a eficácia de uma cartilha com vistas à promoção da saúde ocular. **Métodos:** Estudo transversal, desenvolvido com 130 portadores do HIV/aids, atendidos em um ambulatório, entre maio e agosto/2010. A coleta foi realizada por meio de entrevista e observação, utilizando-se três formulários que abordaram o perfil socioeconômico, o entendimento da cartilha e a realização do autoexame ocular. Os dados foram analisados por meio de estatística descritiva, testes de  $\chi^2$  e Fisher-Freeman-Halton. Consideraram-se como estatisticamente significantes aqueles com  $p < 0,05$ . **Resultados:** A cartilha foi avaliada positivamente nos quesitos entendimento do texto e adequação das ilustrações. Houve diferença estatisticamente significante entre os exames realizados com auxílio da cartilha ( $p = 0,036$ ). Comparando os resultados obtidos pelos participantes e pesquisadores, observou-se proximidade nos achados ( $p > 0,140$ ), excetuando apenas a avaliação da pálpebra direita. **Conclusão:** A cartilha auxiliou no desenvolvimento adequado do autoexame ocular, possibilitando às pessoas conhecerem as alterações no olho.

**Descritores:** Estudos de avaliação; Tecnologia educacional; Promoção da saúde; Infecções por HIV; Saúde ocular

### RESUMEN

**Objetivo:** Analizar la eficacia de una cartilla con vistas a la promoción de la salud ocular. **Métodos:** Estudio transversal, desarrollado con 130 portadores del VIH/Sida, atendidos en un consultorio externo, entre Mayo y Agosto/2010. La recolección de los datos fue realizada por medio de entrevista y observación, utilizándose tres formularios que abordaron el perfil socioeconómico, el entendimiento de la cartilla y la realización del autoexamen ocular. Los datos fueron analizados por medio de la estadística descriptiva, test de  $\chi^2$  y Fisher-Freeman-Halton. Se consideraron como estadísticamente significativos aquellos con  $p < 0,05$ . **Resultados:** La cartilla fue evaluada positivamente en los criterios de entendimiento del texto y adecuación de las ilustraciones. Hubo diferencia estadísticamente significativa entre los exámenes realizados con ayuda de la cartilla ( $p = 0,036$ ). Comparando los resultados obtenidos por los participantes e investigadores, se observó aproximación en los hallazgos ( $p > 0,140$ ), exceptuando la evaluación del párpado derecho. **Conclusión:** La cartilla ayudó en el desarrollo adecuado del autoexamen ocular, permitiendo a las personas conocer las alteraciones en el ojo.

**Descriptores:** Estudios de evaluación; Tecnología educacional; Promoción de la salud; Infecciones por VIH; Salud ocular

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## INTRODUCTION

The development of educational activities, as well as the construction and validation of technologies focusing on promoting the health of individuals and communities have been highlighted among nursing actions over the years. Technology generally refers to any method or device used to promote health, stop death, treat diseases and improve rehabilitation and the care of an individual or population<sup>(1)</sup>.

Thus, the importance of technology is highlighted as a mediator tool for behavioral change in the field of health education, with special emphasis to light technologies. Based on this understanding, there is a variety of materials used in everyday practices, such as posters, brochures, manuals, guides, videos, aiming to assist in the acquisition of healthful attitudes. These materials not only provide information, but also facilitate the learning experience and change<sup>(2)</sup>.

In the context of care, it is clear that in some areas, such as the maternal and child health<sup>(3)</sup>, the development of such materials occurs more frequently. However, we also observed areas, such as eye health, where the development of such materials still does not address important aspects of care of individuals and communities, especially materials which are related to health promotion.

By analyzing the production of materials developed for the care of people living with the Human Immunodeficiency Virus (HIV) and with the Acquired Immunodeficiency Syndrome (AIDS), their priority issues approach aspects related to epidemiology of infections, adherence to medical treatment and preventive measures. Nevertheless, other topics of interest, such as opportunistic infections and their impact on the health of these people, are still not effectively addressed.

In the area of eye health, the offer and initiatives aimed at prevention of injuries to the visual system are still scarce. Besides this aspect, it is worth noting that there are limitations of access to regular consultation with an ophthalmologist, which undermines the identification of early visual changes, thus contributing to the installation of diseases, such as blindness<sup>(4)</sup>.

Within this context, we emphasize that there are most vulnerable groups to the development of visual problems, such as people living with HIV/AIDS. About 50% to 75% of these individuals develop some complications in their eyes. Most of them are triggered by opportunistic infections and neoplasms, as a direct result from immunosuppression<sup>(5,6)</sup>.

Thus, the only effective action is detection in early stages of the eye problem. Given the statements of users about difficulties on health services to get an appointment with an ophthalmologist, which indicates

a weakness in the care of people with HIV, and the high cost of eye exams, an effective strategy would be an eye self-exam, which is characterized as prevention, without cost, safe and easily applied in large population.

For these reasons, Caetano and Pagliuca<sup>(7)</sup> constructed and validated a virtual guide for eye self-examination. This was designed to be used by people living with HIV/AIDS in their daily lives as part of self-care actions. The virtual guide teaches how to practice self-examination of their eyes, through simple information, which enable people to examine themselves and identify changes.

This virtual guide is divided into 14 pages, consisting of cover, presentation, material used and description of the technique of eye self-examination. The latter includes the items: visual acuity testing – distance and near; ocular structures examination – external; visual field examination (peripheral vision and central vision) and eye movement. All these steps aim to identify possible changes such as: reduced visual acuity, blurring, pain, strabismus, diplopia, redness, among others.

In the evaluation of distance visual acuity (DVA), the individual must position himself/herself at a distance of 5 meters from a wall, where it must have been previously placed an optometric scale, at the height of his/her eyes while seated. Then proceed to the evaluation of each eye separately, always starting by occlusion of the left eye. Acuity to be registered is one in which the person can see at least 75% of the line graphics, and the value considered normal is 0.8<sup>(8)</sup>.

In the evaluation of the near VA, the person should use a scale similar to the previous one, differing from the first by presenting fewer lines, in this case, six, J1, J2, J3, J4, J5 and J6 and by the graduation between them, which varies from 0.37 m to 1.25 m. The individual remains sited, holding the card at a distance of 33 centimeters from the eyes, evaluating an eye at a time, identifying until which line he/she can read. In this case, the view is considered abnormal when the person can only read the first two lines, graduation above J2<sup>(7)</sup>. It is noteworthy that in both evaluations, people who wear glasses should wear them during the test.

The external ocular structures of the eye comprise eyelids, conjunctiva, sclera, iris and pupil. To perform the assessment, it is necessary to use a mirror with flexible swabs and cotton ends. The upper and lower eyelids should be inspected for the presence of alterations such as: presence of secretion, swelling, redness, nodules, injuries, trichiasis, entropion and ectropion. In addition to these alterations, other symptoms such as tearing, burning and pain during movement should be recorded, as they may indicate the presence of inflammatory processes, such as scleritis and episcleritis.

Regarding the pupil and iris, one must examine the size, shape, symmetry and pupillary reaction. The eye

should be occluded for one minute to be examined and subsequently observed, with the aid of a mirror, to check if the pupils are also reactive and regular. When there are abnormal pupillary responses, the person should investigate the occurrence of trauma, previous surgery or pathological processes<sup>(9)</sup>.

Examination of eye movement or eye mobility is performed when an individual follows with his/her eyes, the movement of a certain object, for example a pencil, from right to left, up and down and on both diagonals without moving the head. Through this action, the presence of nystagmus, rhythmic movements, involuntary and bilateral eye, and also diplopia are investigated. This screening is particularly valuable when searching for the occurrence of neurological or traumatic disorders<sup>(10)</sup>.

Central vision is measured by the Amsler grid, which consists of a geometric frame of identical squares with a central fixation point. This should be located 33 cm away from the individual and then the evaluation should be performed one eye at a time, using an occluder or the cupped hand. With the opened eye, the individual must look directly at the black dot in the center of the grid, keeping his gaze, noting if that all the lines are straight, if all squares are visible and have the same size. This test is important for the identification of macular degeneration<sup>(9)</sup>.

For the evaluation of peripheral vision, one should gaze in a word located in the middle of an open newspaper, subsequently, approaching the newspaper, so that the impression fills the field of vision; therefore, the person should then observe if any area presents blurry, dark or absence and repeat the test with the other eye.

The virtual guide for the eye self-examination was created to be used on a large scale, increasing the chances of the HIV positive person identify early changes that are indicative of specialized management. Moreover, its application in institutional spaces for teaching and service does not demand great cost, helping to raise awareness of academics and health professionals to the problem of eye health in the context of HIV/AIDS. Please note that any changes detected by eye self-examination test, a professional ophthalmologist should be sought in order to establish a diagnosis and proper treatment.

It is noteworthy that it is necessary to develop studies that evaluate the efficacy, and other aspects of light technologies, with a view to their inclusion in the dynamics of care through multi-professional consultation. Therefore, it is necessary that the language and graphics used are adequate in order to facilitate the understanding and use.

Given the above, this study aimed to assess the efficacy of an educational technology to promote eye health to people living with HIV/AIDS.

## METHODS

This is a quantitative, cross-sectional study, developed in a referral hospital in the care of infectious diseases, located in Fortaleza, CE (Brazil). The population was consisted of people living with HIV/AIDS who were in the ambulatory care at this institution between May and August 2010. In that period, the population consisted of approximately 2583 people with HIV/AIDS.

In order to calculate the sample size, we estimated the proportion  $P$  of individuals with education higher than complete primary education equal to 75%, significance level of 5% ( $\alpha = 0.05$ ) and relative sampling error of 9.6% (absolute error of 7.2%). These values, applied in the formula below, suitable for finite population, provided a sample size equal to 130 clients.

As inclusion criteria, we considered the following parameters: be duly entered in the mentioned service, be over 18 and present physical and emotional conditions for the implementation of the activities proposed for the eye self-examination. For purposes of participating in the study, all patients with mental disorders, with advanced visual impairment and communication difficulties were disregarded.

Data collection was performed by triangulation techniques, using a structured interview, observation and form, being held in three stages, namely: users' approach in the waiting room; usage of the virtual guide by participants; application of eye exam by researchers; and interview.

The structured interview script was formulated to obtain sociodemographic data (age, gender, income, education, marital status), data on the disease (time of diagnosis and drug treatment) and on the understanding of the virtual guide on eye self-examination. In the latter, issues relating to the understanding of the text as a whole were addressed, also understanding on the drawings that illustrated the steps to be followed, and presence or absence of difficulties to use the virtual guide. The Likert scale was used, with items divided into three blocks of analysis: Agree, Disagree and Neutral.

The script for observation was developed, so that it could evaluate the use of the virtual guide on eye self-examination by people living with HIV/AIDS through whether or not the instructions contained therein were made clear. Data was collected by a form of observation. A five-point scale Likert-type was used (1 – Totally adequate, 2 – Adequate 3 – Partially Adequate 4 – Inadequate and 5 – Totally inadequate). The instrument was divided into five areas for the content worked on the virtual guide: a) Distance Visual Acuity Test b) Near Visual Acuity Test; c) External eye structures (eyelids, conjunctiva and sclera, pupil/iris); d) Visual field examination – peripheral vision e) Visual

field examination – central vision. Within each category a score for each response was assigned, ranging on a scale of 1 to 5, whose minimum value was assigned to totally inadequate response and maximum response totally adequate. The distribution generated a unique value for the scale, corresponding to the responses of the 39 items. The possible range of the scale was 39 (39 items multiplied by the value 1) to 195 (39 items multiplied by 5).

It was considered totally adequate when the participant was able to adequately perform the examination without assistance; Adequate when the participant performed the examination suggested in the virtual guide, but adapted some extent without jeopardizing the exam; Partially adequate when partially performed the exam or requested clarification at some point, and inadequate whenever the examination was not performed or there was no record of the results.

After completion of the first two moments, the test was repeated by the researchers and the data were compared to the first, in order to observe the performance of the virtual guide, as material for guiding eye self-examination.

The study was approved by the Ethics in Research Committee, under the Approval No. 005/2010. All study participants signed a Consent Form, in duplicate. Also they were guaranteed the right and freedom to not participate in the research or leave it at any time.

For data analysis, we calculated the descriptive measures of mean and standard deviation. The association analyzes were performed using the  $\chi^2$  test and Fisher-Freeman-Halton test. For all analyzes,  $p < 0.05$  was considered as statistically significant. The data were processed using the Predictive Analytics Software (PASW) version 18.0.

## RESULTS

From the 130 study participants, 76.9% were male and 75.4% were single. The mean age was 35 years

( $\pm 8$  years), educational level, counted from the 1st year of study, in 58.5% of cases was 12 years and per capita income was 45.5% of one minimum wage with a mean of  $1.8 \pm 0.8$  minimum wages. Regarding the time of diagnosis, 27.7% had between 2 and 5 years of diagnosis confirmation, with mean of  $6 \pm 5$  years, with high dispersion around the mean (CV = 82.8%). The treatment time showed a mean of  $5.7 \pm 4.6$  years, also with very high dispersion (CV = 80.7%).

According to the data in Table 1, the proportion of adequacy for the categories “text easy to understand” (85.4%) and “drawings facilitate the performance of steps” (97.7%) was higher ( $p < 0.001$ ) than the proportions of neutral and disagree. The category “presented some difficulty while using the guide” had equivalent proportions between Agree and Disagree, although a higher frequency was found for the category of Disagree.

**Table 1.** Distribution of people with HIV/AIDS, according to the evaluation of the understanding of the text, the adequacy of the design and the presence of difficulties in the use of the virtual guide. Fortaleza, CE, 2010 n = 130

|   | Agree<br>n(%) | Neutral<br>n(%) | Disagree<br>n(%) | p value* |
|---|---------------|-----------------|------------------|----------|
| Text easy to understand                         | 1111(85.4)    | 9(6.9)          | 10(7.7)          | <0.001   |
| Drawings facilitate the performance of steps    | 127(97.7)     | -               | 57(2.3)          | <0.001   |
| Presented some difficulty while using the guide | 63(48.5)      | 2(1.5)          | 65(50.0)         | <0.001   |

\*To table 3x3: Fisher-Freeman-Halton  $p < 0.001$

When evaluating the performance of eye self-examination with the aid of the virtual guide (Table 2) ( $p=0.036$ ), it was found that the evaluation of central vision was the only test that showed a statistically significant difference between the performance categories ( $p=0.008$ ), being the most frequently recorded for the category, partially adequate. As far as the other tests,

**Table 2.** Distribution of the number of HIV/AIDS, as the performance on the eye self-examination. Fortaleza, CE, 2010. n = 130

| Exams                            | Totally adequate<br>n(%) | Adequate<br>n(%) | Partially adequate<br>n(%) | Inadequate<br>n(%) | Totally inadequate<br>n(%) | Valor de p* |
|----------------------------------|--------------------------|------------------|----------------------------|--------------------|----------------------------|-------------|
| Distance Visual Acuity           | -                        | 8(6.2)           | 33(25.4)                   | 61(46.9)           | 28(21.5)                   | 0.001       |
| Near Visual Acuity               | 9(6.9)                   | 26(20.0)         | 49(37.7)                   | 36(27.7)           | 10(7.7)                    | 0.001       |
| External eye structures          | -                        | 2(1.5)           | 104(80.0)                  | 23(17.7)           | 1(0.8)                     | 0.001       |
| Visual field – peripheral vision | 50(38.5)                 | 49(37.7)         | 22(16.9)                   | 2(1.5)             | 7(5.4)                     | 0.001       |
| Visual field –central vision     | 15(11.5)                 | 36(27.7)         | 38(29.2)                   | 21(16.2)           | 20(15.4)                   | 0.088       |
| Eye movement                     | 47(36.2)                 | 59(45.4)         | 9(6.9)                     | 1(0.8)             | 14(10.8)                   | 0.001       |

\*Para a Tabela 6x5: p de Fisher-Freeman-Halton= 0.036

it was observed that the verification of visual acuity showed far greater frequency for the category, inadequate (46.9%), and verification of peripheral vision showed a higher frequency for the category totally adequate (38.5%) . The other tests were classified as partially adequate.

After using the virtual guide for people with HIV/AIDS, researchers started their eye examination, in order to compare the results and determine whether

the virtual guide as a tool for guidance, could assist in the proper development of eye self-examination, generating similarities between the results of researchers and participants. Based on the data presented in Table 3, there was similarities in the results for both groups ( $p > 0.140$ ), excepting only the evaluation of the right eyelid (REL) in external eye structure ( $p = 0.036$ ), in which participants had difficulty performing some of the proposed steps.

**Table 3.** Comparison between the results obtained by the participant group and the researchers, after performing the eye examination. Fortaleza, CE, 2010

| Exams                             | Study participants<br>(n=72)* |         | Researchers<br>(n=130) |         | p value**          |
|-----------------------------------|-------------------------------|---------|------------------------|---------|--------------------|
|                                   | Normal                        | Altered | Normal                 | Altered |                    |
| <b>Distance Visual Acuity</b>     |                               |         |                        |         |                    |
| RE                                | 57                            | 15      | 114                    | 16      | 0.149              |
| LE                                | 58                            | 14      | 110                    | 20      | 0.572              |
| <b>Near Visual Acuity</b>         |                               |         |                        |         |                    |
| RE                                | 64                            | 8       | 120                    | 10      | 0.488              |
| LE                                | 64                            | 8       | 113                    | 17      | 0.585              |
| <b>External eye structures **</b> |                               |         |                        |         |                    |
| RED                               | 64                            | 4       | 129                    | 1       | 0.036 <sup>a</sup> |
| LED                               | 65                            | 3       | 128                    | 2       | 0.248              |
| REL                               | 67                            | 1       | 130                    | -       | 0.178              |
| LEL                               | 64                            | 8       | 130                    | -       | 0.178              |
| RCA                               | 64                            | 4       | 127                    | 3       | 0.225              |
| LCA                               | 66                            | 2       | 127                    | 3       | 0.835              |
| RS                                | 66                            | 2       | 127                    | 3       | 0.835              |
| LS                                | 66                            | 2       | 125                    | 5       | 0.692              |
| RC                                | 67                            | -       | 130                    | -       | -                  |
| LC                                | 67                            | -       | 130                    | -       | -                  |
| RP                                | 63                            | -       | 127                    | 3       | 0.211              |
| LP                                | 63                            | -       | 128                    | 2       | 0.309              |
| RIRIS                             | 66                            | 1       | 129                    | 1       | 0.661              |
| LIRIS                             | 67                            | -       | 129                    | 1       | 0.459              |
| <b>Peripheral Vision</b>          |                               |         |                        |         |                    |
| RE                                | 51                            | 18      | 102                    | 28      | 0.605              |
| LE                                | 52                            | 16      | 102                    | 38      | 0.279              |
| <b>Central Vision</b>             |                               |         |                        |         |                    |
| RE                                | 62                            | 7       | 119                    | 11      | 0.784              |
| LE                                | 62                            | 7       | 114                    | 16      | 0.558              |
| Eye Movement                      | 66                            | -       | 121                    | 1       | 0.447              |

\* Numbers differ for each variable due to not record the response. \*\*Pearson chi-square ( $p < 0.05$ ); <sup>a</sup>statistically significant difference, RE- right eye; LE- left eye. \*\* RED- right eyelid; LED- left eyelid, REL- right eyelashes; LEL left-eyelashes; RCA- right conjunctiva; LCA- left conjunctiva, RS- right sclera, LS- left sclera; RC- right cornea; LC- left cornea; RP- right pupil; LP- left pupil; RIRIS – right iris; LIRIS – left iris.

## DISCUSSION

Characterization of study participants revealed a significant group of young adults, mostly male and with high school level, data consistent with the literature and the Ministry of Health<sup>(11,12)</sup>. Over time, the association of low education to poor living conditions and health has been increasingly done, however this trend extends even among those who have good levels of education, which requires new attitudes towards the development and dissemination of instruments for the health promotion in the communities.

Given the above, it is worth noting that the AIDS epidemic in Brazil started in social spaces of people with higher level of education, with gradual spread to classes where the level of education is lower<sup>(13)</sup>. Thus, it is noteworthy that there was a proportional increase in the number of HIV/AIDS cases among the population with 8 to 11 years of education, between the years 1999 to 2006<sup>(12)</sup>. Nevertheless, having access to knowledge should not be seen as the only factor capable of promoting the development and incorporation of healthy behaviors in the daily lives of individuals<sup>(14)</sup>. Consequently, health professionals should be aware of aspects that promote or hinder the process of acquisition and application of knowledge.

When evaluating the virtual guide on eye self-examination, it was found that, overall, it was understood by the group, although at times there has been confusion in interpreting the instructions contained therein. This point deserves to be worked out, since in the context of preparation of educational materials, most of the mistakes and unsuccessful initiatives are triggered by an eminently conceptual and abstract textual approach<sup>(15)</sup>. As we intend to incorporate these materials to daily care to the health of communities, it is necessary that the information contained therein is presented in a clear and concise manner, making it easy to use.

The introduction of well structured educational materials can help people transform the reality in which they live in, taking more salutary attitudes, since they are appropriate to the demands of each context. The election of these materials as a strategy tool and therapeutic support, grounded in scientific terms, can promote health and social reintegration of individuals at the same time improving the condition of life<sup>(16)</sup>. It is therefore a valuable tool for health promotion (HP) of the community, and should be cultivated within the dynamic services, ensuring people's right to access to resources that can help them cope better with the disease, or where possible, eliminate it.

By analyzing the difficulties presented when using the virtual guide, we highlight the quality of writing, pointed out as one of the reasons as a barrier for performing the appropriate steps. Some participants had difficulty identifying some of the material terms used in for the eye self-exam, due to unfamiliarity with some terms used, such as Snellen chart and Amsler grid. Besides these, other terms also caused disagreement as: degree of visual acuity, conjunctiva, sclera, nodule, conjunctivitis, scleritis, episcleritis, trichiasis, entropion and ectropion. The adequacy of language to all sections of society, regardless of education level, is a key part of developing guidance manuals for health. This concern is necessary, since people's adherence to conduct preventive treatment is determined, partially, by the quality of guidance and information dispensed<sup>(17)</sup>.

The facilities were also presented during the observations. The improved performance was demonstrated during the evaluation of eye movement and peripheral vision, the latter had the steps performed in a fully adequate manner. This is attributed to the higher identification of the group performance with the material used, the simplicity of the technique and short text. Thus, the longer texts are more likely to be understood only in its general aspects, besides contributing to the disinterest of the group<sup>(15)</sup>.

Given these results, it is necessary to mention that, despite the difficulties found, no participant abandoned the use of the virtual guide, striving to realize the self-examination of the eye, under the guidances described by expressing their perceptions at the end of the text, the adequacy of and illustrations presence of difficulties.

## CONCLUSION

The findings of this study showed that the proposed objectives were achieved, since the virtual guide helped participants to perform their eye self-examination, proving its efficacy. In addition, other relevant aspects were identified during the research, such as the lack of knowledge on eye problems for people living with HIV.

A limitation of the study is that the virtual guide was not applied to illiterate people. Still, more researches are necessary to develop this theme, involving this specific group, since it also presents risk for developing visual impairment. As this virtual guide, aims to promote eye health of communities, there is the need for greater dissemination of this technique, extending its use to any individual.

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