

CHANGES IN SCORES ON THE COVID QUALITY OF LIFE ASSESSMENT BEFORE & AFTER VISION THERAPY A MULTI-OFFICE STUDY

■ Paul Harris, O.D.¹
■ Lauren Gormley, O.D.²

1. Cockeysville, MD
2. Philadelphia, PA

ABSTRACT

The College of Optometrists in Vision Development Quality of Life (COVID-QOL) Assessment is comprised of 30 questions to quantify patients' quality of life, pre and post vision therapy (VT). Scores of individual questions as well as the total score are evaluated. This paper reports an analysis of the prospective, multi-office, COVID-QOL data pre and post VT. Six offices submitted these scores of 416 patients. The data were statistically analyzed by paired t-tests, assuming a Likert Scale, for changes in the total pre and post VT scores. The analysis of the difference between the average total pre-score of 45.7 and the average total post-score of 18.81 was significant at the $p < .001$ level. This indicated that the patients reported significantly fewer symptoms after VT.

KEY WORDS

College of Optometrists in Vision Development Quality of Life Questionnaire (COVID-QOL), quality of life (QOL), subjective quantification of quality of life, vision therapy

INTRODUCTION

Quality of life (QOL) is defined as.... *physical factors, psychologic and cognitive factors that reflect the emotional well-being of the patient, and the perception of the patient's health by the patient and by his or her family.*¹ A number of recent reports have served to legitimize QOL instruments as a measure of health care outcomes.¹⁻⁴

At the clinical level, the purpose of the QOL assessments is to afford patients an opportunity to identify and quantify issues that are important in their activities of daily living. The patient's subjective judgments provide important information that is not always available from clinical data.² The basic method is for the patient to complete a QOL assessment prior to therapy. The same instrument can then be used periodically during the treatment to assess the patient's perception of progress. However, the QOL assessment at the termination of treatment represents the functional effect of the diagnosis and its consequent therapy, as perceived by the patient.³

The College of Optometrists in Vision Development Quality of Life (COVID-QOL) Assessment was used in this project. See Appendix A. This assessment was developed by a task force of COVID.² The assessment is comprised of thirty questions that address four areas pertaining to quality of life: physical/occupational, psychological, social interaction and somatic sensation. Each question is scored on a scale from zero to four. The value assigned is relative to the frequency that the patient

experiences the symptom: 0- never, 1-seldom, 2-occasionally, 3-frequently, and 4-always. A total score greater than 20 is suggested to be of concern and indicates further evaluation.⁵

Maples reported the test-retest reliability (repeatability) values of the COVID-QOL. He administered the questionnaire to 19 first-year optometry students, two weeks apart. Their responses on both occasions were compared. The data indicated a repeatability of 89.7%.^{5,6} The clinical application of the COVID-QOL has subsequently and increasingly been reported in the literature.⁷⁻⁹ It is implied that a person's QOL is negatively affected by the signs and symptoms measured with the COVID-QOL.⁹

The purpose of this paper is to report and compare pre and post COVID-QOL scores of patients who have completed vision therapy (VT) at several optometric offices.

METHOD

A letter was sent to potential study sites explaining the research purpose and design; six offices agreed to participate. These offices were sent the administration protocol for the COVID-QOL along with the method to report the data. See Appendix B. The COVID-QOL was administered either by the optometrist or a vision therapist before the initiation of VT. The same person most usually administered the COVID-QOL at the end of the VT program. When the same person did not administer the questionnaire at the end of therapy, that person was instructed to read the administration protocol. In some instances the patient completed the questionnaire, pre and post therapy; in other

instances the patient's parent completed it. In other instances the patient completed one questionnaire, and the parent completed the other.

The pre and post VT QOL-QOL scores were recorded in a Visual FoxPro 6.0 database. The data included a patient identifier, gender, age, the code of the office submitting the data, pre- and post- scores and the computed net change score of each case. These data were then imported into the Student Version of SPSS 11.0 for Windows for analysis. A Likert scale was assumed⁵ and a paired t-test was performed. Descriptive statistics included the mean, minimum, maximum and standard deviation. for the total pool and also for the individual offices that had submitted more than 30 cases (N=397).

RESULTS

The pre and post VT COVID-QOL scores of 416 subjects from six different sites were received and included in our analysis. The diagnoses included strabismus, amblyopia, traumatic brain injury, autism spectrum, sports vision, vision skills, vision perception and reading dysfunction. The data from only one office were from consecutive patients. Because of logistic reasons, the other sites' data can be considered as sampling by convenience.¹⁰ For the data received from all participating sites, the average pre VT score was 45.7 with a range of from 9 to 95 and a standard deviation of 18.61. The average post VT score for the total group was 18.81 with a range from 0 to 86 and a standard deviation of 13.85. See Table 1. These overall lower post VT COVID-QOL scores are significant at $p < .001$.

We also analyzed the data from the four sites that that reported on at least 30 patients. These comprised 397 patients. In each instance, the averaged lower score on the post VT COVID-QOL is significant at $p < .001$. The data for these sites, (Office 1-4) are also presented in Table 1, as are the minimum and maximum pre and post VT scores.

DISCUSSION

The averaged COVID-QOL scores for all subjects showed an impressive improvement from a pre VT score of 45.70 to a post VT score of 18.81. This figure is just under the value of $\neq < 20$, as proposed to indicate a lack of visual signs and symptoms that could interfere with academic performance.^{8,9} This 26.89 decrease in the

Table 1.
Pre and Post COVID-QOL Assessment Results

In the total number of subjects, and in each office (1-4), the lower post VT COVID-QOL score is statistically significant at $p < .001$.

| Total patients reported N= 412 | Range | | | |
|-----------------------------------|---------|---------|---------|--------------------|
| | Average | Minimum | Maximum | Standard Deviation |
| Pre-Testing | 45.70 | 9 | 95 | 18.61 |
| Post-Testing | 18.81 | 0 | 86 | 13.85 |
| Net Change | 26.89 | 9 | 9 | |
| Office 1 n=190 | | | | |
| Pre-Testing | 40.69 | 9 | 94 | 17.71 |
| Post- Testing | 17.83 | 0 | 67 | 12.70 |
| Net Change | 22.86 | 9 | 27 | |
| Office 2 n=68 | | | | |
| Pre-Testing | 44.78 | 19 | 93 | 15.99 |
| Post-Testing | 11.40 | 0 | 51 | 10.62 |
| Net Change | 33.38 | 19 | 42 | |
| Office 3 n=31 | | | | |
| Pre-Testing | 49.06 | 12 | 87 | 17.62 |
| Post- Testing | 21.26 | 2 | 51 | 13.17 |
| Net Change | 27.80 | 10 | 36 | |
| Office 4 n=108 | | | | |
| Pre-Testing | 54.43 | 10 | 95 | 19.29 |
| Post-Testing | 24.36 | 0 | 86 | 15.40 |
| Net Change | 30.06 | 10 | 9 | |

average COVID-QOL score after VT is substantially in agreement with the findings in a previous study by Maples and Bither.⁷ Their pool of subjects were 62 children whose pre and post COVID-QOL scores were analyzed either upon completion, or after 20 hours of VT. The resulting data indicated that the mean averaged post VT score, and the individual item scores were significantly less than the pre VT scores

We interviewed the optometrists at all offices. For those reporting the scores of 30 or more patients, we concluded that Offices 1-3 followed very similar protocols in terms of the sequence of VT activities with similar types of patients. Office 4 followed a different protocol, though similar lengths of VT were given. Nevertheless, the pre and post VT scores were quite similar for these offices, and the change in scores were all statistically significant. Similarities in the decreased scores between programs that use different VT protocols would suggest certain principles that comprise effective VT programs are not procedure specific.

Although the vast majority of patients reported a decrease in post VT QOL scores, each office had at least one subject whose COVID-QOL score worsened. Of the 412 subjects, 15 (3.6%) reported a higher post therapy score. The individuals were not clustered in any one particular office. The increased post therapy scores ranged from 33 to one.

We are aware of several deficiencies in the present study:

1. The study's protocol specified that the completed COVID-QOL sheets should be of consecutive patients. See Appendix B. However, only office #1 was able to adhere to this direction. The others did so in a less orderly (sampling by convenience¹⁰) manner. Although this latter method is arguably an accepted method of sampling, consecutive or a specified type of random sampling would have been preferable.
2. In many instances, the COVID-QOL was not completed by the same person at the pre and post VT administrations; sometimes the patient did the one, and the patient's agent did the other. This

- could well have introduced an inconsistency. Indeed, Vaughn et al have shown that the score on the COVD QOL varies according to who completes the questionnaire.⁹
3. The same person did not always administer the COVD-QOL both times. The directions for administering the test are quite clear²; nevertheless, in an office setting it might not always be followed. Further, while the test-retest reliability of the COVD-QOL has been established,^{5,6} its inter-tester reliability has not.
 4. In retrospect, it would have been beneficial to examine the changes in COVD-QOL scores according to the diagnoses, such as: general binocular dysfunctions, learning related visual problems, strabismus, amblyopia, head injury, autism spectrum, and sports vision. This could provide important information regarding the efficacy for each of these categories beyond the basic clinical findings.

SUMMARY

This paper has examined the relationship of patients' perceptions of changes in QOL secondary to VT. The results have shown that, according to responses on the COVD-QOL, patients generally reported significant improvements after VT. We believe that the present study can act as a template for future research regarding the efficacy of VT.

Acknowledgements

The authors thank Mr. Richard Hoenes who gave guidance on the statistical analysis in this paper; Drs. Robert A. Hohendorf, Carol Scott, David Pearce, Howard Bacon, Robin Lewis, Joseph Miele, Jennifer Kungle, Craig Newland for participating in the study.

References

1. Their SO. Forces motivating the use of health status assessment measures in clinical settings and related clinical research. *Med Care* 1992;30(5)(Suppl):15-22.
2. Mozlin R. Quality of Life Outcomes Assessment. *J Optom Vis Dev* 1995;26:194-9.
3. Schipper H, Clinch J, Powell V. Definitions and conceptual issues. In: Spilker B, ed. *Quality of Life Assessments Clinical Trials*. New York: Raven Press, 1990:11-24.
4. Kohli RM, Sane S, Kumar K, et al. Modification of medical outcome study (MOS) instrument for quality of life assessment & its validation in HIV infected individuals in India. *Indian J Med Res* 2005;122:297-394.
5. Maples W. Test-Retest Reliability of the College of Optometrists in Vision Development Quality of Life Outcomes Assessment. *Optom* 2000;71:579-585.

6. Maples W. Test-Retest Reliability of the College of Optometrists in Vision Development Quality of Life Outcomes Assessment Short Form. *J Optom Vis Dev* 2002;33:126-34.
7. Maples WC, Bither M. Efficacy of vision therapy as assessed by the COVD Quality of Life Checklist. *Optom* 2002;33:492-7.
8. Farrar R, Call M, Maples WC. A comparison of the visual symptoms between ADD/ADHD and normal children. *Optom* 2001;72:441-51.
9. Vaughn W, Maples W, Hoenes R. The association between vision quality of life and academics as measured by the College of Optometrists in Vision Development Quality of Life questionnaire. *Optom* 2006;77:116-23.
10. <http://www.statpac.com/survey/sampling.htm>. Accessed Feb.7, 2007.

Corresponding author:

Paul Harris, O.D., FCOVD, FACBO, FAAO
110 Old Padonia Road, Suite 300
Cockeysville, MD 21030
410-252-5777

Paul.HarrisOD@gmail.com

Date accepted for publication:

March 15, 2007

Appendix A Lifestyle Checklist

Name: _____ Date: _____ PRE POST (Circle One)

Please assign a value between 0 and 4 for each symptom.

0= never or non-existent / 1=seldom / 2=occasionally / 3=frequently / 4=always

| | | |
|----|-------------------------------------------------------------|--|
| 1 | Blurred vision at near | |
| 2 | Double vision | |
| 3 | Headaches associated with near work | |
| 4 | Words run together when reading | |
| 5 | Burning, stinging, watery eyes | |
| 6 | Falling asleep when reading | |
| 7 | Vision worse at the end of the day | |
| 8 | Skipping or repeating lines when reading | |
| 9 | Dizziness or nausea associated with near work | |
| 10 | Head tilt or closing one eye when reading | |
| 11 | Difficulty copying from the chalkboard | |
| 12 | Avoidance of reading and near work | |
| 13 | Omitting small words when reading | |
| 14 | Writing uphill or downhill | |
| 15 | Mis-aligning digits in columns of numbers | |
| 16 | Reading comprehension declining over time | |
| 17 | Inconsistent/poor sports performance | |
| 18 | Holding reading material too close | |
| 19 | Short attention span | |
| 20 | Difficulty completing assignments in reasonable time | |
| 21 | Saying "I can't" before trying | |
| 22 | Avoiding sports and games | |
| 23 | Difficulty with hand tools-scissors, calculator, keys, etc. | |
| 24 | Inability to estimate distances accurately | |
| 25 | Tendency to knock things over on desk or table | |
| 26 | Difficulty with time management | |
| 27 | Difficulty with money concepts, making change | |
| 28 | Misplaces or loses papers, objects, belongings | |
| 29 | Car sickness/motion sickness | |
| 30 | Forgetful, poor memory | |

APPENDIX B

Lifestyle Checklist for Quality of Life Survey- Directions

Note: Once you begin enrolling patients in the study it is important to include ALL patients consecutively and to not select only the ones you feel will show the best improvement. Send in all forms on all patients who finish therapy on whom you get both before and after sheets filled out.

Pre therapy Check List

1. At the first therapy session, the therapist should meet with the patient and one or both parents of the patients are under 16 years of age. If 16 or older, they need not have a parent with them.
2. Explain to them that the checklist is being used to determine what their visual symptoms are before the start therapy and that they will fill out another one at the end of therapy in order for them to see what improvements have been made.
3. Go over the number scale and make sure they understand that a zero means that they NEVER have that problem and that a four means that they ALWAYS have the problem. A one generally is chosen if it does happen, but is rare- maybe once a week or so. A two is generally chosen if it happens more frequently than that, perhaps once a week or so. A three means that it happens most of the time, but is not constant.
4. Go over each item one by one and have the parent and child together come up with a number which the both feel is the best choice. Tell them if they have questions about an item to ask you to clarify it. If dealing with children below age 8 or so, the parent will probably have a more accurate feel of what number to use, but they should ask the child for their input whenever possible.
5. If an item does not apply to the patient, just mark a horizontal line in space. (Example: A “senior citizen” who doesn’t play sports at all would probably not answer #22 or a small child with no concept of money need not answer #27).
6. After completing the Pre-therapy checklist, file it in the patient’s office folder.

Post-Therapy Checklist

1. At the last therapy session (or if you prefer, at the 3 or 6 month post-therapy checkup), have the parent and patient fill out another checklist. It is important that they do NOT have access to the original checklist when they fill out this post-therapy list and that they consider each question as if answering it for the first time.
2. After filling out the sheet, go over it with the patient to see in which the areas they have made improvement and whether they have eliminated or reduced their original adverse symptoms.
3. When the patient has seen both sheets, please send us the following so that we can compile these into a large database in order to chart the efficacy of vision therapy as seen through the eyes of the patient:
 - a. A copy of the Pre-therapy sheet
 - b. A copy of the Post therapy sheet
 - c. A copy of the patient data sheet (attached to this letter)
4. To save postage and save time, it would probably be more efficient to wait until you accumulate records for five people, then send them to us in a group. The results of this study could prove to be very beneficial to all doctors who are involved in vision therapy, so we hope you will take the time to participate in gathering this information.