ARTICLE

Frequency and Types of Pediatric Symptoms in a Clinical Population

W.C. Maples, OD, MS, FAAO, FACBO, FCOVD

Professor of Optometry: Southern College of Optometry

ABSTRACT

Background: Improvement in the quality of life issue is important in the overall treatment of patients presenting to optometrists. These quality of life issues are reflected in the symptoms that patients report in the interview process. What are the most frequent and most severe symptoms reported in a pediatric clinical sample?

Methods: To answer this question a retrospective assessment of the records of an optometric teaching clinic were reviewed. The symptoms by number and severity were recorded from the College of Vision Development - Quality of Life Short Form questionnaire. This questionnaire counts both the symptom and weights the symptom by means of a Likert scale. The results show that of the 19 items, the most frequent and severe symptoms were: Does not use his/her time well, Difficulty copying from chalkboard, Trouble keeping attention on reading, Difficulty completing assignments on time and Reading comprehension down. The least reported and least severe symptoms included: Headaches with near work, Head tilt/closes one eye when reading; Misaligns digits/columns of numbers and Words run together reading. There was some slight variation between symptoms based upon age groups.

Conclusions: The symptoms of the pediatric patients between the ages of 7 and 13 appear to be fairly consistent. Both the mean score ranking and frequency distributions of those who scored "Always" and "A Lot" generally agreed. When the highest ranked symptoms were compared to the opinions of a group of clinical experts; the most serious symptoms overall appeared related to vision perception, binocularity and accommodation; while ocular motor and aspects of orientation were not as apparent.

Keywords: accommodative symptoms, binocular vision symptoms, COVD-QOL Short Form, quality of life, vision perception, visual symptoms

Introduction

The presence of symptoms is considered central to the diagnosis and treatment of the optometric patient.[1] The symptom is the reason that most patients present for care. Optometrists will be somewhat hesitant to offer care, even if they measure abnormal visual findings, if there are no symptoms to justify this care.

The concept of quality of life has become central to health care outcome measures. The individual's quality of life is dependent on the patient's perception of how their life is affected by their symptoms. There have been numerous instruments developed to document the patient's or the care giver's perception of the efficacy of care, i.e., the improvement in the quality of life.[2-14] These instruments have become a primary measure of the effectiveness of treatment. Two of these optometric measures are the College of Optometrists in Vision Development-Quality of Life Questionnaire (COVD-QOL)[2-10] (Appendix A)

Correspondence regarding this article can be emailed to Dr. WC Maples at maples@sco.edu or sent to W.C. Maples, O.D., M.S; Southern College of Optometry, 1045 Madison, Memphis, TN 38104-2222. All statements are the author's personal opinion and may not reflect the opinions of the College of Optometrists in Vision Development, Optometry & Vision Development or any institution or organization to which the author may be affiliated. *Permission to use reprints of this article must be obtained from the editor. Copyright 2010 College of Optometrists in Vision Development.* *OVD is indexed in the Directory of Open Access Journals. Online access is available at http://www.covd.org.*

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and the Convergence Insufficiency Symptom Survey (CISS).[11-14] Improvement in the CISS has been used as the primary measure of a recent study demonstrating the superiority of optometric in-office vision therapy combined with home therapy to either home therapy alone or computer-based therapy alone.[14]

The COVD-QOL has been used extensively by clinicians to document quality of life issues, particularly within the pediatric population.[5,10,15] It is considered a more global measure than is the CISS although there are overlaps between the two checklists. The original COVD-QOL was developed by a task force of the College of Optometrists in Vision Development (COVD).[2,3] The 30 items were generally considered to fall into one of the four major areas, but these areas were not specifically defined for each item on the COVD-QOL in the original report.[2] Maples[3] subsequently defined each of the items by these four areas and Daugherty et al,[4] using these symptom groupings reported that most of these areas were positively affected by optometric vision therapy (VT).

The COVD-QOL has good test-retest reliability.[2,8,9] A number of reports testify as to the validity of the instrument.[4-7,15] The original checklist was comprised of 30 items but a subsequent COVD-QOL Short Form {(SF) Appendix B} has gained in popularity, mostly because of ease of administration.[9,10] Symptoms that were infrequently mentioned by patients were removed from the 30 item list to make the SF.[8] The SF and the modification of the language of the questionnaires additionally made the SF much more user-friendly.[9] The SF has been shown to correlate with academics in at least two studies.[10,15] Vaughan has reported that the parent should complete the form since the parent responses, when compared to the child patient (3rd, 5th and 7th grades) generally had a higher inverse correlation to academic performance than did the child scores.[10] In another study, a large sample (n=1019) of children ages 9 to 13 years contained 114 (26%) symptomatic children defined as a COVD-QOL score ≥ 20. Any child with a strabismic condition, amblyopia or ocular pathology was excluded. Each child was then given an optometric examination. Using standard criteria for diagnosis,[16] it was found that children with a general binocular dysfunction, vergence dysfunction, accommodative dysfunction or any combination of the above had significantly higher score on the COVD-QOL than those who did not exhibit any of these problems.

Table 1: Five Vision Areas by Item and Rank Likert Score in parenthesis

Orientation: Four Items
1. Avoids Sports and Games (81) [A Tie]
2. Clumsy/Knocks Things Over (81) [A Tie]
3. Writes Up/Down Hill (80)
4. Poor and Inconsistent in Sports (70)

Ocular Motor: Four Items
1. Skips/Rereads Lines when Reading (86)
2. Omits Small Words when Reading (77)
3. Poor Eye-Hand Coordination [Poor Handwriting] (59)
4. Misaligns Digits/Columns (57)

Binocular: Nine Items
1. Double Vision (111)
2. Head Tilt/Closes One Eye when Reading (100)
3. Words Run Together (77) [A Tie]
4. Falls Asleep Reading (77) [A Tie]
5. Trouble Keeping Attention on Reading (76)
6. Avoids Near Work/Reading (73)
7. Car/Motion Sickness (65)
8. Dizzy/Nausea with Near Work (60)
9. Does Not Judge Distance Accurately (53)

Accommodative: Six Items
1. Blur When Looking at Near (103)
2. Sees Worse at the End of the Day (98)
3. Headaches with Near Work (83)
4. Burns, Itch, Watery Eyes (79) [A Tie]
5. Difficulty Copying from Chalkboard (79) [A Tie]
6. Holds Reading Close (73)

Perceptual; Seven Items
1. Forgetful/Poor Memory (98)
2. Does Not Make Change Well (96)
3. Does Not Use His/Her Time Well (88)
4. Loses Belongings/Things (83)
5. Difficulty Completing Assignments on Time (57)
6. Says "I can't" Before Trying (52)
7. Reading Comprehension Down (49)

A survey of experts in optometry was asked to give their opinions as to the likelihood that a particular symptom of the COVD-QOL was generated by a deficit in one of five general areas of vision performance.[17] These five areas were: orientation, ocular motor, binocular, accommodative and perceptual. Each item in Appendix B is marked to indicate the specific area from the 5 areas defined to which the

experts thought the item most belonged. Table 1 contains the items for each visual area found in this study.[17]

The question, however, that may now be asked is: What are the most frequent and severe symptoms reported? To answer this question a retrospective chart review was conducted as part of a quality assurance evaluation at The Eye Center, the clinical arm of the Southern College of Optometry.

Table 2: Likert Scale Mean Score for all COVD-QOL Items (Rank)

Overall (N=199)	7 to 9 years (N=87)	10 to 12 years (N=97)
Time Use 1.65	1.64 (1)	0.83 (14)*
Loses 1.50	1.54 (4)	1.47 (1)
Copy Chalkboard 1.47	1.60 (2)	1.39 (2)
Assignments 1.45	0.92 (13)	0.78 (15)*
Low Attention 1.42	1.54 (4)	1.34 (4)
Forgets 1.32	1.37 (5)	1.26 (5)
Skips 1.28	1.55 (3)	1.08(9)
Eyes Water/Itch 1.28	1.20 (10)	1.35 (3)
Holds Reading Close 1.27	1.32 (6)	1.20 (6)
I Can't 1.25	1.27 (7)	1.17 (8)
Comprehension Down 1.19	1.24 (8)	1.18 (7)
Omits 1.16	1.21 (9)	1.18 (7)
Clumsy 1.16	1.32 (6)	0.93 (10)
Words Run Together 1.05	1.27(7)	0.91 (11)
Avoids 0.91	0.96 (12)	0.86 (13)
Up/Down 0.87	1.03 (11)	0.61 (16)
Misaligns 0.87	0.91 (14)	0.78 (15)
Tilts 0.85	0.77 (16)	0.83 (14)*
Headaches 0.82	0.78 (15)	0.88 (12)

* Indicates the total mean was higher than either of the age groups.

Method

The Eye Center protocol asks for all pediatric patients, at least 7 years of age or in the second grade to have a SF completed by the parent or caregiver. Children 13 years or above are seen in the adult primary care clinic. The children included were mostly between the ages of 7 and 12 years. One hundred ninety-nine consecutive examinations (representing two consecutive months) were identified and a tally sheet was made for all the findings in this examination. The SF data were tallied and descriptive and analytical statistics were generated.

Results

The 19 items were ranked according to the primary area most frequently chosen and by the total score for each item assuming a Likert scale. The score was obtained by awarding a score of 1 to "Seldom", 2 to "Occasional" 3 to "A Lot" and 4 to "Always". These scores were then added to obtain the final score. Table 2 contains the scores ranked by overall mean Likert scale score for each item (N=199) and the means by item for the two age groups (7-9 years, N=87; 10-12 years, N=97) on the SF. The sum of the two age groups does not add up to the total in three items since there were 15 patients that were less than 7 years of age and therefore were not considered in the age groups but were included in the total group. The largest mean score for the overall group was "Does not use his/her time well" at 1.65 and "Headaches when reading" was the lowest mean score with 0.82. The largest mean score for the 7 to 9 year old group was also "Does not use his/her time well" (1.64) and the highest mean score for the older group was "Loses belongings/things" (1.47). When the mean scores were compared, (t test) four items scored significantly higher for the younger group than for the older group. These four items were: Words run together reading (p=.037); "Writes up/down hill" (p=.021); "Clumsy, knocks things over" (p=.021) and "Skips/repeats lines reading" (p=.006).

Tables 3 and 4 contain a tally of patients and the percentage of patients represented, overall and by the age groups, who scored "Always" or "A Lot". These were considered to be the most severe categories. Generally, the older age group scored a higher percentage in the "Always" category (Table 3) and the younger age group scored a higher percentage in the "A Lot" category (Table 4). A chi square test was performed to compare the two age groups by symptom frequency to see if there was a significant

Table 3: Ranking of Patients Scoring "Always" by Item and Age from Most to Least. (Total Number) and %

Overall	N=199	%	7 to 9 years	N=87	%	10 to 12 years	N=97	%
Time Use	(22)	11	Copy Chalkboard	(9)	10.3	Time Use	(13)	13.4
Assign Completion	(20)	10	Time Use	(7)	8	Assign Comp	(11)	11.3
Copy Chalkboard	(18)	9	Loses Belongings	(7)	8	Low Attention	(10)	10.3
Loses Belongings	(17)	8.5	Assign Completion	(7)	8	Loses Belongings	(8)	8.2
Holds Read Close	(15)	7.5	Holds Read Close	(6)	6.8	Forgets	(8)	8.2
Low Attention	(15)	7.5	Forgets	(5)	5.7	Copy Chalkboard	(8)	8.2
I Can't	(15)	7.5	Writes Up/Down	(5)	5.7	Comp Down	(7)	7.2
Forgets	(15)	7.5	Skips Lines Reading	(5)	5.7	I Can't	(7)	7.2
Writes Up/Down	(10)	5	I Can't	(5)	5.7	Hold Reading Close	(6)	6.2
Comp Down	(10)	5	Low Attention	(4)	4.5	Omits	(5)	5.2
Clumsy	(9)	4.5	Words Run Together	(3)	3.4	Misalign Num/Let	(4)	4.1
Skips Lines Reading	(9)	4.5	Clumsy	(3)	3.4	Eyes Water/Itch	(4)	4.1
Avoids Near Work	(8)	4	Avoids Near Work	(3)	3.4	Avoids Near Work	(4)	4.1
Misalign Num/Let	(8)	4	Comp Down	(2)	2.2	Write Up/Down Hill	(3)	3.1
Eyes Water/Itch	(7)	3.5	Misalign Num/Let	(2)	2.2	Clumsy	(3)	3.1
Words Run Together	(7)	3.5	Omits words	(2)	2.2	Words Run Together	(3)	3.1
Omits Words	(5)	2.5	Eyes Water/Itch	(2)	2.2	Skips Lines Reading	(3)	3.1
Head Tilt/Close Eye	(4)	2	Head Tilt/Close Eye	(2)	2.2	Headaches	(1)	1.0
Headaches	(2)	1	Headaches	(0)	0	Tilts Head/Close Eye	(0)	0

Table 4: Ranking of Patients Scoring "A Lot" by Item and Age from Most to Least. (Total Number) and %

Overall	N=199	%	7 to 9 years	N=87	%	10 to 12 years	N=97	%
Copy Chalkboard	(30)	15.1	Copy Chalkboard	(18)	20.7	Comp Down	(12)	12.4
Low Attention	(29)	14.6	Low Attention	(15)	17.2	Loses Place	(10)	10.3
Comp Down	(26)	13.1	Assignment	(15)	17.2	Low Attention	(10)	10.3
Assignment	(23)	11.6	Comp Down	(14)	16.1	Time Use	(9)	9.3
Tilt	(22)	11.1	Forgets	(12)	13.8	Water	(9)	9.3
Time Use	(21)	10.6	Up/Down	(12)	13.8	Tilt	(9)	9.3
Up/Down	(21)	10.6	Clumsy	(12)	13.8	Copy Chalkboard	(9)	9.3
Loses	(20)	10	Skips	(11)	12.6	Omits	(8)	8.2
Water	(19)	9.5	Time Use	(10)	11.5	Reads Close	(8)	8.2
Clumsy	(19)	9.5	Loses	(10)	11.5	Assignment	(7)	7.2
Reads Close	(18)	9	Omits	(10)	11.5	Avoids	(7)	7.2
Omits	(18)	8.5	I Can't	(10)	11.5	Misaligns	(6)	6.2
I Can't	(17)	8.5	Tilt	(9)	10.3	I Can't	(6)	6.2
Skips	(17)	8.5	Water	(9)	10.3	Clumsy	(6)	6.2
Forgets	(16)	8.0	Reads Close	(9)	10.3	Runs Together	(6)	6.2
Runs Together	(15)	7.5	Runs Together	(8)	9.2	Skips	(5)	5.2
Avoids	(11)	5.5	Headaches	(6)	6.9	Up/Down	(4)	4.1
Misaligns	(11)	5.5	Avoids	(4)	4.6	Headaches	(4)	4.1
Headaches	(10)	5	Misaligns	(3)	3.4	Forgets	(3)	3.1

difference with any symptom. No significant differences were found in the patients scoring "Always" but four of the symptoms in the "A Lot" group showed that the younger group scored this level of severity of symptom significantly more than the older age group. These four groups were: "Difficulty copying from chalkboard" (p=.0367); "Difficulty completing assignments on time" (p=.0422); "Forgetful/poor memory" (p=.0129) "Writes up/down hill" (p=.0334). Again, the younger group had the more severe symptoms.

Discussion

When comparing the mean Likert scores by age, three of the top five symptoms were common to both the younger and older groups. These were "Loses belongings or things", "Difficulty copying from chalkboard", and "Trouble keeping attention on reading". Those symptoms with the five lowest morbidity overall had four symptoms that were common to both age groups. These were: "Headaches with near work", "Head tilt/closes one eye when reading", "Misaligns digits/columns of numbers", and "Avoids near work/reading".

When the overall severity of symptoms, as defined by a response of "Always" was compared to those with the mean Likert score, four of the five symptoms with the highest morbidity were also among the most severe: "Does not use his/her time well", "Loses belongings/things", "Difficulty completing assignments on time" and "Difficulty copying from the chalkboard". When looking at those overall top five Likert Score symptoms with a response of "A Lot", three symptoms were found to be common. These were "Difficulty copying from the chalkboard", "Trouble keeping attention on reading" and "Difficulty completing assignments on time".

When the three overall data groups, comparing the top five symptoms of each group were analyzed, three symptoms were common to all. These three symptoms were: "Difficulty copying from the chalkboard", "Low attention when reading" and "Difficulty completing assignments on time". Of these three symptoms, one was considered by the experts opinion[16] as being a binocular problem (Low attention when reading), one was considered to be an accommodative problem (Difficulty copying from the chalkboard) and one was considered to be perceptual in nature (Difficulty completing assignments on time).

Conclusions

Generally, symptoms reported by the SF appear to be fairly consistent across the ages of 7 to 13. The symptoms that appear most often, generally agree with those that are perceived by the parents as being most severe. These appear to be associated with perception, binocularity and accommodation (according to expert opinion). None of the most frequent symptoms marked were considered problems of either visual orientation or ocular motor dysfunctions.

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Appendix A – COVD-QOL Checklist[1-6]

PATIENT'S NAME:_____ DATE:_____

Check the column which best represents the occurrence of each symptom. Completed By:_____

	NEVER	ONCE IN A LONG WHILE	SOMETIMES	A LOT	ALWAYS
1. Blur when looking at near					
2. Double Vision					
3. Headaches with near work					
4. Words run together reading					
5. Burn, itch, watery eyes					
6. Falls asleep reading					
7. Sees worse at the end of the day					
8. Skips/repeats lines reading					
9. Dizzy/nausea with near work					
10. Head tilt/close one eye when reading					
11. Difficulty copying from chalkboard					
12. Avoids near work/reading					
13. Omits small words when reading					
14. Writes up/down hill					
15. Misaligns digits/columns of numbers					
16. Reading comprehension down					
17. Poor/inconsistent in sports					
18. Holds reading too close					
19. Trouble keeping attention on reading					
20. Difficulty completing assignments on time					
21. Always says *I can't* before trying					
22. Avoids sports/games					
23. Poor hand/eye (poor handwriting)					
24. Does not judge distance accurately					
25. Clumsy, knocks things over					
26. Does not use his/her time well					
27. Does not make change well					
28. Loses belongings/things					
29. Car/motion sickness					
30. Forgetful/poor memory					

Appendix B – 19 Item COVD-QOL Checklist Questionnaire [8,9,10]

Check the column which best represents the occurrence of each symptom.

		NEVER	SELDOM	OCCASIONAL	FREQUENTLY	ALWAYS
1. Headaches with near work	A					
2. Words run together reading	B					
3. Burn, itch, watery eyes	A					
4. Skips/repeats lines reading	OM					
5. Head tilt/close one eye when reading	B					
6. Difficulty copying from chalkboard	A					
7. Avoids near work/reading	B					
8. Omits small words when reading	OM					
9. Writes up/down hill	O					
10. Misaligns digits/columns of numbers	OM					
11. Reading comprehension down	P					
12. Holds reading too close	A					
13. Trouble keeping attention on reading	B					
14. Difficulty completing assignments on time	P					
15. Always says *I can't* before trying	P					
16. Clumsy, knocks things over	O					
17. Does not use his/her time well	P					
18. Loses belongings/things	P					
19. Forgetful/poor memory	P					

A=Accommodation; B=Binocularity; O=Orientation; OM=Ocularmotor; P=Perception

OTHER COMMENTS: