CHIEF COMPLAINT(S) OF VISION THERAPY PATIENTS DIAGNOSED WITH CONVERGENCE INSUFFICIENCY

by

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Doctoral Candidate

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Date

ABSTRACT

Background: This is a retrospective study of primary chief complaint(s) prior to examination of patients diagnosed with convergence insufficiency (CI) and recommended vision therapy. *Methods:* An electronic search of all CI patients from January, 2006, though December, 2007, was conducted at Michigan College of Optometry Clinic in Big Rapids, Michigan, resulting in sixty-five patients. All patients were recommended vision therapy. Data was collected from patients' medical charts on six variables: patients' chief complaint, gender, age, occupation, review of systems, and additional diagnoses when first diagnosed with CI. *Results:* The significance of the relationship between the previously-mentioned variables was tested using chi-square and/or other analysis. Out of all patients seen in the clinic from January, 2006 through December, 2007, only sixty-five were CI patients. The most frequent chief complaint was blur, followed by tired or strained eyes, then headaches, asymptomatic, and diplopia. The most frequent gender was female. The most frequent occupation was student. The most prevalent age was between the age of 11-20 years old. The most common review of systems was tired eyes. The most frequent diagnosis in addition to CI was astigmatism followed by myopia. *Conclusions*: This new study aids the clinician's knowledge prior to examination for diagnosing CI patients. This allows the practitioner to be clued into the patient's chief complaint, gender, age, occupation, review of systems, and additional diagnosis to convergence insufficiency statistical value prior to diagnosing CI.

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INTRODUCTION

The prevalence of convergence insufficiency (CI) has been reported to be about 3% to 5% of the population, which makes CI the most common binocular anomaly [1]. "Convergence insufficiency is a condition in which there is an exophoria at near, orthophoria or low exophoria at distance, a receded near point of convergence, reduced positive fusional vergence (PFV), and a low AC/A ratio" [1]. A review of the literature did not reveal any articles specifically on convergence insufficiency and chief complaints. The review also indicated only four articles that address briefly CI and symptoms. One published in the Journal of Optometric Vision Development which states that the "presence of symptoms was used by 67.9% of the doctors in making the diagnosis of CI". The most frequent occurring symptoms reported were headaches, diplopia, and asthenopia according to this study[2].

METHODS

The retrospective study collected information from sixty-five patients that were diagnosed with convergence insufficiency (CI) and recommended vision therapy over the period of January 1, 2006 through December 10, 2007 at Michigan College of Optometry Clinic. The subjects were selected through an electronic search on the clinic's database. These patients' hard copy medical charts were pulled by hand in alphabetical order. A

questionnaire was developed to record the information contained on the patients' charts. The patients' charts consisted of patients' health information form and a primary care form. The patient information form, which the patient completes, includes a review of systems checklist. The checklist appears in Appendix A. The primary care form is filled out by the attending physician/ intern.

Data on patients' chief complaint, gender, age, occupation, review of systems, and additional diagnosis to convergence insufficiency when first diagnosed with CI were recorded on a questionnaire. The questionnaire appears in Appendix A and consists of six questions. The first three are demographic and the last three are clinical questions. The questions are as follows:

1. What is your gender?
2. What is your age?
3. What is your occupation?
4. What is your chief complaint today?
5. What is your review of symptoms (may have more that one answer)?
6. In addition to CI, any other diagnosis today (may have more than one answer)?

Additional alternatives for clinical questions 4, 5 and 6 were added and recorded while examining the medical chart. This makes the alternatives all inclusive for chief complaint, review of system and other diagnosis of CI patients. The data was then transferred onto a tabulation spreadsheet. An alpha-numeric code was used to record the data from the questionnaire onto a spreadsheet. The code is as follows: 1. A one character code "P" represents patients one through sixty-five. 2. A two or three character

code with the first character being small "q" represents a question which is then followed by a numeral representing the question's number. If the third character present is a small letter, then it represents an alternative associated with the question. For example, q5c means question number five alternative c. 3. The separate numerals ranging from one through five in columns of the spreadsheet of Appendix B represent the numbers as defined by the questionnaire in Appendix A.

The frequency of all variables is described in Appendix C. The data was then analyzed by chi-square and a bar chart and tables were developed to show the prevalent-primary chief complaint, gender, age, occupation, review of systems, and additional diagnoses when first diagnosed with CI. The significance of the association between chief complaint vs. review of systems, chief complaint vs. gender, review of systems vs. gender, and additional diagnoses vs. gender, were statistically tested using chi-square.

RESULTS

The result of the survey follows below in the order in which the questions appear on the questionnaire (see Appendix A). The results of the first question "What is your gender?" indicated that the most frequent gender in the pool of subjects was female by 1.4:1 ratio. See Table 1 for breakdown in percentages.

Table 1. Gender: (N=65)

Gender	No. and (%) of patients
Females	38 (58)
Males	27 (42)

The results of the second question "What is your age?" indicated that the most frequent age was eleven to twenty years of age, making up 51% of total patients in this pool of study. The second most frequent cohort is twenty-one years to thirty years at 24%. The previous two cohorts constitute 75% of the patients, which suggests a very youthful occurrence of CI. See Table 2 below.

Table 2. Age of Cohorts: (N=65)

Age (years)	No. and (%) of patient
10 years or less	9 (14)
11 years -20 years	34 (51)
21 years -30 years	15 (24)
31 years- 40 years	4 (6)
40 years or more	3 (5)

The results of the third question, "What is your occupation?" indicates that the most frequent occupation was students. See Table 3 below.

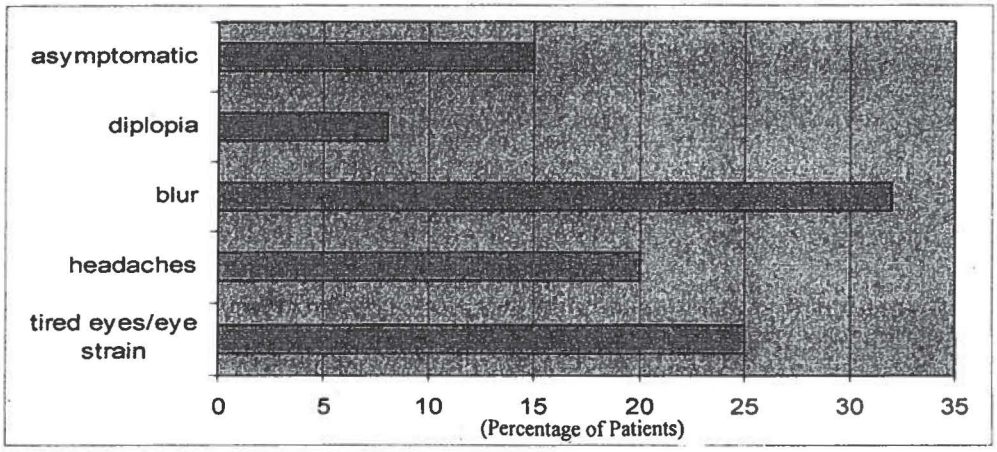
Table 3. Occupation: (N=65)

Occupation	No. and (%) of patients
Student	56 (86)
Retired	2 (3)
Other	7 (11)

The results of the fourth question "What is your chief complaint?" indicates that the most frequent chief complaint was blur, followed by tired or strained eyes, then headaches, asymptomatic, and diplopia. See Figure 1 on next page.

A frequency distribution analysis of the chief complaint and gender indicates a fairly even distribution between gender and chief complaint. See gender distribution p. 26 of Appendix C. A chi-square test was used to test the significance of how gender affects chief complaints. The null hypothesis connected with the test is that gender is associated with chief complaints. The chi-square test rejected the null hypothesis at the 0.05 level of significance for each of the chief complaints.

Figure 1: Chief Complaint vs. Percent of CI Patients.



The results of the fifth question, "What is your review of systems" indicated that the most common problem in patients' review of systems was tired eyes, followed by allergies and learning disabilities (see Table 4 on next page). A chi-square test was used to test the significance of how the chief complaint affects review of each system, with the exception of tired eyes. Tired eyes were excluded from the test because it was reported twice, once as a chief complaint and second as a review of system. In this particular case, they cannot help but be associated with one another and were excluded for this reason. The null hypothesis connected with the test is that the chief complaint is associated with the review of systems. The chi-square test rejected the null hypothesis at the 0.05 level of

significance for each of the review of systems. A frequency distribution analysis of the spreadsheet in Appendix B, concerning gender and review of systems, indicated a fairly even distribution between gender and review of systems (with the exception of learning disabilities--11% of female patients vs. 30% of male patients). However, a chi-square test was used to test the significance of how gender affects review of systems. The null hypothesis connected with the test is that gender is associated with review of systems. The chi-squared test rejected the null hypothesis at the 0.05 level of significance for each of the review of systems.

Table 4. Review of Systems: (N=65) may have more than one answer

Problem	No and. (%) of patient
Asthma	6 (9)
Tired eyes	25 (38)
Itchy eyes	3 (5)
Headaches	10 (15)
Red eye	6 (9)
Allergies	13 (20)
Diplopia	6 (9)
Learning disabilities	12 (18)
Amblyopia	1 (2)
Arthritis	3 (5)

The results of the sixth question "In addition to CI, any other diagnosis today?" indicated that the most frequent diagnosis was astigmatism followed by myopia (see Table 5 on next page). Also, a frequency distribution analysis of the spreadsheet

(Appendix B) indicated that 48% of the patients had two other diagnoses and 38% had only one diagnosis in addition to CI. The most common single diagnosis was hyperopia. Whereas, the two most common diagnoses were myopia and astigmatism in addition to CI. A chi-square test was used to test the significance of how gender affects other diagnoses of patients in addition to CI. The null hypothesis connected with the test is that gender is associated with the occurrence of other diagnoses in addition to CI. The chi-square test rejected the null hypothesis at the 0.05 level of significance for each of the other diagnosis with the exception of astigmatism. Based on the test, females with CI were significantly more likely to be associated with astigmatism than males with CI. A frequency distribution analysis of the spreadsheet in Appendix B concerning diagnoses and gender indicates a fairly even distribution between gender and diagnoses with the exception of astigmatism where it occurs in 58% of female patients and 33% of males which supports the chi-square outcome.

Table 5. In Addition to CI Diagnosis: (N=65) may have more than one answer

Diagnosis	No. and (%) of participants
Myopia	26 (40)
Hyperopia	22 (34)
Astigmatism	31 (48)
Accommodative dysfunction	7 (11)
Exotropia	11 (17)
Tramatic brain injuries	2 (3)
Glaucoma suspect	3 (5)
Aphakia	2 (3)
Amblyopia	1 (2)

CONCLUSION

Presence of symptoms is used by two-thirds of the doctors in making the diagnosis of CI. In earlier studies the most frequent occurring symptoms reported were headaches, diplopia, and asthenopia. This study reveals that the regional area of Big Rapids, Michigan might be different than the classic textbook symptoms. This study reveals that many patients had common symptoms for the doctor to suspect convergence insufficiency. The most frequent chief complaint was blur, followed by tired or strained eyes, then headaches, asymptomatic, and diplopia. Most common problem in patient's review of systems was tired eyes. Most frequent additional diagnosis to CI was astigmatism followed by myopia.

A chi-square test was used to test the significance of how the chief complaint affects review of systems and also how gender affects chief complaints, review of systems, and occurrence of additional diagnoses in CI patients. The null hypothesis connected with the test is that chief complaint is associated with review of systems, gender is associated with chief complaints, review of systems, and occurrence of other diagnoses in addition to CI. The chi-square test rejected the null hypothesis at the 0.05 level of significance for all variables with the exception of astigmatism. Based on the test, females with CI were significantly more likely to be associated with astigmatism than males with CI.

This study suggests a linking of variables together that could help in the diagnosis of convergence insufficiency. The typical CI patient at the Michigan College of

Optometry clinic is a male or female student between the ages of 11 years to 20 years with a chief complaint of blur or tired/strained eyes. This new study aids the clinician's knowledge prior to examination for diagnosing CI. This allows the practitioner to be clued into the patients' chief complaint, gender, age, occupation, review of systems, and additional diagnosis to convergence insufficiency statistical value prior to diagnosing CI. The findings of the study are useful for diagnostic purposes of convergence insufficiency and; therefore, will be helpful to better serve the patient.

REFERENCES

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2. Hyman, Leslie. et.al. Journal of Optometric Vision Development. 28 no.2; p.91-97: 1997.
3. Rouse, Michael W. et.al. Ophthalmic and Physiological Optics. 24 no.5; p.386-393: 2004.

APPENDIX A

QUESTIONNAIRE AND REVIEW OF SYSTEMS

QUESTIONNAIRE

1. What is your gender?
a) 1 Male
b) 0 Female

2. What is your age?
a) Years :Code age in years (e.g., 70)

3. What is your occupation?
a) 1 student
b) 2 retired
c) 3 other

4. What is your chief complaint today?
a) 1 tired eyes/eye strain
b) 2 headaches
c) 3 blur
d) 4 diplopia
e) 5 asymptomatic

5. What is your review of symptoms (may have more than one answer)?
a) asthma :If they checked yes = 1; If they check no = 0
b) tired eyes
c) itchy eyes
d) headaches
e) red eye
f) allergies
g) diplopia
h) learning disabilities
i) amblyopia
j) arthritis

6.. In addition to CI, Any other diagnosis today (may have more than one answer)?
a) myopia If they checked yes = 1; If they checked no = 0
b) astigmatism
c) accommadative dysfunction
d) hyperopia
e) XT
f) tbi
g) glaucoma suspect
h) aphakia
i) amblyopia

Figure 2 Review of Systems: a checklist which is part of the patient health information form

REVIEW OF SYSTEMS

Do you now have or have you ever had any of the following health problems?

PROBLEMS	YES	NO	IF YES, PLEASE EXPLAIN
♦ Eyes			
♦ Eye injury or eye pain			
♦ Loss of vision			
♦ Blurred vision			
♦ Tired eyes			
♦ Redness			
♦ Itching			
♦ Burning			
♦ Sandy or dry eyes			
♦ Excessive tears (watery eyes)			
♦ Vision disturbance (spots, halos, light flashes)			
♦ Light sensitivity / glare			
♦ Double vision			
♦ Glaucoma			
♦ Cataract			
♦ Macular degeneration			
♦ Diabetic retinopathy			
♦ Amblyopia			
♦ Eye turn (eso- or exotropia)			
♦ Keratoconus			
♦ Learning disability			
♦ Constitutional (fever, weight loss)			
♦ Ears, Nose, Mouth, Throat (sinus, chronic cough, etc)			
♦ Respiratory (asthma, emphysema, etc)			
♦ Cardiovascular (high blood pressure, vascular disease, etc)			
♦ Gastrointestinal (diarrhea, constipation, ulcers, etc)			
♦ Genitourinary (genitals, kidney, bladder)			
♦ Muscles/Bones/Joints (arthritis, etc)			
♦ Endocrine (diabetes, thyroid, etc)			
♦ Psychiatric (anxiety, depression, etc)			
♦ Blood/Lymph (anemia, high cholesterol, etc)			
♦ Allergic/Immunologic (hay fever, lupus, etc)			
♦ Skin			
♦ Neurological (headaches, multiple sclerosis, etc)			

Source: patient health information form, Michigan College of Optometry's clinic

APPENDIX B

QUESTIONNAIRE TABULATION SPREADSHEET

Table 6: Questionnaire Tabulation Spreadsheet

P	q1	q2	q3	q4	q5a	q5b	q5c	q5d
1	0	25	1	2	1	0	0	0
2	0	23	3	3	1	0	0	0
3	0	35	3	1	0	1	0	0
4	1	25	2	4	0	0	0	0
5	0	28	1	3	0	0	0	0
6	1	36	3	5	0	1	0	0
7	0	15	1	1	0	1	0	0
8	0	15	1	1	0	1	0	0
9	0	20	1	3	0	0	0	1
10	0	9	1	1	0	1	0	0
11	0	19	1	1	0	0	0	0
12	1	13	1	3	0	0	0	0
13	0	10	1	3	0	1	0	0
14	0	17	1	3	0	0	0	0
15	0	17	1	5	0	0	0	0
16	1	17	1	3	0	0	0	0
17	0	23	1	5	0	1	0	0
18	0	13	0	1	0	1	0	0
19	1	35	1	1	0	1	0	0
20	0	10	1	3	0	0	0	0
21	0	20	2	3	0	0	0	0
22	1	48	3	3	0	1	0	0
23	1	42	1	4	0	1	0	0
24	0	20	1	1	0	1	0	0
25	1	19	1	1	0	0	0	1
26	0	17	3	2	0	0	0	1
27	1	14	1	4	0	1	0	0
28	1	22	1	5	0	0	0	0
29	0	20	1	2	0	0	0	1
30	0	18	1	2	0	0	0	0
31	1	15	1	3	0	0	0	0
32	0	14	1	2	0	1	0	0
33	0	14	1	1	0	1	0	0
34	0	23	1	4	0	1	0	0
35	0	10	1	5	0	0	0	0
36	1	17	1	1	0	1	0	0
37	0	26	1	3	0	0	0	0
38	0	24	1	5	0	0	0	0
39	1	13	1	1	0	0	0	0
40	1	9	1	1	0	0	0	0
41	1	12	1	3	0	0	0	0
42	0	21	3	1	0	0	1	0
43	1	47	1	3	0	1	0	0
44	1	7	1	3	0	0	1	0

Table 6 (cont'd.)

45	0	14	1	2	0	0	1	0
46	1	9	1	1	1	1	0	1
47	1	17	1	2	0	0	0	0
48	1	14	3	5	1	0	0	1
49	0	37	1	2	0	0	0	1
50	1	22	1	3	0	1	0	0
51	0	20	1	3	0	0	0	0
52	1	21	1	1	0	0	0	0
53	0	19	1	3	1	1	0	0
54	0	24	1	2	0	0	0	0
55	1	17	1	2	0	1	0	1
56	0	12	1	2	0	0	0	0
57	0	12	1	3	0	0	0	0
58	1	28	1	5	0	0	0	0
59	0	20	1	3	0	1	0	0
60	0	15	1	2	0	1	0	1
61	1	9	1	2	0	0	0	0
62	1	20	1	3	0	0	0	0
63	1	11	1	5	0	0	0	0
64	0	10	1	5	0	0	0	0
65	0	27	1	4	1	1	0	1

See pages 2-3 and Apprendix A for description of the alpha numeric codes and numerical meanings.

Table 6 (cont'd.)

q5e	q5f	q5g	q5h	q5i	q5j	q6a	q6b
0	1	0	0	0	1	1	1
0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	1
0	0	0	0	0	0	0	0
0	1	0	1	0	0	0	1
0	0	0	1	0	1	1	1
0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	1
0	0	0	1	0	0	1	0
1	1	0	0	0	0	0	1
1	1	0	0	0	0	0	0
0	1	0	0	0	0	1	1
0	0	1	0	0	0	0	0
0	1	0	1	0	0	0	0
0	1	0	0	0	0	1	1
0	0	1	0	0	0	0	0
0	0	0	1	0	0	1	1
0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	1
0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	1
0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1
0	0	0	0	0	0	1	1
0	0	0	1	0	0	0	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	0
0	1	0	1	0	0	0	0

Table 6 (cont'd.)

0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1
0	1	0	0	0	0	1	1
0	0	0	0	0	0	1	1
1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0
0	0	1	0	0	0	1	1
0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	1	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	0	0	1	1

Table 6 (cont'd.)

q6c	q6d	q6e	q6f	q6g	q6h	q6i
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	1	1	0	1	0	0
0	0	0	0	0	1	0
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	0	1	0	0	0	0
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1	0	1	0	0	0	0
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0	1	1	0	0	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	0	0	1	0	1	0
0	0	0	0	1	0	0
1	1	0	0	0	0	0
0	1	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
1	0	0	0	0	0	0
0	0	0	0	0	0	0
1	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	0	0	0

Table 6 (cont'd.)

0	0	0	0	0	0	0
1	0	0	0	0	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	1	0	0	0	0	0
0	0	0	0	0	0	0
1	0	0	0	0	0	0
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	1	0	1	0	0
0	1	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	1	0	0	0	0	0
0	0	1	0	0	0	0
0	0	0	0	0	0	0

APPENDIX C

FREQUENCY OF ALL VARIABLES

Table 7: Frequency of Variables

The following are the frequencies for all of the variables: derived from the spreadsheet in Appendix B.

q1_gend -- participant gender

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 female	38	58.46	58.46	58.46
	1 male	27	41.54	41.54	100.00
	Total	65	100.00	100.00	

q2_age -- age

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	7	1	1.54	1.54	1.54
	9	4	6.15	6.15	7.69
	10	4	6.15	6.15	13.85
	11	1	1.54	1.54	15.38
	12	3	4.62	4.62	20.00
	13	3	4.62	4.62	24.62
	14	5	7.69	7.69	32.31
	15	4	6.15	6.15	38.46
	17	7	10.77	10.77	49.23
	18	1	1.54	1.54	50.77
	19	3	4.62	4.62	55.38
	20	7	10.77	10.77	66.15
	21	2	3.08	3.08	69.23
	22	2	3.08	3.08	72.31
	23	3	4.62	4.62	76.92
	24	2	3.08	3.08	80.00
	25	2	3.08	3.08	83.08
	26	1	1.54	1.54	84.62
	27	1	1.54	1.54	86.15
	28	2	3.08	3.08	89.23
	35	2	3.08	3.08	92.31
	36	1	1.54	1.54	93.85
	37	1	1.54	1.54	95.38
	42	1	1.54	1.54	96.92
	47	1	1.54	1.54	98.46
	48	1	1.54	1.54	100.00
	Total	65	100.00	100.00	

q3_occu -- occupation

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	1 student	56	86.15	86.15	86.15
	2 retired	2	3.08	3.08	89.23
	3 other	7	10.77	10.77	100.00
	Total	65	100.00	100.00	

q4_comp -- What is your chief complaint today?

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	1 tired eyes/eye strain	16	24.62	24.62	24.62
	2 headaches	13	20.00	20.00	44.62
	3 blur	21	32.31	32.31	76.92
	4 diplopia	5	7.69	7.69	84.62
	5 asymptomatic	10	15.38	15.38	100.00
	Total	65	100.00	100.00	

q5a_asth -- Asthma symptoms

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	59	90.77	90.77	90.77
	1 yes	6	9.23	9.23	100.00
	Total	65	100.00	100.00	

q5b_tire -- Tired eyes

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	40	61.54	61.54	61.54
	1 yes	25	38.46	38.46	100.00
	Total	65	100.00	100.00	

q5c_itch -- Itchy eyes

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	62	95.38	95.38	95.38
	1 yes	3	4.62	4.62	100.00
	Total	65	100.00	100.00	

q5d_head -- headaches

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	55	84.62	84.62	84.62
	1 yes	10	15.38	15.38	100.00
	Total	65	100.00	100.00	

q5e_red -- red eye

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	59	90.77	90.77	90.77
	1 yes	6	9.23	9.23	100.00
	Total	65	100.00	100.00	

q5f_alle -- allergies

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	52	80.00	80.00	80.00
	1 yes	13	20.00	20.00	100.00
	Total	65	100.00	100.00	

q5g_dipl -- diplopia

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	59	90.77	90.77	90.77
	1 yes	6	9.23	9.23	100.00
	Total	65	100.00	100.00	

q5h_lear -- learning disabilities

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	53	81.54	81.54	81.54
	1 yes	12	18.46	18.46	100.00
	Total	65	100.00	100.00	

q5i_ambl -- amblyopia

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	64	98.46	98.46	98.46
	1 yes	1	1.54	1.54	100.00
	Total	65	100.00	100.00	

q5j_arth -- arthritis

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	62	95.38	95.38	95.38
	1 yes	3	4.62	4.62	100.00
	Total	65	100.00	100.00	

q6a_myop -- myopia

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	39	60.00	60.00	60.00
	1 yes	26	40.00	40.00	100.00
	Total	65	100.00	100.00	

q6b_asti -- astigmatism

				Valid	Cum.

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	34	52.31	52.31	52.31
	1 yes	31	47.69	47.69	100.00
	Total	65	100.00	100.00	

q6c_acco -- accommadative dysfunction

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	58	89.23	89.23	89.23
	1 yes	7	10.77	10.77	100.00
	Total	65	100.00	100.00	

q6d_hype -- hyperopia

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	43	66.15	66.15	66.15
	1 yes	22	33.85	33.85	100.00
	Total	65	100.00	100.00	

q6e_xt -- xt

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	54	83.08	83.08	83.08
	1 yes	11	16.92	16.92	100.00
	Total	65	100.00	100.00	

q6f_tbi -- tbi

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	63	96.92	96.92	96.92
	1 yes	2	3.08	3.08	100.00
	Total	65	100.00	100.00	

q6g_glau -- glaucoma suspect

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	62	95.38	95.38	95.38
	1 yes	3	4.62	4.62	100.00
	Total	65	100.00	100.00	

q6h_apha -- aphakia

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	63	96.92	96.92	96.92
	1 yes	2	3.08	3.08	100.00
	Total	65	100.00	100.00	

q6i_ambl -- amblyopia

		Freq.	Percent	Valid Percent	Cum. Percent
Valid	0 no	64	98.46	98.46	98.46
	1 yes	1	1.54	1.54	100.00
	Total	65	100.00	100.00	

The following are the frequncies, for males and females, for each of the variables:

-> q1_gend = female

occupation	Freq.	Percent	Cum.
student	33	86.84	86.84
retired	1	2.63	89.47
other	4	10.53	100.00
Total	38	100.00	

-> q1_gend = male

occupation	Freq.	Percent	Cum.
student	23	85.19	85.19
retired	1	3.70	88.89
other	3	11.11	100.00
Total	27	100.00	

. bysort q1_gend: tab q4_comp

-> q1_gend = female

What is your chief complaint today?	Freq.	Percent	Cum.
tired eyes/eye strain	9	23.68	23.68
headaches	10	26.32	50.00
blur	12	31.58	81.58
diplopia	2	5.26	86.84
asymptomatic	5	13.16	100.00
Total	38	100.00	

```
-> q1_gend = male

   What is your chief |
     complaint today? |      Freq.     Percent        Cum.
----------------------+-----------------------------------
tired eyes/eye strain |          7       25.93       25.93
            headaches |          3       11.11       37.04
                 blur |          9       33.33       70.37
              diplopia |          3       11.11       81.48
         asymptomatic |          5       18.52      100.00
----------------------+-----------------------------------
                Total |         27      100.00

. bysort  q1_gend: tab  q5a_asth

-------------------------------------------------------------------------------
------------
-> q1_gend = female

     Asthma |
   symptoms |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         34       89.47       89.47
        yes |          4       10.53      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

     Asthma |
   symptoms |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         25       92.59       92.59
        yes |          2        7.41      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab   q5b_tire

-------------------------------------------------------------------------------
------------
-> q1_gend = female

 Tired eyes |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         23       60.53       60.53
        yes |         15       39.47      100.00
------------+-----------------------------------
      Total |         38      100.00
```

```
-----------
-> q1_gend = male

 Tired eyes |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         17       62.96       62.96
        yes |         10       37.04      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab   q5c_itch

-------------------------------------------------------------------------------
-----------
-> q1_gend = female

 Itchy eyes |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         36       94.74       94.74
        yes |          2        5.26      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
-----------
-> q1_gend = male

 Itchy eyes |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         26       96.30       96.30
        yes |          1        3.70      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab   q5d_head

-------------------------------------------------------------------------------
-----------
-> q1_gend = female

  headaches |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         32       84.21       84.21
        yes |          6       15.79      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
-----------
-> q1_gend = male

  headaches |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         23       85.19       85.19
        yes |          4       14.81      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab    q5e_red
```

```
-------------------------------------------------------------------------------
------------
-> q1_gend = female

    red eye |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         34       89.47       89.47
        yes |          4       10.53      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

    red eye |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         25       92.59       92.59
        yes |          2        7.41      100.00
------------+-----------------------------------
      Total |         27      100.00


. bysort  q1_gend: tab    q5f_alle

-------------------------------------------------------------------------------
------------
-> q1_gend = female

  allergies |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         30       78.95       78.95
        yes |          8       21.05      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

  allergies |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         22       81.48       81.48
        yes |          5       18.52      100.00
------------+-----------------------------------
      Total |         27      100.00


. bysort  q1_gend: tab     q5g_dipl

-------------------------------------------------------------------------------
------------
-> q1_gend = female

   diplopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         33       86.84       86.84
        yes |          5       13.16      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
```

```
------------
-> q1_gend = male

   diplopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         26       96.30       96.30
        yes |          1        3.70      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab  q5h_lear

-------------------------------------------------------------------------------
------------
-> q1_gend = female

   learning |
disabilitie |
          s |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         34       89.47       89.47
        yes |          4       10.53      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------

------------
-> q1_gend = male

   learning |
disabilitie |
          s |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         19       70.37       70.37
        yes |          8       29.63      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab   q5i_ambl

-------------------------------------------------------------------------------

------------
-> q1_gend = female

  amblyopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         37       97.37       97.37
        yes |          1        2.63      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

  amblyopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         27      100.00      100.00
------------+-----------------------------------
      Total |         27      100.00
```

```
. bysort  q1_gend: tab    q5j_arth

-------------------------------------------------------------------------------
------------
-> q1_gend = female

  arthritis |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         36       94.74       94.74
        yes |          2        5.26      100.00
------------+-----------------------------------
      Total |         38      100.00
-------------------------------------------------------------------------------
------------
-> q1_gend = male

  arthritis |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         26       96.30       96.30
        yes |          1        3.70      100.00
------------+-----------------------------------
      Total |         27      100.00


. bysort  q1_gend: tab     q6a_myop

-------------------------------------------------------------------------------
------------
-> q1_gend = female

     myopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         21       55.26       55.26
        yes |         17       44.74      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

     myopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         18       66.67       66.67
        yes |          9       33.33      100.00
------------+-----------------------------------
      Total |         27      100.00


. bysort  q1_gend: tab   q6b_asti

-------------------------------------------------------------------------------
------------
-> q1_gend = female

astigmatism |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         16       42.11       42.11
        yes |         22       57.89      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
```

```
------------
-> q1_gend = male

astigmatism |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         18       66.67       66.67
        yes |          9       33.33      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab   q6c_acco

-------------------------------------------------------------------------------
------------
-> q1_gend = female

accommadati |
         ve |
dysfunction |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         33       86.84       86.84
        yes |          5       13.16      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

accommadati |
         ve |
dysfunction |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         25       92.59       92.59
        yes |          2        7.41      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend: tab    q6d_hype

-------------------------------------------------------------------------------
------------
-> q1_gend = female

  hyperopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         25       65.79       65.79
        yes |         13       34.21      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

  hyperopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         18       66.67       66.67
        yes |          9       33.33      100.00
------------+-----------------------------------
      Total |         27      100.00
```

```
. bysort  q1_gend: tab   q6e_xt

-------------------------------------------------------------------------------
------------
-> q1_gend = female

         xt |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         31       81.58       81.58
        yes |          7       18.42      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

         xt |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         23       85.19       85.19
        yes |          4       14.81      100.00
------------+-----------------------------------
      Total |         27      100.00


. bysort  q1_gend: tab   q6f_tbi

-------------------------------------------------------------------------------
------------
-> q1_gend = female

        tbi |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         37       97.37       97.37
        yes |          1        2.63      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

        tbi |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         26       96.30       96.30
        yes |          1        3.70      100.00
------------+-----------------------------------
      Total |         27      100.00


. bysort  q1_gend:  tab q6g_glau

-------------------------------------------------------------------------------
------------
-> q1_gend = female

   glaucoma |
    suspect |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         37       97.37       97.37
        yes |          1        2.63      100.00
------------+-----------------------------------
      Total |         38      100.00
```

```
-------------------------------------------------------------------------------
------------
-> q1_gend = male

   glaucoma |
    suspect |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         25       92.59       92.59
        yes |          2        7.41      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend:  tab  q6h_apha

-------------------------------------------------------------------------------
------------
-> q1_gend = female

    aphakia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         37       97.37       97.37
        yes |          1        2.63      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

    aphakia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         26       96.30       96.30
        yes |          1        3.70      100.00
------------+-----------------------------------
      Total |         27      100.00

. bysort  q1_gend:  tab  q6i_ambl

-------------------------------------------------------------------------------
------------
-> q1_gend = female

  amblyopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         37       97.37       97.37
        yes |          1        2.63      100.00
------------+-----------------------------------
      Total |         38      100.00

-------------------------------------------------------------------------------
------------
-> q1_gend = male

  amblyopia |      Freq.     Percent        Cum.
------------+-----------------------------------
         no |         27      100.00      100.00
------------+-----------------------------------
      Total |         27      100.00

.
end of do-file
```