Contact Lens Assessment in Youth: Multi-Center Testing of a Risk Assessment Survey for Soft Contact Lens Wearers with Red Eyes L. Sorbara¹, R.L. Chalmers², H. Wagner³, D.Y. Lam⁴, B. T. Kinoshita⁵,



¹School of Optometry and Vision Science, University of Waterloo, Waterloo, ON, Canada, ²Indiana University School of Optometry, Bloomington, IN; ³College of Optometry, NOVA Southeastern University, Ft. Lauderdale, FL; ⁴Southern California College of Optometry at Marshall B. Ketchum University, Fullerton, CA;. ⁵College of Optometry, Pacific University, Forest Grove, OR; ⁶College of Optometry, Ohio State University, Columbus, OH; ⁷College of Optometry, State University of New York, NY, NY.

BACKGROUND AND PURPOSE

The Contact Lens Assessment in Youth (CLAY) study group recently developed the Contact Lens Risk Survey (CLRS) to study known and potential risk factors associated with soft CL wear. ^{1,2}

We hypothesized that soft CL wearers with active serious and significant CL-related events (IK, CLPU, CLARE, MK) would report different CL wear and care behaviors, hygiene or environmental factors than those experiencing other "red eye" events (allergic or bacterial conjunctivitis, etc.).

The purpose of this study was to demonstrate the ability of the CLRS to discriminate factors associated with serious and significant events among subjects as they presented for care.

METHODS

The CLRS was fielded by 171 soft CL wearers presenting with complaints of a red or painful eye at 11 sites in the US and Canada. After consent procedures, self-administered surveys were completed prior to any education on the diagnosis or possible associations to the event. Subjects' diagnoses were later classified as serious and significant (S&S) or other (See Table 1).

Responses to the CLRS from 98 subjects with serious and significant events and 73 other red eye subjects were analyzed using multivariate regression to determine which factors were associated with the risk of having a serious and significant event (SAS version 9.3).

Table 1

S&S	Microbial Keratitis	MK (presumed or culture positive)
S&S	Inflammatory Conditions	CLPU, CLARE with SEI or without, IK, Iritis
Non-S&S	Other Infectious Conditions	Bacterial Conjunctivitis, Viral Conjunctivitis
Non-S&S	Conjunctival Conditions	Abrasions, injection, hemorrhage, pingueculitis,
		Allergic Conjunctivitis
Non-S&S	Corneal Conditions	Staining, Toxic Keratitis, Edema
Non-S&S	Mechanical Conditions	Abrasions, FB, SEAL, lens stuck/torn in eye

In this pilot study, 8 of the 30+ CLRS items were associated with increased risk of having a serious and significant event in a univariate analysis (see Table 2). Three of the factors were retained in a multivariate model that included age, gender and number of days of CL wear per week:

- 1-2 weekly CL replacement
- Sleeping in CLs
- Purchasing CLs on the internet

Distribution of responses for these factors are shown (Figures 1-3).

		%	% Univariate model			Multivariate model*					
Factor	Level	S & S	OR	95% CI	p-value	aOR	95% CI	p-value			
Lens	Hydrogel	44.2		reference		Highly associated with replacement					
material	Silicone hydrogel	63.2	2.16	1.10, 4.26	0.025	schedule (p<0.0001)					
Replacement					0.006			0.016			
schedule	Daily disposable	37.5	0.58	0.24, 1.42	0.23	0.64	0.23, 1.74	0.38			
based on	1-2 Week	69.9	2.23	1.07, 4.65	0.032	2.36	1.03, 5.39	0.042			
brand	Monthly	50.9		reference		reference					
Lens	When a problem	77.8	3.05	1.16, 8.00	0.024	Highly associated with where					
replacement	All other responses	53.5	reference purchase CLs (p=0.003)				003)				
Where					0.038			0.043			
purchase	Private practice	59.2	0.53	0.21, 1.34	0.18	0.40	0.14, 1.13	0.084			
CLs	Retail w/eye exam	65.2	0.68	0.21, 2.22	0.52	0.41	0.11, 1.53	0.18			
	Retail w/o eye exam	50.0	0.36	0.10, 1.30	0.12	0.29	0.07, 1.19	0.085			
	University clinic	30.4	0.16	0.05, 0.53	0.003	0.12	0.03, 0.46	0.002			
	Internet	73.3				reference					
How often					0.025			0.017			
sleep in CLs	Always or Fairly often	75.0	2.95	1.09, 7.95	0.033	3.85	1.17, 12.71	0.027			
	Sometimes	71.4	2.46	1.00, 6.02	0.049	3.15	1.12, 8.84	0.029			
	Infrequently or Never	50.4	reference			reference					
How often					0.024						
nap in CLs	Always or Fairly often	74.5	2.76	1.24, 6.14	0.013	Highly correlated with sleep in CLs					
	Sometimes	50.0	0.95	0.46, 1.94	0.88	(R=0.51, p<0.0001)					
	Infrequently or Never	51.1		reference							
How often					0.025	Highly correlated with sleep in CLs					
shower in	Always or Fairly often	65.7	2.63	1.23, 5.64	0.013						
CLs	Sometimes	48.4	1.29 0.50, 3.34 0.60 (R=0.36, p<0.0001)								
	Infrequently or Never	42.1		reference							
How often					0.044	Highly correlated with sleep in CLs					
wear CLs	Always or Fairly often	64.2	1.97	0.97, 4.01	0.060						
> 18 hrs/day	Sometimes	69.4	2.51	1.09, 5.75	0.030	(R=0.50, p<0.000	1)			
	Infrequently or Never	47.6		reference	ce						
All models include age, gender and number of days of CL wear per week 1-3 days, 4-6 days or everyday											

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G.L. Mitchell⁶, A. Zimmerman⁶, K. Richdale⁷

RESULTS

Table 2



In this pilot study of CL wearers with active "red eyes" the CLRS was able to discriminate factors associated with serious and significant events versus more benign CL-related events.

For DD lenses, our study concurs with Chalmers' previous work³ in showing that they are protective to inflammatory events. On the other hand, 1-2 week replacement has not been shown before and needs further consideration. This study also agrees with others concerning overnight wear and increased risk of S&S events.^{4,5} Finally, internet purchase of CLs has also been considered as a risk for events recently, where Young⁶ in a literature review found that unregulated and internet purchase may be linked to cases of MK.

Some items in the current version of the CLRS could likely be removed to help streamline the instrument for broader clinical use.

use of CLs.

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DISCUSSION

CONCLUSIONS

The CLRS is a survey tool designed to identify risk factors for CL complications. It can also be used to document patient-reported contact lens practices in wearers without an active complication as a starting point for individualized training on proper

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