



Low Vision and Dry Eye: Does one diagnosis overshadow the other?

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Introduction

- The prevalence of both dry eye disease (DED) and low vision (LV) increase with age. Visual aids for LV patients are becoming more digital (computers/tablets) and their usage has shown to affect the tear film due to decreased blinking rates. Consequently, it is of interest to evaluate if DED is being assessed in LV patients, given the change in current population demographics.

The **objective** of this study was to elucidate whether DED risk factors, signs and symptoms are assessed in LV patients who receive an optometric exam in the context of their vision rehabilitation services.

Methods

Patient files were randomly selected for a retrospective chart review if they fulfilled the following inclusion criteria;

1. Patients were seen at one of the two following centers;
 - a) *Institut Nazareth et Louis-Braille (INLB) du CISSS de la Montérégie-Centre*
 - b) *Centre de réadaptation Lethbridge-Layton-Mackay (LLM) du CIUSSS du Centre-Ouest-de-l'Île-de-Montréal*
2. Patients were seen for a comprehensive eye exam within the past 3 to 5 years

Files meeting these criteria were evaluated to extract:

1. Demographic data
2. Risk factors associated with DED, including signs and symptoms
3. DED-specific tests
4. Ocular surface evaluation
5. Type of visual aids recommended

Results

- The files of 80 men and 121 women (n=201), age range 24 to 101, (mean 71.2 ± 18.9 yrs) identified risk factors for DED. They included systemic medication use (30.3%); systemic diseases (49.2%); history of ocular surgery (72.1%); and use of artificial tears (36.8%) (Table 1 and 2)
- No specific DED testing (questionnaire, tear stability, quantity, osmolarity) was performed, with the exception of corneal integrity assessment.
- The evaluation of ocular surface structures (cornea, conjunctiva and eyelids) were recorded in >70% of the charts, whereas eyelashes (31.3%) and blink and lid closure (3%) were documented less often. (Table 2)
- Visual aids were recommended to 92.5% of patients, with 39.8% using a computer/tablet (Figure 1)

Table 1: Patient Demographics

		LLM	INLB	TOTAL	
Charts reviewed		n = 101	n = 100	n = 201	
Age (years)	Mean \pm SD Range	68.6 \pm 19.0 26 - 97	73.8 \pm 18.5 24 - 101	71.2 \pm 18.9 24 - 101	p = 0.054
Sex	Female Male	62 39	59 41	121 (60.2%) 80 (39.8%)	p = 0.73
Visual acuity (logMAR)		0.9 \pm 0.6	0.9 \pm 0.4	0.9 \pm 0.5	

Table 2: Frequency of reported risk factors, symptoms and signs for DED in the visually impaired patient charts

Risk factors

participants (%)

> 1 Systemic disease	99 (49.2 %)
History of ocular surgery	145 (72.1 %)
Systemic medications	61 (30.3 %)
Use of artificial tears	74 (36.8 %)

Symptoms

participants (%)

1 symptom	46 (22.9 %)
> 1 symptom	15 (7.5 %)

Ocular structures evaluated

participants (%)

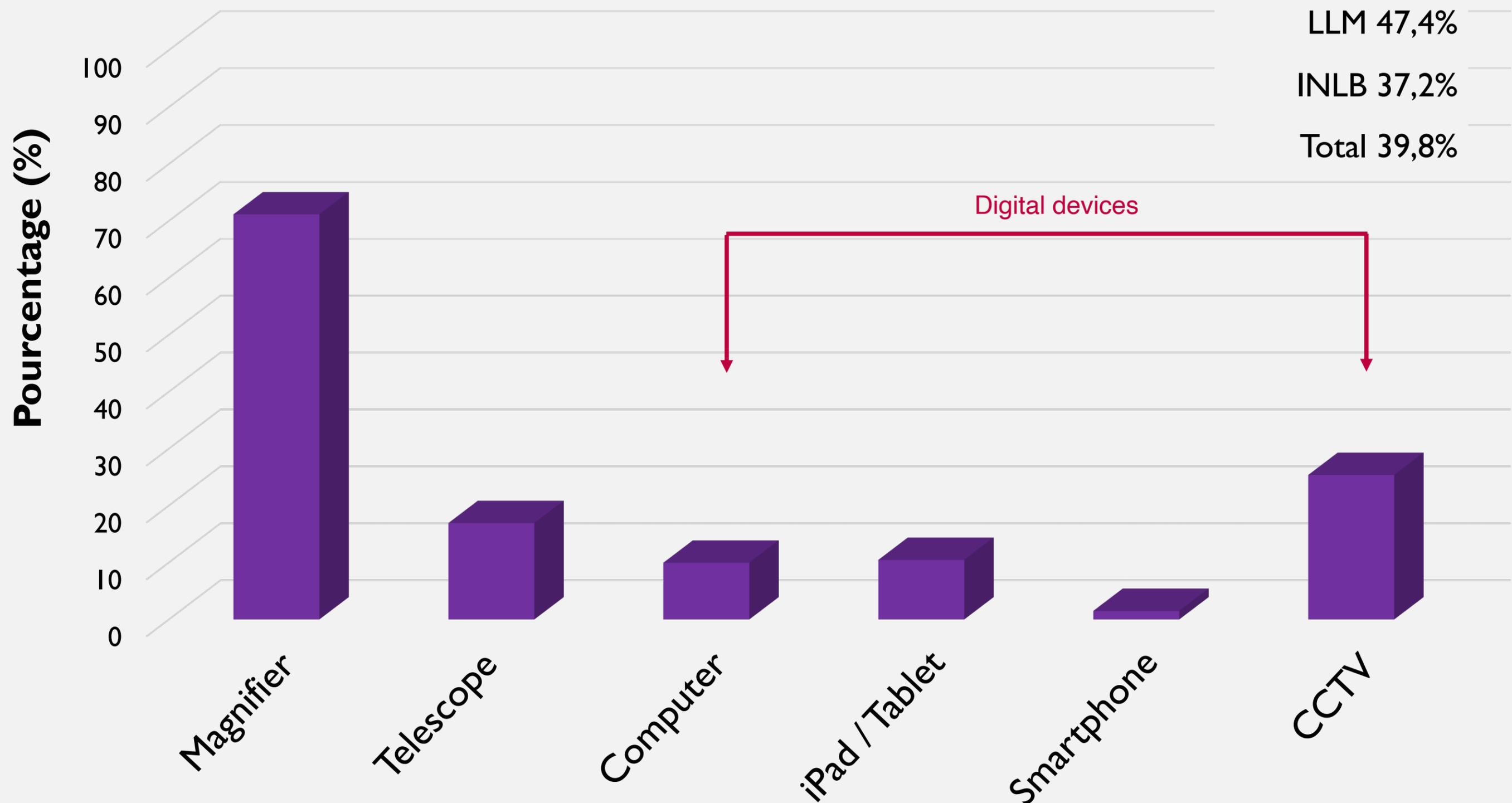
Eyelids	70.1 %
Eyelashes	31.3 %
Blink and lid closure	3.0 %
Cornea	82.6 %
Bulbar conjunctiva	70.6 %

Dry eye-specific tests

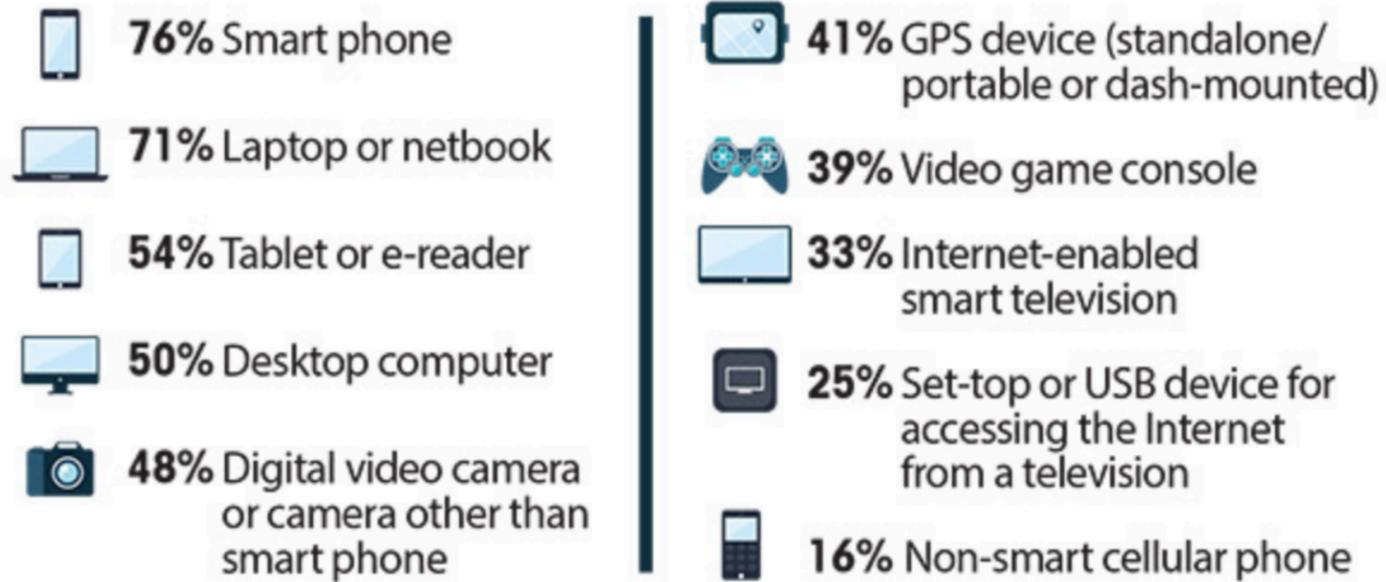
participants (%)

DED questionnaire (ie. OSDI)	0
Tear film stability (ie. TBUT)	0
Tear volume	0
Tear osmolarity	0
Corneal integrity	8.9%

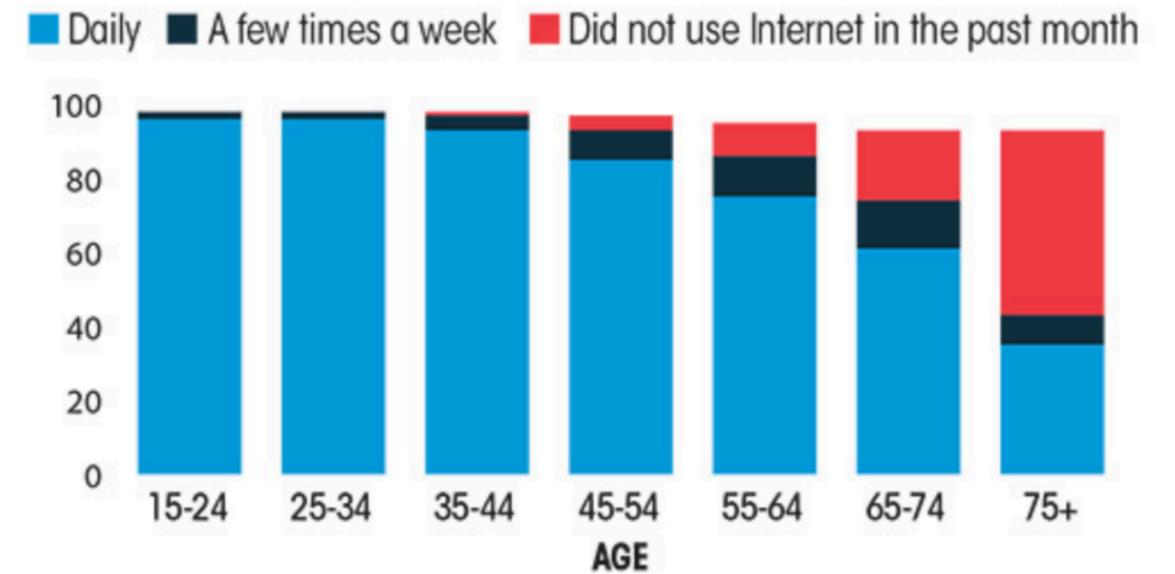
Figure 1 : Recommended visual aids in our sample of low vision patients



Top 10 devices owned.



Nearly all Canadians under the age of 45 use the Internet every day.



<https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2017032-eng.htm>

Internet usage in Canada (2013-2018), by age category

	0-11	12-17	18-24	25-34	35-44	45-54	55-64	65+
2013	47.5%	94.2%	95.7%	95.6%	94.4%	87.6%	81%	49%
2014	49.1%	96.2%	96.5%	96.3%	94.5%	88.8%	82.5%	50%
2015	50.6%	97.3%	97.4%	96.7%	94.6%	90%	83%	51%
2016*	52.1%	97.6%	98%	97.3%	95.3%	91.2%	83.5%	52%
2017*	53.5%	97.7%	98.9%	97.6%	96.7%	92.7%	84%	52.5%
2018*	54.9%	97.8%	99.7%	98%	98%	94.5%	84.5%	53%

<https://www.statista.com/statistics/373955/canada-online-penetration-age/>

Discussion

LV population are

- older
- have more systemic disease
- take more medication
- have undergone ocular surgery
- use electronic visual aids
- have numerous risk factors for DED

Digital devices affect

- blink rate ¹¹⁻¹²
- the number of incomplete blinks ¹¹⁻¹²
- >4hrs/day: reduction of tears (TMH) ¹³
- >4hrs/day: increases symptoms ¹³
- lipid layer instability ¹³
- decrease in TBUT ¹⁴
- increase of MGD ¹⁵

Effect on vision

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graph TD; A[LV population are] --> D[Effect on vision]; B[Digital devices affect] --> D;
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Conclusion

- LV patients have multiple risk factors for DED. Even though DED tests were not currently performed in a comprehensive LV eye exam in this sample.
- Use of optical aids is variable amongst LV patients, however digital devices are used in 40% of them, and will likely increase in the future according to stats-canada)
- More efforts should be made to assess DED in an attempt to enhance comfort and functional vision, especially with the increasing demands of digital devices as visual aids.



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Images sources : www.freepik.com; www.picabay.com; Medical News Today

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