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Visual light sensitivity in community-dwelling Israeli older adults: distribution profile and relations to sleep, executive functioning and health status parameters

Maria Korman*, Pavel Fishbein, Daria Zarina, Adi Berger, Liat Hen-Herbst

Occupational Therapy Department, Faculty of Health Sciences, Ariel University, Israel

*korman.maria@ariel.ac.il

Background

The prevalence and distribution of visual light sensitivity (VLS) symptoms in the general population and the relationships between VLS, sleep-wake behavior and health are largely unknown. Visual light sensitivity in older adults was suggested to be an important contributor to sleep dysregulation and cognitive-emotional problems.

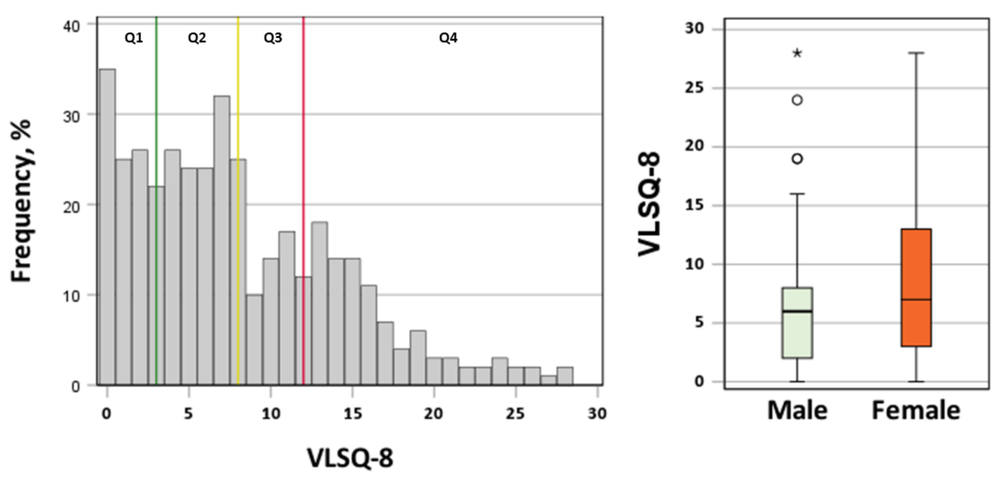
The objectives of this study were to explore the distribution of the VLS, as well as to map the relationships between VLS, sleep parameters, health status, and executive functioning deficits in the sample of community-dwelling Israeli older adults.

Method. We developed a digital Circadian-Light-Executive Function questionnaire for the elderly, the CLISEF+, by combining several research tools: Visual light sensitivity questionnaire (VLSQ-8)[1], Munich ChronoType Questionnaire (MCTQ) [2], Dysexecutive Questionnaire (DEX-21)[3], Epworth Sleepiness Scale (ESS)[4] and the Global Health Short Form questionnaire PROMIS-10[5]. Additional separate questions assessed: subjective sleep quality using a Likert scale, number of nocturnal awakenings and sleep latency in min. A total of 791 participants opened the link to the CLISEF+ survey. The analytic sample consisted of 389 subjects, 60-88 years old (67±5.6, 75.6% women), after exclusion of participants with diagnosed eye disease or photophobia, eye surgery, shift-workers, participants who reported poor health and partial data.

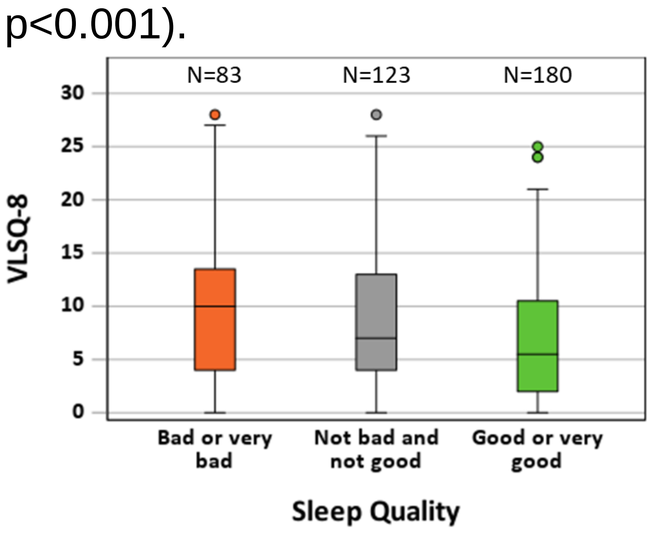
Results

The mean VLSQ-8 total score of the sample was 8.0 ± 6.2. The distribution of the VLSQ-8 scores was strongly skewed towards zero (skewness = 0.82, median score = 7, 25th percentile = 3, 75th percentile = 12), suggesting that symptoms of visual light sensitivity, e.g., eyestrain, blinking, eye pain or discomfort, are mild.

There was a significant difference between males and females in the VLSQ-8 total scores (Mann-Whitney U=10954, Z=-2.95, p<0.001; 6.32 ± 5.45, 8.54 ± 6.41, males and females, respectively). Males scored lower than females in five out of eight VLSQ-8 items, there were no items in which females scored lower than males.



Spearman correlation analysis revealed significant negative correlation between the VLSQ-8 score and subjective sleep quality (ρ_S=-0.22**). Kruskai-Wallis test showed that this relationship is gradual (Kruskal-Wallis H (3) = 13.88, p<0.001).



Additional correlations were found between the **VLSQ-8 score** and habitual **nocturnal sleep duration** (ρ_S =-0.13**); **number of nocturnal awakenings** (ρ_S =0.17**), **symptoms of daytime sleepiness** (ESS: ρ_S =0.19**) and **sleep latency** (ρ_S =0.19**). Chronotype (mid-sleep time on free days) and social jetlag did not correlate with the VLSQ-8 score.

Higher VLSQ-8 scores were also associated with more **symptoms of executive dysfunction** (DEX-21: ρ_S =0.21**) and **lower general health status score** (PROMIS-10: ρ_S =-0.27**).

Conclusions

These results suggest that most community-dwelling older adults did not present strong negative symptoms of VLS. Nevertheless, in the elderly with higher levels of subjective VLS it may constitute an important factor related to reduced sleep function, lower health status and executive functioning deficits. Additional, large-scale epidemiological research is needed to model the relationship between individual visual light sensitivity and sleep, cognitive and physical health in the elderly.

References

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