

QUALITY OF LIFE AND DEPRESSION LEVEL IN PATIENTS WITH WATERY EYE

Jelena Juri Mandić¹, Petra Kristina Ivkić¹, Krešimir Mandić¹, Dina Lešin¹,
Tomislav Jukić¹ & Jasenka Petrović Jurčević

¹Department of Ophthalmology, University Hospital Center Zagreb, School of Medicine,
University of Zagreb, Zagreb, Croatia

²Health Center East, Eye Health Unit, Zagreb, Croatia

received: 26.10.2017;

revised: 9.1.2018;

accepted: 18.1.2018

SUMMARY

Background: The aim of this study was to assess subjective, human aspect of the medical condition, evaluate the quality of life (QOL) and level of depressive symptoms in patients with watery eye and compare it with patients with two most common causes of visual deterioration: cataract and macular region pathology. The results of this study may serve to raise awareness of watery eye impact on a large number of patients and subsequently promote their treatment in order to restore full visual and life quality necessary for normal human functioning.

Subjects and methods: In this prospective, randomised, questionnaire-based study, we have surveyed three groups of patients with a total of 210 patients: group with the watery eye of different etiology (n=69), group with one pseudophakic eye and one cataract eye (n=73) and group with the unilateral pathology of the macular region (n=68). All three groups underwent a complete ophthalmologic examination. To examine the overall quality of life we have used a modified vision-related quality of life questionnaire (VR-QOL) and to evaluate depression level "Beck Depression Inventory - 2". The results were analyzed with statistical program STATISTICA 13.

Results: Compared to group with unilateral cataract eye and to group with unilateral pathology of the macular region, the results of this study show that patients with watery eye have significantly decreased quality of life in all daily activities, particularly in outdoor activities (F=125.80, df=2/143, p<0.01), during sports (F=36.67, df=2/143, p<0.01) and interpersonal relations (F=18.73, df=2/143, p<0.01). Results between three groups showed that group with watering eye expressed highest depression level and group with one pseudophakic eye and the other cataract eye the lowest (F=25.86, df=2/207, p<0.01).

Conclusion: Watery eye has a significant impact on vision-related quality of life. Our research showed that patients with watery eye had expressed more depressive symptoms than other groups, but still without statistically significant value. Since it affects a large and heterogenic group of patients it is important to be recognized on time and treated etiologically in attempt to restore full function and life quality. The results of this study may serve to raise awareness of watery eye impact on a large number of patients and subsequently promote their treatment in order to restore full visual and life quality necessary for normal functioning.

Key words: watery eye - quality of life – cataract - pathology of macular region - depression

* * * * *

INTRODUCTION

A stable tear film is vital for maintaining optical quality and normal functioning of the visual system (Denoyer et al. 2012). Watery eye is a symptom of etiologically different conditions in which there is an overflow of tears onto the face. It is usually a result of multifactorial causes (Bakri et al. 1999). Watery eye is a commonly reported symptom and has even been described on ancient Egyptian papyrus artifacts and in the era of Hippocrates (Hirschberg 1982). There are three main causes resulting with watery eye - excessive production of tears, insufficient tear drainage or both. There are many different etiological conditions causing excessive or reflex tearing resulting in occasional or permanent watery eye: systemic autoimmune diseases, central nervous system diseases, local corneal conditions. There are also many different conditions for insufficient lacrimal drainage system resulting in the watery eye: eyelid malposition or blockage of drainage in congenital and acquired conditions. It is well known that any dis-

ruption of the tear film on the eye surface degrades the vision-related quality of life (Shin et al. 2015). In order to maintain optimal anterior eye segment conditions and full vision-related quality of life, secretory and lacrimal drainage system should be in physiological and functional balance (Guyat et al. 1993, Reiger 1992). The variety of conditions resulting with watery eye makes obvious that this symptom can be found in a large and heterogenic group of young, middle-aged and older individuals. Moreover, data shows that occasional or permanent watery eye symptoms, regardless to its etiology, represent one of the most frequently encountered complain in ophthalmology practice (Battu et al. 1999, Deschamps et al. 2013, Guyat et al. 1993, Qihua et al. 2014). The exact prevalence of watery eye is not known and it varies from study to study probably because of nomenclature problems and lack of clear etiological differentiation of causes resulting in watery eye symptom.

In the early eighties of the last century, it has been suggested by Cassel (1982), that not only the scientific outcome but also the human, subjective perspective of

medical condition or procedure should account. Since then, there have been many studies assessing the quality of life in different medical conditions (Rubic et al. 2014, Filipčić et al. 2010, Glavić et al. 2014). Many clinical trials have proven impaired quality of life in patients with different unilateral or bilateral pathology of the anterior and posterior eye segment (Brahma et al. 2000, Casard et al. 1995, Linder et al. 1999, Mackenzie et al. 2002, Ranta & Kivela 2002, Schiffman et al. 2000, Scott et al. 1998, Vitale et al. 2004). Despite a long history of recognizing the symptom of the watery eye, there are few reports on its impact on patients daily activities and social life (Cassel 1982, Shin et al. 2015). There are few studies that describe the effect of the dry eye on the expression of psychiatric symptoms, but so far there is no influence which has been described on the expression of depressive symptoms in patients with watery eye (HAN SB et al. 2017, Zheng Y et al. 2017). This has resulted in certain health care policy worldwide, that assigns higher priorities to anterior eye segment problems, namely cataract and its treatment to other ophthalmological conditions and treatments. The aim of this study is to assess the effect of watery eye symptom on vision-related activities of everyday life in a large cohort of patients with a mean age of 69 ± 3 years. Even though the condition can affect all age groups, it is more common in middle-aged and older people (50+ years) because in that group of patients there are numerous factors affecting both secretory and lacrimal drainage system causing watery eye.

The indirect aim of this study is to raise awareness to this condition and its impact on everyday life and improvement of a diagnostic algorithm that will facilitate etiological treatment and restoration of function.

SUBJECTS AND METHODS

In this prospective, randomised, questionnaire-based study, we have surveyed three groups of patients: group I - patients with the watery eye of different etiology, group II - patients with one pseudophakic eye and the other cataract eye, group III - patients with unilateral pathology of macular region. A total of 210 patients from ophthalmology outpatient clinic in a period of 6 months were collected. The group comprised 69 patients with the watery eye of different etiologies, 73 with one cataract and other pseudophakic eye and 68 with unilateral macular region pathology. The study was conducted in accordance with the Declaration of Helsinki. All patients were provided written informed consent prior to participation in the study. Patients older than 18 years were included. All three groups had similar epidemiological characteristics and groups II and III had similar visual acuity in both eyes. The inclusion criteria in group I was frequent or permanent watery eye for at least three months because of lacrimal drainage problems, tear hypersecretion, dry eye or some other multifactorial causes with best corrected visual acuity (BCVA) on both eyes from 0.7 to 1.0. Non-inclusion criteria for the group I were any anterior or posterior eye segment pathology

that can affect visual acuity more than BCVA of 0.7 per eye. All three groups underwent a complete ophthalmological examination (visual acuity, slit lamp examination, corneal fluorescein dye test, tear breakup time test, Schirmer tests) and in group I we also performed an evaluation of secretory and lacrimal drainage system (examination of the face, eye corners and eyelids, eyelid tendons laxity, thickness of tear meniscus, Jones test, syringing). To examine the quality of life we used a vision related questionnaire published in a scientific journal, modified by additional questions.

Out of a total of 210 enrolled patients examined in our outpatient clinic during the 6-months period, 117 were females and 93 males with a mean age of 69 ± 3 years (range 26-92 years). Our group of patients with the watery eye is a bit older than average, with mean age 69 ± 3 . The reason for it is to minimise the bias while comparing them to the groups with cataract eye and macular region pathology. Participants completed a self-administered questionnaire. The questionnaire consisted of 11 questions concerning common vision related symptoms that affect performing of daily activities based on the Ocular Surface Disease Index (OSDI). Questions on the frequency of discomfort with daily activities were answered on the scale (1-3) as 1-always, 2-under certain condition and 3-never. Daily activities that were assessed included reading, watching TV, working at a computer, daytime and nighttime driving, work-related activities, household activities, outdoor activities, sports activities, interpersonal relations and general happiness. Depression level was evaluated by using a 21 - question multiple - choice self - report inventory (Back Depression Inventory BDI-II). Statistical analysis was performed using standard statistical program STATISTICA 13. We used standard parametric statistics procedures, t-tests, analysis of variance (ANOVA), correlation and regression analysis. The level of statistical significance was $p=0.05$.

RESULTS

Group with watery eye exhibit significantly impaired outdoor and sports activities and least impaired working on the computer (Table 1). The group with one pseudophakic eye and the other cataract eye exhibit significantly impaired reading and least impaired sport and interpersonal relations ($F=28.58$, $df=2/143$, $p<0.01$). In this group, general happiness reached the highest score (mean: 2.54) compared to group I (mean: 1.66) and group III (mean: 1.79). The group with the unilateral pathology of macular region exhibit significantly impaired reading and least impaired outdoor and sports activities. Results of analysis of variance showed statistically significant differences between the three groups practically in all activities, particularly in following daily activities: outdoor activities, sports activities, interpersonal relations and general happiness. Only performing household activities showed no statistically significant difference between three groups. The average value of results in the analysis of variance for all three

groups showed that group with watery eye have the greatest discomfort during outdoor activities (mean: 1.23) and lowest score in general happiness (mean: 1.67). Results of correlation between groups I, II and III, showed that group with watery eye had a statistically significant positive correlation between older age and the amount of interference during daytime driving and activities associated with work and during leisure activities (sports and recreation). Results of correlation analysis in group I showed that greater discomfort in reading indicated greater disturbances while watching TV ($r=0.37$), greater discomfort during nighttime driving is associated with major disturbances during daytime driving ($r=0.63$), working on the computer ($r=0.50$) and watching TV ($r=0.42$). Greater discomfort during outdoor activities is associated with greater difficulties during leisure activities (sports and recreation). Discomfort during interpersonal relations is positively related to general happiness and quality of life

(Table 2). The results of the correlational analysis for group II and III are in tables 5, 6 (Table 3, 4). Analyzing the gender effect on daily discomfort in daily activities in group I, females had statistically significant higher scores for daytime ($t=-3.47$, $df=45$, $p<0.01$) and nighttime ($t=-4.51$, $df=45$, $p<0.01$) driving and working at computer ($t=-2.20$, $df=46$, $p<0.015$) (Table 5). Males had significantly higher score during household activities ($t=2.23$, $df=46$, $p<0.03$). Unilateral and bilateral watery eye patients showed no significant differences in scores. We also examined depression level using a 21-question multiple-choice self-report inventory (Beck Depression Inventory, BDI-II). Results of analysis of variance between three groups showed that group with watery eye expressed highest depression level and group with one pseudophakic eye and the other cataract eye the lowest ($F=25.86$, $df=2/207$, $p<0.01$). However, none of these three groups showed no signs of significant depression.

Table 1. Descriptive values on the Quality of life questionnaire and Beck Depression Inventory score for 3 groups of patients

QOL items	M ₁	SD ₁	M ₂	SD ₂	M ₃	SD ₃
Reading	2.333333	0.724446	2.380000	0.602376	1.687500	0.689009
Watching TV	2.229167	0.805291	2.500000	0.580288	1.708333	0.617419
Computer	2.729167	0.573885	2.800000	0.451754	2.229167	0.750591
Daytime driving	2.479167	0.771558	2.740000	0.486973	2.319149	0.810432
Nighttime driving	2.541667	0.713348	2.640000	0.597956	2.085106	0.928528
Work	2.500000	0.684167	2.820000	0.481918	2.583333	0.646869
Household activities	2.562500	0.649263	2.780000	0.464670	2.770833	0.472187
Outdoor activities	1.229167	0.515281	2.600000	0.638877	2.833333	0.429415
Sport	1.979167	0.837666	2.860000	0.350510	2.812500	0.394443
Interpersonal relations	2.020833	0.699227	2.800000	0.494872	2.437500	0.681246
General happiness	1.666667	0.663111	2.540000	0.578880	1.791667	0.617419
BDI-2 score	10.145000		7.835600		9.411800	

1 – (n=69); 2 – (n=73); 3 – (n=68); 1 - a group of patients with the watery eye of different etiology; 2 - a group of patients with one pseudophakic eye and the other cataract eye; 3 – a group of patients with unilateral pathology of macular region

Table 2. Results of correlational analysis for patients with watery eye of different etiology

	Gender	Age	Discomfort	Reading	Watching TV	Computer	Daytime driving	Nighttime driving	Work	Household activities	Outdoor activities	Sport	Interpersonal relations	General happiness
Gender	1.00	-0.08	0.03	-0.08	0.08	-0.15	0.10	0.18	-0.03	-0.19	0.05	0.19	-0.22	0.09
Age		1.00	-0.03	-0.15	-0.06	0.27	0.35*	0.28	0.58	0.08	0.06	0.34*	0.04	-0.10
Discomfort			1.00	0.07	0.03	-0.30*	-0.07	0.02	-0.05	0.32*	0.18	-0.25	0.02	0.22
Reading				1.00	0.56**	0.01	-0.05	0.11	-0.04	0.31*	0.13	-0.21	0.32*	0.34*
Watching TV					1.00	0.23	0.21	0.42**	0.10	0.31*	-0.14	-0.12	0.18	0.35*
Computer						1.00	0.17	0.50**	0.28	-0.18	-0.23	-0.25	0.01	0.05
Daytime driving							1.00	0.63**	0.23	0.20	0.11	0.12	0.02	0.27
Nighttime driving								1.00	0.31*	0.18	-0.04	-0.05	0.06	0.24
Work									1.00	0.22	-0.15	0.06	0.02	-0.00
Household activities										1.00	0.17	0.02	0.16	0.22
Outdoor activities											1.00	0.32*	0.05	0.05
Sport												1.00	0.04	-0.25
Interpersonal relations													1.00	0.34*
General happiness														1.00

* $p<0.05$; ** $p<0.01$

Table 3. Results of correlational analysis for patients with one pseudophakic eye and the other cataract eye

	Gender	Age	Discomfort	Reading	Watching TV	Computer	Daytime driving	Nighttime driving	Work	Household activities	Outdoor activities	Sport	Interpersonal relations	General happiness
Gender	1.00	0.15	0.08	-0.01	-0.36**	-0.15	0.11	0.11	-0.02	-0.18	-0.28	-0.18	-0.22	-0.02
Age		1.00	-0.08	-0.03	-0.20	0.03	-0.11	0.01	0.05	0.05	-0.18	0.04	-0.05	-0.06
Discomfort			1.00	0.41**	0.37**	0.25	0.36**	0.28*	0.21	0.12	0.35*	0.41**	0.36*	0.61**
Reading				1.00	0.38**	-0.09	-0.0	-0.07	0.03	0.23	0.14	0.35*	0.33*	0.57**
Watching TV					1.00	0.31*	0.04	-0.06	0.04	0.42**	0.44**	0.35*	0.50**	0.39**
Computer						1.00	0.41**	0.56**	0.30*	-0.12	-0.21	0.08	0.18	0.19
Daytime driving							1.00	0.72**	0.49**	-0.08	0.05	0.02	0.03	0.15
Nighttime driving								1.00	0.41**	-0.07	-0.17	0.05	-0.04	0.16
Work									1.00	0.18	0.03	0.09	0.10	0.21
Household activities										1.00	0.38**	0.31*	0.43**	0.37**
Outdoor activities											1.00	0.29*	0.32*	0.26
Sport												1.00	0.42**	0.48**
Interpersonal relations													1.00	0.60**
General happiness														1.00

*p<0.05; **p<0.01

Table 4. Results of correlational analysis for patients with unilateral pathology of macular region

	Gender	Age	Discomfort	Reading	Watching TV	Computer	Daytime driving	Nighttime driving	Work	Household activities	Outdoor activities	Sport	Interpersonal relations	General happiness
Gender	1.00	0.12	0.19	-0.20	-0.15	0.29*	0.46**	0.56**	0.12	-0.29*	-0.21	0.26	-0.18	0.10
Age		1.00	0.38	-0.03	0.07	0.62**	0.56**	0.63**	0.73**	-0.03	0.01	0.22	-0.09	0.46**
Discomfort			1.00	0.25	0.27	0.47**	0.37*	0.42**	0.42**	0.14	0.15	0.04	0.12	0.42**
Reading				1.00	0.55**	0.21	-0.22	-0.23	0.20	0.21	0.26	-0.05	0.17	0.12
Watching TV					1.00	0.37*	-0.02	-0.03	0.22	0.08	0.13	-0.15	0.08	0.02
Computer						1.00	0.46**	0.37*	0.63**	-0.18	0.05	0.21	-0.21	0.23
Daytime driving							1.00	0.89**	0.47**	-0.16	-0.21	0.26	-0.08	0.21
Nighttime driving								1.00	0.49**	-0.26	-0.23	0.28	-0.10	0.26
Work									1.00	0.13	0.12	0.10	-0.19	0.55**
Household activities										1.00	0.68**	-0.11	0.05	0.16
Outdoor activities											1.00	0.06	-0.10	0.04
Sport												1.00	0.18	0.11
Interpersonal relations													1.00	0.17
General happiness														1.00

*p<0.05; **p<0.01

Table 5. Results of daily discomfort between genders for group of patients with watery eye

Variable	Mean 1	Mean 2	t-value	df	p	Valid N 1	Valid N 2	SD
Discomfort	1.631579	1.655172	-0.11839	69		30	39	0.760886
Reading	2.421053	2.275862	0.67508	69		30	39	0.768533
Watching TV	2.157895	2.275862	-0.49231	69		30	39	0.958190
Computer	2.842105	2.655172	1.10623	69		30	39	0.374634
Daytime driving	2.368421	2.551724	-0.80186	69		30	39	0.760886
Nighttime driving	2.368421	2.655172	-1.37478	69		30	39	0.760886
Work	2.526316	2.482759	0.21350	69		30	39	0.696692
Household activities	2.736842	2.448276	1.52703	69		30	39	0.653376
Outdoor activities	1.210526	1.241379	-0.20078	69		30	39	0.418854
Sport	1.789474	2.103448	-1.27847	69		30	39	0.787327
Interpersonal relations	2.210526	1.896552	1.54357	69		30	39	0.713283
General happiness	1.578947	1.724138	-0.73824	69		30	39	0.692483

DISCUSSION

Even though occurrence of watery eyes requires serious disruption of physiological balance between the lacrimal secretory and drainage system and is found in many systemic and local pathological conditions, this entity is often neglected in clinical practice and it is not identified as a real pathology (Ho et al. 2006, Woog et al. 2007). The etiological causes for watery eye symptom are frequently neglected and etiological treatment is often missing. Moreover, there are only a few reports assessing subjective part of similar diseases in a form of QOL questionnaires (Boisjoly et al. 2002, Denoyer et al. 2012, Ho et al. 2006, Kafil-Hussain & Khooshebah 2005, Qihua et al. 2014, Shin et al. 2015). On the other hand, other ocular pathologies like anterior eye segment diseases and posterior eye segment diseases are well recognized as conditions with strong vision-related quality of life component (Casard et al. 1995, Elliot et al. 2000, Kafil-Hussain & Khooshebah 2005, Linder et al. 1999, Mackenzie et al. 2002, Steinberg et al. 1994, Woog et al. 2007). There are number of studies investigating the impact of unilateral or bilateral cataract on life quality, as well as the impact of macular region pathology on life quality (Casard et al. 1995, Elliot et al. 2000, Kafil-Hussain & Khooshebah 2005, Linder et al. 1999, Mackenzie et al. 2002, Steinberg et al. 1994, Woog et al. 2007). Even though watery eye, cataract and macular region pathology are primarily vision-related disorders, the objective measurement of similar visual acuities between those groups may not equivalently reflect the level of patient's satisfaction regarding everyday activities and overall life quality (Kafil-Hussain & Khooshebah 2005).

There are few reports, as well as results of our study, that show greater adverse impact on every day activities in patients with watery eye in different pathological conditions, compared to one-eyed cataract patients and one-eyed macular region pathology patients (Casard et al. 1995, HO et al. 2006, Kafil-Hussain & Khooshebah 2005, Mackenzie et al. 2002, Shine et al. 2015). Results of Kafil-Hussain et al. suggested that patients with epiphora (insufficient lacrimal drainage resulting with watery eye) suffer the same if not more of a visual handicap than patients with unilateral cataract.

The aim of this study was to evaluate the quality of life and depression level in patients with watery eye regardless of its etiology as a subjective component of the ocular disease comprising social, emotional and cognitive data. Quality of life according to World health organization is multidimensional and subjective. It depends on general health, psychological condition, level of independence in patient's daily activities, social relationships, environment and possibilities for the realization of personal goals (Filipic et al. 2010, Glavic et al. 2014, Guyat et al. 1993, Rubic et al. 2014). There is a number of questionnaires used for assessing the quality of life in different conditions resulting in a watery eye.

NEI-VFQ (National Eye Institute Vision Functioning Questionnaire) and a disease-specific questionnaires like IDEEL (Impact of Dry Eye Everyday Life) and OSDI (Ocular Surface Disease Index) are typically used (Boisjoly et al. 2002, Casard et al. 1995, Kafil-Hussain & Khooshebah 2005, Linder et al. 1999, Mackenzie et al. 2002, Schiffman et al. 2000, Shine et al. 2015, Steinberg et al. 1994, Vitale et al. 2004). The Beck Depression Inventory is a 21 – question multiple – choice self – report inventory, one of the most widely used psychometric tests for measuring the severity of depression. However, the successful completion of those questionnaires usually requires repeated detailed instructions and is subsequently time-consuming. Given the specific characteristics of our groups (older age, visual acuity, diverse etiologies of conditions resulting with watery eye) we used simple modified questionnaire published by Shin et al. in *BMC Ophthalmology* 2015. It consists of 10 questions assessing vision-related QOL in three groups of patients. Fulfilling the questionnaire did not require additional clarification and it wasn't time-consuming. The results showed that group with watery eye have significantly hindered almost all questioned categories, especially outdoor activities. In the group with unilateral cataract, the most hindered was reading and in the group with unilateral macular pathology reading and watching TV. Group of patients with one pseudophakic and one cataract eye showed the most satisfying results through all examined categories. Group of patients with watery eye and group of patients with unilateral macular pathology showed almost the same results through all questioned categories. However, the group with watery eye had slightly less satisfying results in general happiness category. Shin et al. (2015) showed that epiphora significantly impaired outdoor activities. In our study, we got similar results. Interestingly, their results showed a higher score for household activities in females, opposite to the results of our study where male patients had significantly higher score during household activities. Through all examined categories between three groups, a group with watery eye showed the greatest adverse impact on life quality. However, none of these three groups showed no signs of significant depression. Our study, unlike others, comprised patients with watery eyes of different etiologies including those with dry eye syndrome, lacrimal drainage problems and lacrimal pump dysfunction. Also, to the best of our knowledge, this is the first report comparing the quality of life and depression level between patients with watery eyes, unilateral pathology of anterior eye segment - cataract, and unilateral posterior eye segment pathology – macular region disease.

CONCLUSIONS

Quality of life questionnaires provide subjective components of certain pathological conditions and add a deeper insight into objective clinical findings. Diverse

etiological pathways affecting lacrimal system, periocular region and neuromuscular function can result with watery eye symptom which is one of the most often seen complain in ophthalmology practice. The condition affects a large number of patients, mostly older people but also middle-aged, working people as well as children. Since these groups make a large number of patients encountered in every day ophthalmology practice the impact of such condition on society in whole is clear. Moreover, as life expectancy increases according to demographic trends in many countries, the watery eye prevalence in older people will continue to increase and significantly affect the quality of life. Our research showed that patients with watery eye had expressed more depressive symptoms than other two groups, but still without statistically significant value. We believe that awareness of watery eye as a condition that has a significant adverse impact on everyday activities in a large number of patients can lead to greater appreciation of this symptom and facilitate physician's attempt to resolve it.

Acknowledgements: None.

Conflict of interest: None to declare.

Contribution of individual authors:

Jelena Juri Mandić - study design, manuscript writing, final approval;

Petra Kristina Ivkić - data collection, manuscript writing, statistical analysis;

Krešimir Mandić - data collection, statistical analysis;

Dina Lešin, Tomislav Jukić & Jasenka Petrović Jurčević - data collection.

References

1. Bakri SJ, Carney AS, Robinson K, Jones NS, Downes RN: *Quality of life outcomes following dacryocystorhinostomy: external and endonasal laser techniques compared. Orbit* 1999; 18:83-8
2. Battu VK, Meyer DR, Wobig JL: *Improvement in subjective visual function and quality of life outcome measures after blepharoptosis surgery. Am J Ophthalmol* 1996; 121:677-686
3. Boisjoly H, Gresset J, Charest M: *The VF-14 index of visual function in recipients of corneal graft: a 2-year follow-up study. Am J Ophthalmol* 2002; 134:166-171
4. Brahma A, Ennis F, Harper R: *Visual function after penetrating keratoplasty for keratoconus: a prospective longitudinal evaluation. Br J Ophthalmol* 2000; 84:60-66
5. Casard SD, Patrick DL, Damiano AM: *Reproducibility and responsiveness of the VF-14. An index of functional function in patients with cataracts. Arch Ophthalmol* 1995; 113:1508-151
6. Cassel EJ: *The nature of suffering and the goals of medicine. N Engl J Med* 1982; 306:639-45
7. Denoyer A, Rabut G, Baudouin C: *Tear film aberration dynamics and vision-related quality of life in patients with dry eye disease. Ophthalmol* 2012; 119:1811-8
8. Deschamps N, Ricaud X, Rabut G, Labbé A, Baudouin C, Denoyer A: *The impact of dry eye disease on visual performance while driving. Am J Ophthalmol* 2013; 156:184-9
9. Elliot DB, Parla AE, Furniss M, Adkin A: *Improvements in clinical and functional vision and quality of life after second eye cataract surgery. Optom Vis Sci* 2000; 77:13-24
10. Filipcic I, Margetic B, Simunovic I, Jakovljevic M: *Depression treatment and its impact upon the quality of life in patients with diabetes type 2 – the Croatian study. Psychiatr Danub* 2010; 22:231-5
11. Glavic Z, Galic S, Krip M: *Quality of life and personality in patients with colorectal cancer. Psychiatr Danub* 2014; 26:172-180
12. Guyat GH, Fenny DH, Patrick DL: *Measuring health-related quality of life. Ann Intern Med* 1993; 118:622-629
13. Hirschberg J: *The history of ophthalmology. In: Vol 1 Blodi FC, trans. Bonn: Wayenborgh JP* 1982; p.10
14. Ho A, Sachidananda R, Carrie S, Neoh C: *Quality of life assessment after non-laser endonasal dacry ocystorhinostomy. Clin Otolaryngol* 2006; 31:399-403
15. Kafil-Hussain N, Khooshebah R: *Clinical research, comparison of the subjective visual function in patients with epiphora and patients with second-eye cataract. Orbit* 2005; 24:33-8
16. Linder M, Chang TS, Scott IU: *Validity of the visual function on index (VF-14) in patients with retinal disease. Arch Ophthalmol* 1999; 117:1611-1616
17. Mackenzie PJ, Chang TS, Scott IU et al.: *Assessment of vision-related function in patients with age-related macular degeneration. Ophthalmol* 2002; 109:720-729
18. Qihua Le, Meiyang Li, Jianjiang Xu et al.: *Comparison on the vision-related quality of life between outpatients and general population with dry syndrome. Acta Ophthalmol* 2014; 92:124-132
19. Ranta P, Kivela T: *Functional and anatomic outcome of retinal detachment surgery in pseudophakic eyes. Ophthalmol* 2002; 109:1432-1440
20. Reiger G: *The importance of the precorneal tear film for the quality of optical imaging. Br J Ophthalmol* 1992; 76:157-8
21. Rubic M, Kuna SK, Tesic V: *The most common factors influencing on quality of life of thyroid cancer patients after hormone withdrawal. Psychiatr Danub* 2014; 26:520-527
22. Schiffman RM, Christianson MD, Jacobsen G, Hirsch JD, Reis BL: *Reliability and validity of the Ocular Surface Disease Index. Arch Ophthalmol* 2000; 118:615-21
23. Scott IU, Smiddy WE, Feuer W, Merikansky A: *Vitroretinal surgery outcomes. Results of a patient satisfaction/functional status survey. Ophthalmol* 1998; 105:795-803
24. Shin JH, Kim YD, Woo KI, et al.: *Impact on epiphora on vision-related quality of life. BMC Ophthalmol* 2015; 15:6
25. Steinberg EP, Tielsch JM, Schein OD et al.: *The VF-14. An index of functional impairment in patients with cataract. Arch Ophthalmol* 1994a; 112:630-638
26. Steinberg EP, Tielsch JM, Schein OD: *National study of cataract surgery outcome. Variation in 4-month post-operative outcomes as reflected in multiple outcome measures. Ophthalmol* 1994b; 101:1131-1140

27. Vitale S, Goodman LA, Reed GF, Smith JA: Comparison of the NEI-VFQ and OSDI questionnaires in patients with Sjögren's syndrome-related dry eye. *Health Qual Life Outcomes* 2004; 2:44
28. Woog JJ: The incidence of symptomatic acquired lacrimal outflow obstruction among resident of Olmsted County, Minnesota, 1976-2000 (an American Ophthalmological Society thesis) *trans Am ophthalmol Soc* 2007; 105:649-66
29. Han SB, Yang HL, Hyon JY, Wee WR: Association of dry eye disease with psychiatric or neurological disorders in elderly patients. *Clin Interv Aging* 2017; 12:785-792
30. Zheng Y, Wu X, Lin X, Lin H: The Prevalence of Depression and Depressive Symptoms among Eye Disease Patients: A Systematic Review and Meta – analysis. *Sci Rep* 2017; 7:46453

Correspondence:

Jelena Juri Mandić, MD, PhD
Department of Ophthalmology, Medical School University of Zagreb
University Hospital Centre Zagreb
Kišpatićeva 12, 10 000 Zagreb, Croatia
E-mail: jjuri@kbc-zagreb.hr