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Visual Impairment in the Elderly and its Influence on the Quality of Life

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Abstract

According to data of United Nations, it is estimated that the global share of people aged 60 years or over will increase from 841 million people (11.7%) in 2013 to more than 2 billion (21.1%) by 2050 (UN DESAPD, 2013). This burden can be reduced by the abilities of older persons to increase their independently lifestyle, and financially self-support through their own labor earnings, income from their assets, and through public transfers, but all of these are dependent by their health status and quality of life (WHO 2012). In this context, visual impairment and its consequences represent an important element of the burden of the disease, even more than dementia, hearing loss and osteo-arthritis, and also, a factor that altered quality of life of this category of individuals. It was realized a cross-sectional research on a sample comprised of 53 patients with diagnosis of cataract, sample homogenous regarding gender (26 males, 27 females) and age (average age 70.1 ± 8.3 years) of patients. Quality of life were assessed at the baseline and after one month follow-up by WHO-5 Well-Being Index, a psychometric tool who can be used also to screen all patients showing signs of depression (cut-off point < 13) (WHO, 1998). Significant correlations were found between the presence of cataract and both impaired quality of life expressed through the level of well-being and sleep disorders in elderly patients. Both the quality of life and sleep disorders improved after cataract surgery, which proved the importance of the intervention.

Keywords: cataract, quality of life, well-being, sleep disorders, elderly, depressive symptoms.

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Introduction

Population ageing phenomenon is common in nearly all the countries of the world and has important demographic, social and economic consequences, because of low old-age support ratios (number of working-age adults per older person in the population), of presence of a high level of poverty among older individuals, and pressure which action on the social security systems. Also, population ageing represent an important issue for public health, due to increasing prevalence of non-communicable diseases and disabilities in this category of population.

According to data of United Nations, it is estimated that the global share of people aged 60 years or over will increase from 841 million people (11.7%) in 2013 to more than 2 billion (21.1%) by 2050. (UN DESAPD, 2013) This burden can be reduced by the abilities of older persons to increase their independently lifestyle, and financially self-support through their own labor earnings, income from their assets, and through public transfers, but all of these are dependent by their health status and quality of life (WHO 2012).

In this context, visual impairment and its consequences represent an important element of the burden of the disease, even more than dementia, hearing loss and osteo-arthritis, and also, a factor that altered quality of life of this category of individuals. Among ophthalmic pathology in the elderly, the cataract is responsible for 51% (20 millions of persons) of blindness causes at the world level (WHO, 2013) and represent one of the major causes of burden of disease, with 1478 YLD (Years Lost due to Disability) per 100,000 persons in the whole world, 2492 YLD per 100,000 persons in low income countries, respectively in the 136 YLD per 100,000 persons in developed countries. (WHO, 2012) More important, this type of burden of disease can be reduced at very little cost, through a surgery with significant results on improving visual acuity and, consecutively, quality of life for these individuals (McAlinden, Gothwal & Khadka, 2011).

Data from literature showed that visual impairment in elderly has been associated a high level of mortality (Lam *et al.*, 2006; Karpa *et al.*, 2009), presence of depression and anxiety disorders (Augustin *et al.*, 2007), and affected quality of sleep (Asplund, 2000; Zizi *et al.*, 2002; Lockley, Arendt & Skene, 2007). Moreover, sleep disorders, linked or not with visual deficit in elderly, are associated with severe risk factors for health as cardiovascular diseases, hypertension, stroke, diabetes mellitus, and obesity (Cappuccio *et al.*, 2011; Knutson, 2010) which represent also important reasons for an impaired quality of life for older persons. The aim of our study was to evaluate the associations between visual impairment; the quality of life expressed through well-being level, and self-reported quality of sleep in a sample of older persons with ophthalmic pathology, before and after the surgery realized in order to correct the visual deficit.

Material and methods

It was realized a cross-sectional research on a sample comprised of 53 patients with diagnosis of cataract, sample homogenous regarding gender (26 males, 27 females) and age (average age 70.1 ± 8.3 years) of patients. The subjects were selected from the individuals admitted in Clinic of Ophthalmology Timisoara, between January 1st and April 30th 2015 for cataract surgery. All the patients were involved in the study following their consent and according to the ethical norms for scientific research, this research being approved by the Ethic Committee of Victor Babes University of Medicine and Pharmacy Timisoara, Romania.

Testing of visual acuity with and without correction was realized through Snellen eye chart and auto refractometer. At the baseline (considered the evaluation realized before cataract surgery), from the patients included in the research, 69,8% presented minor visual impairment, 20.8% mild visual impairment, while at 9.4% was assessed severe deficit and total blindness. One month after the surgery, the visual acuity were regained for all the patients, with a maximum value for 83% of patients, and a level of 0.6, 0.7, respectively 0.9 for each 5.7% of them.

Quality of life were assessed at the baseline and after one month follow-up by WHO-5 Well-Being Index, a psychometric tool who can be used also to screen all patients showing signs of depression (cut-off point < 13). (WHO, 1998) The WHO-5 Well-being Index is a short, self-administered questionnaire covering 5 positively worded items, related to positive mood (good spirits, relaxation), vitality (being active and waking up fresh and rested), and general interests (being interested in things). The quality of sleep was assessed with a self-developed Likert scale with six degrees, and patients have completed a record of number of sleep hours for every night during the period between baseline and follow-up.

Data obtained were recorded on Microsoft Excel 2007 sheets and analyzed by SPSS 18 statistical software. Statistical significance was considered for $p < 0.05$ in the Kendal, Mann-Whitney and Kruskal-Wallis tests and mixed-design analysis of variance model (Mixed ANOVA).

Results

The average score obtained at *baseline* for WHO-5 Well-Being Index, the tool used in the assessment of quality of life were 40.53 ± 18.97 , with a minimum score of 4 and a maximum of 80 out of 100. According to the WHO instructions (WHO, 1998), scores below 13 are significant for the presence of depressive symptoms, and were present at 9.4% (5 patients) of the study sample, 4 of them diagnosed with total blindness, and one with major visual impairment. Regarding the number

of sleep's hours, before surgical intervention, were recorded an average of 5.04 ± 1.27 hours for week-nights (39.6% of patients has slept less than 5 hours per night), and 5.40 ± 1.35 for weekend nights (26.4.6% with less than 5 sleeping hours per night), with limits between 2 and 8 hours. The quality of sleep were also considered poor or very poor for 62.3% of them, in the context in which they have affirmed that for a sleep of good quality and with positive effects against tiredness are necessary 8.03 ± 0.682 hours, data significantly correlated both for week-nights ($\tau=0.546$; $p<0.001$; $r=0.29$) and weekend nights ($\tau=0.609$; $p<0.001$). Consecutively, WHO-5 scores were significantly lowest for those with less than 5 hours of sleep, both for week-nights ($U=147.5$; $z=-3.43$; $p=0.001$; $r=0.47$) and weekend nights ($U=130.5$; $z=-2.88$; $p=0.004$; $r=0.39$).

At *one month follow-up*, after the surgical intervention, WHO-5 showed an average score of 66.04 ± 14.24 , with a minimum of 32, and a maximum of 92, all patients being above the cut-off point for depression. A mixed between-within subject analysis of variance was conducted to assess the impact of initial categories of visual acuity deficit on subjects index WHO-5, evaluated before and one month after cataract surgery, with a significant improvement of the evolution of the well-being scores (Wilks Lambda=0.232; $F(1.50)=165.31$; $p<0.001$; partial eta squared=0.768) and a large effect size. The number of sleep's hours was 6.83 ± 0.612 for week-nights, respectively 7.04 ± 0.619 for weekend nights, and 41 patients (77.3%) has described a good and very good quality of sleep. The positive changes on WHO-5 scores was significantly correlated with the increased number of sleep's hours both for week-nights ($\tau=0.418$; $p<0.001$; $r=0.18$) and weekend nights ($\tau=0.385$; $p<0.001$; $r=0.15$). (*Table 1*)

Mixed ANOVA for the increased quality and number of sleep's hours showed a significant evolution with a large size effect for the number of sleep's hours before and after surgical intervention both for week-nights (Wilks Lambda=0.256; $F(1.50)=145.31$; $p<0.001$; partial eta squared=0.744), and weekend nights (Wilks Lambda=0.362; $F(1.50)=88.29$; $p<0.001$; partial eta squared=0.638). It was observed also an improvement based on a great difference between scores of the self-assessment for the quality of sleep, before and after cataract surgery ($z=-5.87$; $p<0.001$; $r=0.80$).

Both at baseline and one month follow-up were not emphasized significant correlation between the level of visual deficit and quality of life, duration and quality of sleep.

Table 1. Mean scores of before-after surgery parameters by visual deficiency in worst eye

	Visual deficit on worst eye					
	Without deficit (n=11)		With deficit (n=17)		Blindness (n=25)	
	Before surgery	After surgery	Before surgery	After surgery	Before surgery	After surgery
Hours slept during week nights	5.5±1.13	6.7±0.47	4.81±0.44	6.9±0.66	5.01±0.21	6.8±0.65
Hours slept during weekend nights	6.1±1.22	7.1±0.54	5.1±1.50	7.0±0.71	5.31±0.24	7.0±0.61
WHO-5	52.42±3.29	69.81±6.33	34.61±4.28	64.51±3.41	39.41±8.10	65.4±14.14

Discussions

Data from literature confirmed that WHO-5 Well-Being Index showed a very good internal and external validity, and reliability both for expressing the quality of life through its items related to positive mood, vitality, and general interests, and signaling the presence of depressive symptoms (Topp *et al.*, 2015), especially on elderly patients (Heun *et al.*, 1999; Bonsignore *et al.*, 2001). In our research, the scores of WHO-5 were significantly reduced for the patients whose quality of sleep was poor or very poor with less than five hour of sleep per night. Moreover, its scores highlighted the presence of depressive symptoms for 9.4% out of all patients, diagnosed confirmed by psychiatric assessment, all those patients having severe visual impairment or even total blindness. Depressive disorder represent by itself a major factor contributing to sleep impairment in elderly (Lee *et al.*, 2003), and depression associated with in cataract increase the risk for development of sleep disorders. (Moseley *et al.*, 1996) Direct correlation between quality of life and depression after cataract surgery were reported (Ishii, Kabata & Oshika, 2008), even if some other study did not find significant change in sleep quality before and after cataract surgery (Tanaka *et al.*, 2010). In our sample, one month after the surgery we found a statistically significant improvement for the WHO-5 (25.5±13.62), in direct correlation with the increasing of sleep hours and quality, results similar with those of some other studies (Toa *et al.*, 2014) which showed also significant improvements regarding depressive symptoms after surgical intervention.

The prevalence of sleep disorders in individuals with visual deficiency has been reported to be 58% (Arendt *et al.*, 1997) and 23% – 47% (Leger *et al.*, 1999), and disruption of the circadian rhythm, common in older people, remain one of the main reasons for sleep disturbances and their association with depressive symptoms (Nechita, Pirlog & Chirita, 2015). The disruption of circadian rhythms are caused by cataracts which block the light transmittance needed to maintain them (Eramudugolla, Wood & Anstey, 2013), but also by the decreased melatonin

secretion, decreased physical activity, polipharmacy, and comorbiditie (Van Someren, Riemersma & Swaab, 2002).

According to data of National Sleep Foundation (Hirshkowitz *et al.*, 2015), for a good quality of life, the recommended duration of sleep for elderly is in average of 7-8 hours (no more than 9, respectively less than 5 hours), the average duration of sleep for our study sample being at the low level of this recommendation before the surgical intervention, as well as for quality of sleep (poor and very poor for our patients). These results are similar to other studies which have proved poor quality and short duration of sleeps for older individuals with cataract (Ayaki *et al.*, 2013). After the surgery, the duration of sleep for patients included in our study has recorded a significant increase (1.79 ± 1.02 hours for week-nights, respectively 1.62 ± 1.16 for weekend nights), data consistent with the results of researches realized for similar category of patients (Asplund, Ejdervik & Lindblad, 2002; Wei *et al.*, 2013).

In this context, considering cataract and its direct effects as an important issue for public health, this kind of surgical intervention is expected to represent an effective treatment option to regaining visual acuity and, also, to lead to improvement in sleep and associated depression, and also in the quality of life of people affected (Turner, Someren & Mainster, 2010; Tanaka *et al.*, 2010; Ayaki *et al.*, 2013)

Despite its proven benefits, cataract surgery through the method of lens implant is not yet widespread, due to the significant financial costs involved in implementing it. In the current Romanian health system funded by the state, are not reimbursed the full cost to perform cataract surgery, because the National Health Insurance House partially settled this medical service and there is, to date, no reimbursement from any private medical insurance. Due to the increased awareness on the use of this intervention, and a positive ratio between social and economical benefits (low direct costs due to reduced time of surgery and the hospital admission, basic non-medical costs related with homecare and transport) and indirect expenses (cost of care for comorbidities, burden of disease to family members or caregivers, loss of well-being or quality of life), more and more patients request it, even if they are forced to incur additional costs.

Loss of visual acuity through cataract represent thus an important issue for public health, its influence on quality of life for people affected being emphasized also by the increased risks for mood disorders, especially depression (Monteleone, Martiadis & Maj, 2011), insomnia and other sleep disorders (Lack & Wright, 2010), obesity (Froy, 2010), diabetes mellitus (Gale *et al.*, 2011), cardiovascular diseases (Puttonen, Harma & Hublin, 2010) or cancer (Savvidis & Koutsilieris, 2012).

Conclusions

Significant correlations were found between the presence of cataract and both impaired quality of life expressed through the level of well-being and sleep disorders in elderly patients. Both the quality of life and sleep disorders improved after cataract surgery, which proved the importance of the intervention. There is a direct correlation between any level of visual impairment and worsened quality of life, and presence of depressive symptoms in older persons, which underline the necessity of a screening program followed by a therapeutically approach for older individuals identified with cataract. This measure of prevention can be an efficient measure in order to reduce expensive social and economical costs determined by the direct and indirect effects of visual impairment determined by cataract.

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