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RESEARCH

Correlation Between Online Gaming Duration and Dry Eyes Complaints and Quality of Life Using DEQS Questionnaire

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Abstract

Introduction: Dry eye is a component of computer vision syndrome (CVS) which is affected by the duration of using a visual display terminal (VDT), such as playing online games. **Purpose:** To analyze the correlation between the duration spent playing online games and the degree of dry eye complaints and quality of life. **Methods:** This research is cross-sectional research conducted on students of the General Practitioner Study Program, Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia, who play online games through Zoom meetings and WhatsApp with a total sampling method on 47 respondents. Data was acquired through online game playing duration questionnaire and dry eye related quality of life score (DEQS) questionnaire. The inclusion criteria in this research was an active medical student of the Universitas Nusa Cendana, Kupang, Indonesia, who had a habit of playing online games and had good literacy skills. This research used eta square statistical analysis. **Results:** From the 47 acquired samples, the most prominent acquired sample was male (70.2%). DEQS score that was acquired was vary. The lowest score 0-10 is was present on 25.53% of samples, score 11-74 was present on 72.34% of samples and the highest score (75) is present on 2.1% of samples. Impaired quality of life score was found on dry eye range (31-75). There was no significant correlation between the duration spent online playing games and the degree of dry eye complaints ($p = 0.693$). There was significant correlation between degree of dry eye complaint and quality of life ($p = 0.000$). **Conclusions:** The duration of spent online playing games has no effect on the degree of dry eye complaints. The degree of dry eye complaints can affect the quality of life.

Keywords: computer vision syndrome; dry eye; quality of life; online games; visual display terminal

Introduction

Computer vision syndrome (CVS) is a complex problem in the eyes and vision due to the prolonged use of computers and video display terminals (VDT).[1],[2] Dry eye is one of the components of CVS.[1],[2],[3],[4] Dry eye disease (DED) is defined as a multifactorial disease of the tears and surface of the eyes resulting in symptoms of discomfort, visual impairment, and instability of the tear layer with the potential for damage to the surface of the eye.[5] Dry eye has symptoms such as itchy eyes, excessive tears, burning sensations, grittiness or sensation of foreign object in the eye, pain, redness and sensitivity to light.[6] Screen Time is related to DED. The longer the screen viewing time, the higher the risk of getting DED. Examples of screen time that are often done such as watching television (TV), online schooling, playing online games using smartphones, laptops or computers.[3],[2],[7] Online game players cannot stop in the middle of the game to rest their eyes because the game cannot be paused, so that, online game players continue to concentrate for a long time. When playing online games, players need strong concentration and visual attention so that the frequency of blinking eyes decreases.[8] The study conducted by Lee et al.[9] found that the frequency of blinking before playing games was 16.24 times per minute and decreased to 8.27 and 9.51 times per minute after one hour and four hours of playing games.

Reduced blinking frequency when playing online games can cause symptoms DED.[3],[8] This DED problem can reduce the quality of life and work productivity by 4% to 19%.[1],[3],[10]

A global epidemiological study conducted by dry eye workshop (DEWS)[11] in 2017, the prevalence of DED reached 5 to 50%. National health and wellness survey data[12] in 2013, approximately 16.4 million adult USA residents suffer from dry eyes. Based on health insurance review and assessment service statistics[13] from 2005-2015, the number of patients treated with DE symptoms has increased from 1.4 million to 2.4 million over the past ten years. The results of a study conducted in Indonesia, Riau Province, in 2001 found that the prevalence of dry eye in patients aged < 21 years reached 27.5%, aged 21-29 years as much as 19.2% and aged ≥ 60 years as much as 30% of 1.058 patients. [14] Research conducted by Yang et al.[15] more than 1.173 school children in Korea, found that the average time spent in computer-based schools was 1.35 hours and playing games was 2.03 hours. Meanwhile, Korean teenagers who have internet addiction have a computer usage time of 3.6 ± 2.2 hours.[15] Research conducted by Chidi-Egboka et al.[16] reported playing games using VDT non-stop for one hour has a risk of experiencing dry eye symptoms. Research by Lee et al.[9] reported the use of VDT for non-stop gaming for four hours a day is more at risk of experiencing CVS whose one component is dry eye. Research conducted by Sodani et al.[17] reported the use of VDT at night with a duration of > one hour for gaming increases the risk of getting dry eye symptoms.

The dry eye-related quality-of-life score (DEQS) questionnaire was developed in 2013, and the authors chose the DEQS questionnaire because it could assess the severity of dry eye symptoms such as eye dryness, irritation, decreased visual acuity, and photophobia and assess the multifaceted effects of dry eye on the quality of life.[10]The DEQS questionnaire has fifteen components consisting of six components that assess dry eye symptoms and nine components that assess the effect of dry eye on the quality of life of sufferers.[18],[19],[20],[21] From the discussion above, it shows that dry eye, which is one of the components of CVS, is a severe problem. So, researchers want to research the correlation between the duration of spent online games playing with the degree of dry eye complaints and quality of life using the DEQS questionnaire.

Methods

This research was conducted online via Zoom meetings and WhatsApp. The research was managed using an online questionnaire form that was distributed virtually. The research was conducted from January 5, 2022, to February 7, 2022. This research was cross-sectional analytic research. Respondents of this research were students of General Practitioner Study Program, Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia, from the class of 2018, 2019, 2020, and 2021 who play online games. The inclusion criteria in this research were an active medical student of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia, who had a habit of playing online games and had good literacy skills. The exclusion criteria in this research were medical student who consumed drugs in the past week that can cause dry eyes, used eye drops, used contact lenses, and had diabetes and allergic conjunctivitis.

The questionnaire used is the DEQS questionnaire, with a total sampling technique. Data was taken on the duration of spent online games playing, the dry eye complaint degree, and quality of life. It was managed via Zoom meetings and WhatsApp using a questionnaire. The DEQS questionnaire used in this research was developed by the Japan Dry Eye Society and Santen Pharmaceutical Co., Ltd and has been translated into English, and has passed validation studies. According to the pre-research survey, 47 total respondents meet the inclusion terms. This research used Eta Square statistical analysis. The independent variable was the duration spent online games playing and the dependent variable was the dry eye complaint degree and quality of life. This research

Table 1. Characteristics of respondents.

Variable	Frequency (n=47)	Percentage (%)
Sex		
Male	33	70.2
Female	14	29.8
Age		
17	1	2.1
18	6	12.8
19	11	23.4
20	7	14.9
21	18	38.3
22	3	6.4
23	1	2.1
Class		
2018	23	48,9
2019	8	17,0
2020	10	21,3
2021	6	12,8
Play duration		
< 2 hours	14	29.80
2 hours - 4 hours	19	40.40
> 4 hours	14	29.80

Table 2. Play duration distribution by sex and age.

Variable	Play duration			Total
	< 2 hours	2-4 hours	> 4 hours	
Gender				
Male	9	11	13	33
Female	5	8	1	14
Age				
17	1	0	0	1
18	3	1	2	6
19	2	5	4	11
20	1	5	1	7
21	6	6	6	18
22	0	2	1	3
23	1	0	0	1

had an ethical clearance review from the Research Ethics Committee, Faculty of Medicine, Universitas Nusa Cendana with the number: 3179/UN15.16.4/PP/2021.

Results

The result of a univariate analysis to find out an overview of the distribution of duration of spent online games playing, the degree of dry eye complaints and the quality of life in medical students of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia.

Based on Table 1, the number of male samples (70.2%) in this research was more than the female samples (29.8%). The average age of them was 20.02 ± 1.34. Most samples were 21 years old (38.3%). The samples in this research were medical students of the class of 2018 (48.9%) samples, 2019 (17%) samples, 2020 (21.3%) samples, and 2021 (12.8%) samples. Most samples played online games in the duration range of 2-4 hours (40.40%) in a day.

Based on Table 2, male and 21-year-old respondents were the most significant samples who played online games with a duration of < 2 hours, 2-4 hours, and > 4 hours.

Based on Table 3, scores varied from 47 respondents:

Table 3. Dry eye degree score distribution and quality of life.

Dry eye degree score	Quality of life				Total
	Extremely good	Very good	Good	Bad	
0-10	2	4	6	0	12
11-20	0	4	9	0	13
21-30	0	2	7	0	9
31-40	0	1	5	1	7
41-50	1	0	1	0	2
51-60	0	0	0	3	3
61-75	0	0	0	1	1
Total	**3**	**11**	**28**	**5**	**47**

Table 4. Dry eye degree score distribution by sex.

Dry eye degree score	Sex		Total
	Male	Female	
0-10	10	2	12
11-20	11	2	13
21-30	6	3	9
31-40	5	2	7
41-50	0	2	2
51-60	0	3	3
61-75	1	0	1
Total	**33**	**14**	**47**

Table 5. Quality of life score distribution by sex.

Dry eye degree score	Quality of life				Total
	Extremely good	Very good	Good	Bad	
Male	2	6	24	1	33
Female	1	5	4	4	14
Total	**3**	**11**	**28**	**5**	**47**

the lowest range score was 0 and the highest was a score of 75. Scores of 0-10 were 25.53% samples, scores of 11-20 were 27.65% samples, and scores of 75 were 2.1% samples. Most of the samples (89.36%) had a good quality of life. Impaired quality of life was only found in dry eye degree scores of 31 to 75. Male samples had a lower dry eye degree score than female samples (Table 4).

Based on Table 5, most men (68.08%) of respondents have a good quality of life. Impaired quality of life was found in the female sample (8.51%).

The results of the eta statistical test showed that there was no significant correlation between the duration of spent online games playing and the degree of dry eye complaints. The long duration of spent online games playing can cause a high dry eye degree score, but a high dry eye degree score was not necessarily caused only by playing online games; because of the online games were not the sole factor causing dry eyes.

The eta statistical test results showed a strong and significant correlation between the variable degree of dry eye complaints and the quality of life. The results showed that the degree of dry eye complaints could affect the quality of life.

Discussion

The study was conducted from January 5, 2022 to February 7, 2022 with a sample size of 47 samples. The samples in this study were students of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia, who played online games. By age, most samples were 21 years old. Most of the samples used in this study were

Table 6. Results of bivariate analysis of the correlation between online gaming duration and dry eye complaint degrees.

Variable	Eta-value	P-value
Duration spent playing online games	0.777	0.693
Degree of dry eye complaints	0.333	0.693

Table 7. Results of bivariate analysis of the correlation between dry eye complaint degrees and quality of life.

Variable	Eta-value	P-value
Degree of dry eye complaints	0.693	0.000
Quality of life	0.816	0.000

students who were male. This is because most of the online games are in the genres of action, sport, shooting and also fighting. This causes online game players to have good hand reflex movements, foresight in order to compete and win matches. Men play more online games because they are competitive or competitive. While most women prefer to play exploration or adventure and puzzle genre games.[22],[23],[24]

In this study, the division of play duration used was < 2 hours, 2-4 hours and > 4 hours.[9],[16],[17] Data on the degree of dry eye complaints and quality of life of samples in this study were taken using the DEQS questionnaire with a dry eye degree score consisting of the lowest value of 0, which showed no indication of dry eyes and the highest score of 100 indicating severe symptoms. Quality of life data was taken based on the sample's subjective answers to the last question from the DEQS questionnaire. The question asked about the sample's quality of life over the past week regardless of how many DEQS scores the sample obtained.[25]

Table 6 showed an overview of the correlation between the duration of spent online games playing and the degree of dry eye complaints in students of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia. The p-value shows no significant correlation between the duration spent playing online games and the degree of dry eye complaints. It is because online games are not the sole factor causing dry eyes because many other factors cause dry eyes.[26]

Table 7 also showed a picture of the correlation between dry eye degrees and quality of life in students of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia. In the correlation value between the degree of dry eye complaints and the quality of life, it was found that this correlation is classified as a strong category.[26] The p-value showed a significant correlation between the degree of dry eye complaints and the quality of life. This showed that the degree of complaint of dry eyes could affect the quality of life. The higher the degree of dry eyes experienced, the worse the quality of life will be.

Research conducted by Lee et al.[9] stated that playing games using VDT for four hours without take a break can increase the risk of developing CVS, one of whose components is dry eyes. Research conducted by Chidi-Egboka et al.[16] stated that playing games using VDT for one hour without take a break can worsen dry eye symptoms. Playing online games causes the frequency of blinking decrease so that the secretion of aqueous and lipids is reduced and increases the evaporation of tear film which can trigger the onset of dry eyes. Significant degrees of dry eyes were not obtained in this study. This research showed that online games are were not the only factor that triggered the onset of dry eyes. There are were contributing factors that can influence the results of this study, such as online lectures, the use of air-conditioned (AC) and lack of sleep time. Dry eyes must be treated immediately because if ignored, the degree of dry eyes will continue to be burdensome so that the patient's quality of life will worsened. This research has not been able to represent the degree of dry eye complaints and quality of life for medical students as a whole because researchers only researched a small part of the medical student population of the Faculty of Medicine, Universitas Nusa Cendana which played online games.

Conclusions

Based on this research, it is obtained that the most time spent online games playing was two to four hours. The duration spent on online games playing does not affect the degree of dry eye complaints in medical students of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia. The degree of dry eye complaints can affect the quality of life of students of the Faculty of Medicine, Universitas Nusa Cendana, Kupang, Indonesia.

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