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Original Research Article

Binge watching and its effects on ocular health among young adults

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ABSTRACT

Purpose: To assess the effects of binge watching on ocular health.**Materials and Methods:** A short term (2 months) descriptive study was conducted on young adults aged 18 years - 26 years of a medical college of North India. Sample size was 492 participants. A pre-validated questionnaire was administered online to the participants collecting data on demographics, attitudes and practices of binge watching and ocular symptoms they experienced. Then they were subjected to ocular examination. Schirmer test 1 and tear break up time were conducted to diagnose dry eye. Data was compared between the two subsets of binge-watching and non-binge-watching, the association between binge-watching and observations were established by chi-square test.**Results:** A total of 492 young adults participated in the study. Prevalence of binge-watching among the participants was 54.87%. A significant association was found between the use of streaming services and binge-watching (p-value = 0.002128). A significant association was found between binge-watching and discomfort in eyes (p-value = 0.008882), trouble sleeping (p-value = 0.003455), blurring of vision (p-value = 0.042263) and pain in neck and shoulder (p-value = 0.000042). The binge-watching subset was associated with dry eyes as found by Tear Breakup Time Test (TBUT) (OU p-value= <<0.01).**Conclusion:** The practice of binge-watching has a negative effect on ocular health.This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: reprint@ipinnovative.com

1. Introduction

Binge-watching is a practice of watching several episodes of a TV show in rapid succession with an average session lasting hours at a stretch.¹ This practice is fueled by the modern-day pop culture influences as well as the new trend of the entertainment industry to make a "binge-worthy" show. Binge-watching is gaining widespread viewership, as the consumers are being accustomed to the concept of video on demand. Contrast to conventional television it does not give advertisement breaks in between the episodes. In addition to this, the freedom to use an array of devices ranging from a television set to handheld devices like

smart phones, tablets, laptops etc. gives the ability to view anything, anywhere, anytime.²

This is a transitory phenomenon as it has continued to increase in recent years as shown by media company surveys.^{3,4} Being a relatively newer practice of the modern world, the effects on health of this practice are unknown. In the field of health sciences, very little research is present on this topic, that too was done in the field of psychology.⁵ A study was done in the field of psychology which was aimed to qualitatively understand this behaviour but authors could not find sufficient literature of effects of binge watching on ocular health.³

Keeping all this in view, this study was undertaken to determine the effects of the practice of Binge-Watching on ocular health. The biggest role in modern-day trends

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is portrayed by the young adults, being ever curious and adventurous, they adapt to newer practices faster than others so study population selected were young adults. The aim of the study was to determine the prevalence and ocular effects of binge watching and also to compare the ocular health of binge-watching subset with the non-binge-watching subset.

2. Materials and Methods

This was a descriptive, short term (2 months) cross sectional, observational study, in a cohort of young college students. Age group : 18-26 years, who consented to participate study. Participants who did not give consent were excluded from the study.

492 participants were included in this study. A questionnaire used was created by the authors and validated. This study questionnaire was validated internally by the faculty of ophthalmology department of our medical college, externally by two faculty members of other medical colleges. After this, the study questionnaire was pretested on 20 undergraduate medical students. The necessary modifications were done to ensure ease of understanding and clarification of all questions. Reliability of study questionnaire was testing using Cronbach's alpha, which was calculated to be >0.70 . The four batches of undergraduate medical students were invited to participate in the study via a Google form link which was shared through official Whatsapp groups of undergraduate medical students. The Google form was set to accept only one response from one Google account, thus limiting duplication of responses. Cookies and IP Check were not used. The students were asked to respond by one week and two reminders were sent.

For the purpose of this study, binge-watching was defined as watching a television show for 2 hours or more continuously. The rationale behind defining binge-watching as a function of time is that the lengths of episodes vary from series to series and may vary in the same series as well. So just using the number of episodes would not have provided uniformity in the data.

After approval from the Institutional Ethics Committee (IEC), participants were sensitized about the purpose and the procedure of the study. The participants were subjected to the questionnaire which consisted of 3 sections: demographics, questions pertaining to ocular health and attitudes and practices.

2.1. Demographics

In this section of the questionnaire, data was collected pertaining to the age and sex of the participants. A code was allocated to co-relate the questionnaire and ocular examination. This section also emphasized on details pertaining to the time spent during a session of watching, the types of devices used for watching, the frequency

of a watching session and the use of streaming services. This data was used to determine the prevalence of binge-watching in the study population.

2.2. Ocular health

This section of the questionnaire was focused on the symptoms experienced by the subjects pertaining to the eyes, during or after a watching session. This included questions about experiencing discomfort, burning sensation, blurring of vision, diplopia, pain in neck and shoulders, sleep disturbances and headaches. They were asked if they have sought any treatment for any of the symptoms experienced.

2.3. Attitude and practices

This section of the questionnaire was used to assess how much is the effect of binge-watching on the day to day life of the participant. The participants were asked about the distance from the screen as well as the illumination of the surroundings during the watching session. It included questions on how much work they were missing, whether they were aware of the time spent, did the hide the time they spent, whether they experienced any behavioral changes and whether it had any impact on their social life.

After being subjected to the questionnaire participants were examined as per the case study form attached. (Annexure 2). Positive findings were recorded from the ocular examination. Two tests were used namely Schirmer's Test 1 and Tear Breakup Time Test (TBUT). Dry eye diagnosis was made when Schirmer strip was less than 10mm or TBUT was less than 8 seconds.

Data from the questionnaire was collected according to the scales for each question, this data was further analyzed and divided under the sections of ocular health and attitudes and practices. Content analysis for qualitative data was done. The data in the eye examination included Tear break up time, Schirmer's test reading and any positive finding on slit-lamp examination. According to the questionnaire, Binge-watching and non-binge-watching subsets were derived. Association of the Tear break up time, Schirmer's test and binge watchers and non binge watchers was sought using Chi-square test. All the data was kept confidential.

3. Results

The study enrolled 500 students but a total of 492 students participated in the study (292 females 194 males and 6 preferred not to disclose their gender) with age ranging from 17-22 years (average 20.92 years). All the participants (492/492) watched television shows/movies. According to the responses, 380(77.2%) of the participants reported that they have binge-watched. Average session of watching lasted in 222 (45.1%) for less than 2 hours at a stretch,

two to 5 hours for 240(48.8%) of the participants, and 30 (6.1%) lasting more than 5 hours (Figure 1). So 54.87% (270) of the participants were binge-watchers and 45.13% (222) were non-binge-watchers. The choice of streaming device is shown in Figure 2. In response to how often they watch, the non-binge-watchers, 114 (51.35%) reported daily sessions, 78(35.13%) weekly and 30(13.51%) monthly. For binge-watchers, 136 (50.37%) reported daily sessions, 94(34.81%) weekly and 40(14.81%) monthly sessions. Distance preferred by participants from the screen presented in Figure 2. Amongst them 354 (71.95%) reported never to have sought any treatment for their symptoms, 122 (24.8%) had sought treatment sometimes and 16(3.25%) reported always seeking treatment for their symptoms. The behavior of the students in binge watching versus non binge watching subset is shown in Table 2. The illumination of the surrounding was scored from 1 (poorly lit) to 5 (well lit), 62 (19.5%) reported a score of 1, 80(16.3%) reported a score of 2, 164 (33.3%) reported a score of 3, 90 (18.3%) reported a score of 4 and 96(19.5%) reported a score of 5. The median score was 3.

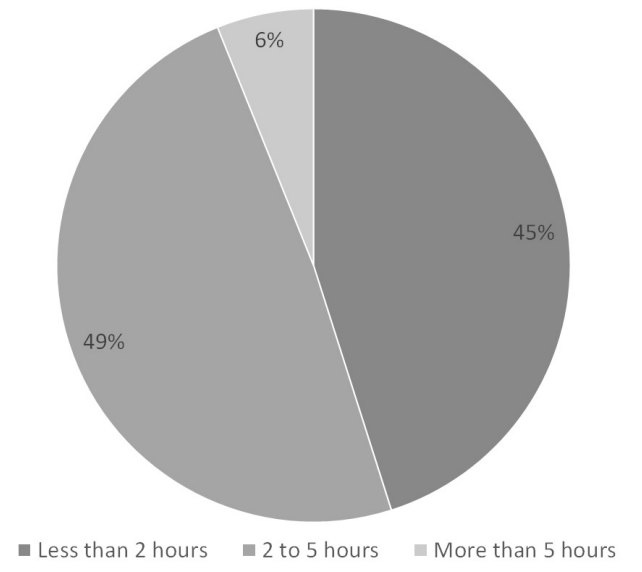


Fig. 1: Tim spent on watching television shows

Out of the total participants, 350(71.13%) were using spectacles for refractive error. Of the total, 315(64.02%) had a myopic refractive error and 35 (7.11%) had a hypermetropic error. Out of the binge-watching subset, 180(66.66%) were observed to have a refractive error and out of the non-binge-watching subset, 170 (76.57%) were observed to have a refractive error. Of the total population, 400 (81.3%) were observed to have an aided visual acuity of 6/6 and 18.7% were observed to have an aided visual acuity of 6/6P. In 47 (9.55%) participants, superficial congestion was observed. Of the binge-watching subset, 30 (11.11%) were observed to have this finding. Out of the non-binge-

watching subset, 17 (7.65%) participants were observed to have this finding. On measuring intraocular pressure, 100% of the participants had normal values, average intraocular pressure was 15.06 mmHg. The maximum recorded value was 20 mmHg and the minimum recorded value was 10 mmHg. Dry eye Tests: the findings of the Schirmer test and Tear Breakup time and association between dryness and binge watching is shown in are shown in Figure 3.

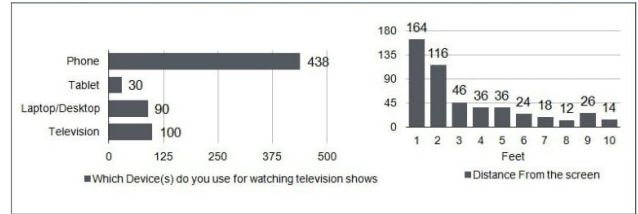


Fig. 2: Practice pattern followed by participants

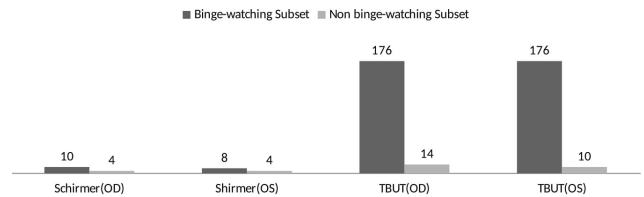


Fig. 3: Association of ocular dryness and binge-watching

4. Discussion

Binge-watching is a new practice with the potential to be addictive, health effects of which were unknown and being a relatively newer practice very less literature was available. We conducted this study to determine the effects of Binge-Watching on ocular health.

In our study it was found that the prevalence of binge-watching among young adults in the research participants was 54.87% and amongst them 6.1% reported to have a watching session lasting more than 5 hours. A majority of the participants (71.95%) reported using streaming service(s). The use of streaming services was more among the binge-watching subset (77.77%) than the non binge-watching subset (64.86%). There was a very significant association between the practice of binge-watching and the use of streaming services (p-value = 0.002). This supports the fact that the majority of the streaming services promote binge-watching which is in concordance with other studies done on binge watching and using of streaming services.⁶

More than half of the binge-watching subset (51.35%) indulged in the practice of binge-watching on a daily basis. Mobile phones were the device of choice for the purpose followed by laptops for watching television shows as reported by other studies.^{7,8}

Table 1: Association of ocular symptoms and binge-watching

Symptoms after a watching session	Subset	Symptom Present	Symptom Absent	P-value
Discomfort in the eyes	Binge-watching	192	78	0.008882
	Non-Binge-watching	132	90	
Trouble in sleeping	Binge-watching	108	162	0.003455
	Non-Binge-watching	60	162	
Burning sensation in eyes	Binge-watching	98	172	0.149465
	Non-Binge-watching	66	156	
Blurring of vision	Binge-watching	92	178	0.042263
	Non-Binge-watching	56	166	
Diplopia	Binge-watching	28	242	0.482615
	Non-Binge-watching	18	204	
Pain in neck and shoulder	Binge-watching	184	86	0.000042
	Non-Binge-watching	110	112	
Headache	Binge-watching	152	118	0.315217
	Non-Binge-watching	114	108	

Table 2: Behavior and binge watching

Behaviours	Subset	Present	Sometimes	Absent
Missing a class or work for binge watching	Binge-watching	88	0	182
	Non-Binge-watching	36	0	186
Jeopardise/Impacted a relationship, job or educational Opportunity.	Binge-watching	34	0	222
	Non-Binge-watching	18	0	194
Feeling restless when trying to cut down time spent watching.	Binge-watching	86	0	184
	Non-Binge-watching	32	0	190
Having lost track of time while watching	Binge-watching	112	102	56
	Non-Binge-watching	64	90	68
Feeling of loss of control while watching	Binge-watching	46	54	170
	Non-Binge-watching	20	42	160
Feeling ashamed or trying to hide time spent watching.	Binge-watching	54	80	136
	Non-Binge-watching	28	56	138
Feeling frustrated and/or upset when others sought their attention while watching.	Binge-watching	90	84	96
	Non-Binge-watching	52	52	118

Majority of the participants (65.9%) reported discomfort in the eyes after a watching session. This complaint was higher among the binge-watching subset (71.11%) than the non binge-watching subset (59.45%). A very significant association was seen between binge-watching and discomfort in the eyes was reported (p-value = 0.008). This is in accordance to a study done by Shimai et al that long working hours on visual display units leads to more visual complaints.⁹ Among other ocular symptoms reported, binge watching had a significant association with blurring of vision (p-value = 0.042), and no significant association was found with burning sensation (p-value= 0.14), diplopia reported only by 9.35% (p-value = 0.483615).

A few of the participants (34.1%) were found to have trouble sleeping after a watching session with a significant association between binge-watching and trouble sleeping.(p-value = 0.003). Sleep disturbances have been reported in an another study done on young adults and consequences of binge watching where late bed

time and trouble in sleeping were reported owing to binge watching.¹⁰ Postural problems like pain in the neck and shoulders was reported more in the binge watching subset than the non binge watching subset with significant association (p-value=0.000042). A majority of the participants (54.1%) reported headaches after a watching session but no significant association was found between binge-watching and headache. (p-value = 0.315217).

Binge watching has an addictive potential which the authors found through significant association in binge watching subset and the symptoms of missing classes (p-value = 0.000049) and being restless or irritable when attempting to cut down time spent on binge watching shows (p-value = 0.000007). This is in concordance to other studies which establish binge watching as an addiction.¹¹

Amongst dry eye tests, Schirmer's test and Tear break up time were performed. On Schirmer's test only 2.85% of the participants were observed to have moderate dryness in the right eye and 2.43% of the participants were observed

to have moderate dryness in the left eye. This was an unexpected observation as dryness of the eye is one of the main features of prolonged use of Visual display terminal (VDTs) but it was not so in our study.^{12–14} This was explained as the reflex secretion of tears caused by irritation, as no anesthetic agent was used. No significant association was observed between Schirmer test score and binge-watching. (Right eye: p-value = 0.32212; left eye :p-value = 0.591138). But a very significant association was observed between TBUT score and binge-watching (Both eyes p-value << 0.01). This point out that binge-watching is associated with dryness in the eyes. This is in concordance with many studies on association with dry eye and longer hours on visual display devices. The limitations of this study are the limited number of participants. Given the lack of research in this field, this paper aims to encourage more research in this field.

5. Conclusion

The prevalence of binge-watching among young adults was 54.87%. It was found that binge-watching causes asthenopic symptoms, dryness of the eye. Association was also established between binge-watching and symptoms of addiction like irritation on cutting down the time of watching shows, missing work or class for the purpose of binge-watching. This proves the hypothesis that binge-watching causes an adverse effect on ocular health.

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7. Conflict of Interest

None.

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