Duration of smartphone usage in online learning during the COVID-19 pandemic and the occurrence of computer vision syndrome in the students of MTsN 1 Bone

Suradi Efendi  
Sekolah Tinggi Ilmu Kesehatan Makassar, Indonesia  
Correspondent author email: atolnurse@gmail.com

Nour Sriyanah  
Sekolah Tinggi Ilmu Kesehatan Makassar, Indonesia

Fatmawati  
STIKES Panrita Husada Bulukumba, Indonesia

Livana PH  
Sekolah Tinggi Ilmu Kesehatan Kendal, Indonesia

Andi Suswani  
STIKES Panrita Husada Bulukumba, Indonesia

Nuratifah  
Sekolah Tinggi Ilmu Kesehatan Makassar, Indonesia

Abstract—The smartphone screen emits ultraviolet radiation and X-rays, and if exposed for a long time, eye health problems may occur. One of these disorders is Computer Vision Syndrome (CVS). This research is to determine the duration of smartphone usage in online learning during the Covid-19 pandemic and the occurrence of computer vision syndrome in the students of Mtsn 1 Bone. The research design used was descriptive research. The population was 1,289 students, and the sample used as many as 309 students were a combination of representatives from grades 7, 8, and 9 with the Proportional Stratified Random Sampling technique. The results showed the duration of smartphone usage in online learning by 170 students (55%) with ≥ 3 hours of use. And the complaints of CVS disorders were 185 students (59.9%) with neck pain. Then the duration of smartphones usage outside of online learning was 79
respondents (25.6%) with ≥ 3 hours continously use in a day. The most complaints on CVS occurrence were 177 students (57.3%) with eyestrain. The conclusion is the duration of smartphone usage is mostly ≥3 hours and experiences neck pain and eyestrain. Therefore, the student of MTsN 1 Bone should prevent the long durations of smartphone usage and avoid the occurrence of CVS.

**Keywords**---Smartphone usage duration, CVS symptoms, COVID-19.

**Introduction**

One of the eye health disorders is Computer Vision Syndrome (CVS). It causes headaches, eye strain, blurring, dry eyes, irritated eyes, tired eyes, sensitivity to light (glare), double vision, and pain in the neck, shoulder, and back. (Amalia, 2018). The research results on the occurrence of Computer vision syndrome (CVS) in students of computer science at the University of Lampung with a total of 56 respondents were used as research samples, 75.51% experienced CVS, and 39 students (69.6%) experienced CVS with the duration of computer usage more than two hours continiously use. CVS occurs due to the interaction between the eye and the computer screen and other visual display terminals (VDTs) such as smartphone and tablets (Valentina dkk., 2019).

Based on the description above, researchers are interested in examining the duration of smartphone usage during online learning and outside of online learning during the COVID-19 pandemic and recognizing the computer vision syndrome in the students of MTsN 1 Bone. One of the reasons the author chose MTsN 1 Bone as the research location because the school has the highest number of students in Bone regency at the high school level and during the pandemic, students applied online learning.

**Method**

The type of research used was descriptive research to find out the description between the variables to be examined, and carried out on students at MTsN 1 Bone, Bone Regency, South Sulawesi Province and carried out on 30 June - 18 July 2021. Determination of the number of samples used the Proportional Stratified random sampling technique.

**Result**

The population was 1,289 students of MTsN 1 Bone and the sample was 309 students including class VII consisting of 11 classes, 8 people were selected from each class, for class VIII there were 11 classes as well, 7 people were selected from each class, then for class IX had 16 Classes, and 9 People were selected from each class.
Distribution of Respondents based on Smartphone usage during online learning at the students of MTsN 1 Bone in 2021

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 Jam</td>
<td>139</td>
<td>45,0</td>
</tr>
<tr>
<td>≥ 3 Jam</td>
<td>170</td>
<td>55,0</td>
</tr>
</tbody>
</table>

Based on the duration of smartphone usage in a day shows that 170 people (55%) with ≥ 3 hours and 139 people (45%) with < 3 hours duration of use.

<table>
<thead>
<tr>
<th>Symptom/Complaint</th>
<th>Yes</th>
<th></th>
<th>No</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Eyestrain</td>
<td>178</td>
<td>57,6</td>
<td>131</td>
<td>42,4</td>
</tr>
<tr>
<td>Eyes tense</td>
<td>76</td>
<td>24,6</td>
<td>233</td>
<td>75,4</td>
</tr>
<tr>
<td>Painful Eyes</td>
<td>87</td>
<td>28,2</td>
<td>222</td>
<td>71,8</td>
</tr>
<tr>
<td>Dry Eyes</td>
<td>78</td>
<td>25,2</td>
<td>231</td>
<td>74,8</td>
</tr>
<tr>
<td>Headache</td>
<td>136</td>
<td>44,0</td>
<td>173</td>
<td>56,0</td>
</tr>
<tr>
<td>Watery eyes</td>
<td>86</td>
<td>27,8</td>
<td>223</td>
<td>72,2</td>
</tr>
<tr>
<td>Irritated Eyes Due to Contact Lenses</td>
<td>17</td>
<td>5,5</td>
<td>292</td>
<td>94,5</td>
</tr>
<tr>
<td>Blurred Vision</td>
<td>62</td>
<td>20,1</td>
<td>247</td>
<td>79,9</td>
</tr>
<tr>
<td>Double Vision</td>
<td>22</td>
<td>7,1</td>
<td>287</td>
<td>92,9</td>
</tr>
<tr>
<td>Difficulty Focusing</td>
<td>63</td>
<td>20,4</td>
<td>246</td>
<td>79,6</td>
</tr>
<tr>
<td>Eyes</td>
<td>122</td>
<td>39,5</td>
<td>187</td>
<td>60,5</td>
</tr>
<tr>
<td>Shoulder Pain</td>
<td>145</td>
<td>46,9</td>
<td>164</td>
<td>53,1</td>
</tr>
<tr>
<td>Back Pain</td>
<td>185</td>
<td>59,9</td>
<td>124</td>
<td>40,1</td>
</tr>
<tr>
<td>Total</td>
<td>309</td>
<td>100,0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complaints about the occurrence of Computer Vision Syndrome during online learning, for the answer Yes, the highest is Neck Pain as many as 185 people (59.9%). For the answer No, the highest is the complaint of irritated eyes due to contact lenses as many as 292 people (94.5%), This is because more students do not use contact lenses when using smartphones, so they are more dominant in not having these complaints.
Distribution of Respondents based on Smartphone usage Outside the Online Learning in the students of MTsN 1 Bone in 2021

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 hour</td>
<td>49</td>
<td>15.9</td>
</tr>
<tr>
<td>10 hours</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td>12 hours</td>
<td>5</td>
<td>1.6</td>
</tr>
<tr>
<td>13 Hours</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>2 hours</td>
<td>72</td>
<td>23.3</td>
</tr>
<tr>
<td>24 hours</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>3 hours</td>
<td>79</td>
<td>25.6</td>
</tr>
<tr>
<td>4 hours</td>
<td>46</td>
<td>14.9</td>
</tr>
<tr>
<td>5 Hours</td>
<td>29</td>
<td>9.4</td>
</tr>
<tr>
<td>6 Hours</td>
<td>12</td>
<td>3.9</td>
</tr>
<tr>
<td>7 hours</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>8 hours</td>
<td>5</td>
<td>1.6</td>
</tr>
<tr>
<td>9 hours</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>309</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The duration of Smartphone/Laptop usage in a day outside of online learning shows the most respondents is 79 people (25.6%) with 3 hours of use.

<table>
<thead>
<tr>
<th>Symptom/Complaint</th>
<th>Yes n</th>
<th>Yes %</th>
<th>No n</th>
<th>No %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyestrain</td>
<td>177</td>
<td>57.3</td>
<td>132</td>
<td>42.7</td>
</tr>
<tr>
<td>Eyes tense</td>
<td>66</td>
<td>21.4</td>
<td>243</td>
<td>78.6</td>
</tr>
<tr>
<td>Painful Eyes</td>
<td>77</td>
<td>24.9</td>
<td>232</td>
<td>75.1</td>
</tr>
<tr>
<td>Dry Eyes</td>
<td>65</td>
<td>21.0</td>
<td>244</td>
<td>79.0</td>
</tr>
<tr>
<td>Headache</td>
<td>132</td>
<td>42.7</td>
<td>177</td>
<td>57.3</td>
</tr>
<tr>
<td>Watery eyes</td>
<td>83</td>
<td>26.9</td>
<td>226</td>
<td>73.1</td>
</tr>
<tr>
<td>Irritated Eyes Due to Contact Lenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blurred Vision</td>
<td>19</td>
<td>6.1</td>
<td>290</td>
<td>93.9</td>
</tr>
<tr>
<td>Double Vision</td>
<td>64</td>
<td>20.7</td>
<td>245</td>
<td>79.3</td>
</tr>
<tr>
<td>Difficulty Focusing Eyes</td>
<td>25</td>
<td>8.1</td>
<td>284</td>
<td>91.9</td>
</tr>
<tr>
<td>Shoulder Pain</td>
<td>60</td>
<td>19.4</td>
<td>249</td>
<td>80.6</td>
</tr>
<tr>
<td>Back Pain</td>
<td>113</td>
<td>36.6</td>
<td>196</td>
<td>63.4</td>
</tr>
<tr>
<td>Neck Pain</td>
<td>136</td>
<td>44.0</td>
<td>173</td>
<td>56.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>309</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complaints about the occurrence of Computer Vision Syndrome outside of online learning, for the answer Yes, the highest is Eyestrain as many as 177 people (57.3%). For the answer No, the highest is the complaint of irritated eyes due to contact Lenses as many as 290 people (93.9%).

**Discussion**

The results showed the duration of smartphone usage in online learning by 170 students (55%) with ≥ 3 hours of use and 139 respondents (45%) with < 3 hours.
From these data, the duration of smartphone use in the online learning process for students was the same, but during the online learning process, some students answered that they used it continuously for more than 3 hours, and some answered for less than 3 hours. It is because some of the use of learning time is not entirely for online learning, but only for a short time without focusing on smartphones during the online learning process.

It is in line with research conducted at the University of Lampung, students of computer science, and mathematics faculty, that the duration of smartphone usage in a day will lead to the occurrence of Computer Vision Syndrome. It was found that there were 75.51% for > 2 hours continuously use, and 7.7 times greater experiencing CVS (Valentina dkk., 2019).

Based on the results of research on the complaints about the occurrence of Computer Vision Syndrome during online learning, the highest is Neck Pain as many as 185 people (59.9%). Then, 178 students (57.6%) complained of eyestrain, 145 students (46.9%) complained of back pain, and 136 students (44%) complained of headaches.

DS etc (2018) state that prolonged use of the VDT device will keep the eyes focused and maintain visual acuity which will force the eye muscles to work continuously to focus on an object at close range and for a long time will trigger symptoms of asthenopia and extraocular problems such as eye fatigue, neck pain, and back pain (Nurhalimah, Mardalena dan Kurniawan, 2020). Based on the duration of Smartphone usage outside of online learning shows the most respondents are 79 people (25.6%) with 3 hours of continuous use in a day.

The complaints about the occurrence of Computer Vision Syndrome outside online learning as many as 177 students (57.3%) with eye strain, followed by 163 students (57.6%) who complained of neck pain, 136 students (44%) complained of back pain, and 132 students (42.7%) complained of headache.

From a study on nursing students at Syiah Kuala University, the most common complaint was eye fatigue with 324 people (77.7%). Ardyanto and Indriani (2013) conducted research on Surabaya Container terminal operators and the most frequent symptoms are eyestrain (79.4%), dry eyes (11.8%) and headaches (5.9%). These symptoms make the respondents’ eyes forced to focus at work due to exposure to the computer screen. If the exposure has been received for a long period of time, it will result in eyestrain and headaches (Febrianti dan Bahri, 2018).

**Conclusion**

On the duration of smartphone usage during online learning, the most were 170 students (55%) with ≥ 3 hours of use. Outside of Online Learning, the most duration used is 3 hours in a day in 79 Respondents (25.6 %). For complaints of symptoms from the occurrence of Computer Vision Syndrome (CVS) during online learning, the most complaints were 185 students (59.9%) with complaints of Neck Pain, and when outside of online learning, the highest was 177 students (57, 3%) with complaints of eyestrain.
To the students of MTsN 1 Bone should prevent long duration of Smartphones usage that can endanger health, especially eye health problems, and be able to recognize the symptoms, therefore, use the 20-20-20 technique which means looking away from the screen every 20 minutes then staring at a distant object about 20 feet for 20 seconds and let the eye muscles to relax. Then this research can be used as literature in nursing science to recognize and prevent complaints from CVS occurrence. Different research designs can be carried out with further analysis.

References


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