EFFECT OF STRUCTURED TEACHING PROGRAMME ON PREVENTING COMPUTER VISION SYNDROME AMONG SCHOOL STUDENTS

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ABSTRACT

Background: Computer Vision Syndrome, also referred to as Digital Eye Strain, describes a group of eye and vision-related problems that result from the prolonged computer, tablet, e-reader, and cell phone use. Many individuals experience eye discomfort and vision problems when viewing digital screens for extended periods. The level of discomfort appears to increase with the amount of digital screen use.

Method: Quasi-experimental design was used for the study. The 60 participants who satisfied the inclusion criteria were included for the study. Purposive sampling technique was used for sample selection. The pretest was conducted in the experimental and control group. Structured teaching programme was given on prevention of computer vision syndrome for the experimental group. After 7 days post-test was conducted for both groups. The data gathered were analyzed by both descriptive and inferential statistics based on the objectives of the study.

Results: The level of knowledge regarding prevention of computer vision syndrome in the experimental and control group were 10.7±1.8 and 18.7±2.2 respectively (t=71.12, P<0.05). The mean posttest level of knowledge of experimental and control group after teaching programme were 18.7±2.2 and 11±2.4 respectively. The level of knowledge was increased and was statistically significant at 0.05 level (t=18.3 P<0.05).

Conclusion: The level of knowledge among school students regarding computer vision syndrome, has increased after the teaching programme on prevention of computer vision syndrome and was highly significant at 0.05 levels. There was no significant association found between the level of knowledge and selected demographic variables.

Keywords: Adolescents, awareness, prevalence, computer vision syndrome.

1. INTRODUCTION

Computer Vision Syndrome, also referred to as Digital Eye Strain, describes a group of eye and vision-related problems that result from the prolonged computer, tablet, e-reader, and cell phone use. Many individuals experience eye discomfort and vision problems when viewing digital screens for extended periods. The level of discomfort appears to increase with the amount of digital screen use. With the increased use of computers by the children and young adults in educational institutions and at home there is a need to investigate whether students are adopting the ergonomic principles when using computers, laptops, and tablets. Recent studies have reported the most frequently occurring health problem among digital technology users are Computer Vision Syndrome (CVS) 1-4. It is believed that it affects as many as 9 out of 10 people who spend three hours or more per day using computers, laptops, and tablets.

The American Optometric Association defines computer vision syndrome as a complex of eye and vision problems related to the activities which stress the near vision and which are experienced in
The main ocular symptoms reported among computer workers are eyestrain, irritation, burning sensation, redness, blurred vision, and double vision. NIOSH Survey (National Institute of Occupational Safety and Health) has reported that visual symptoms occur in 75-90% of visual display terminal workers as opposed to 22% musculoskeletal disorders (carpal tunnel syndrome) in computer users. The symptoms of Computer Vision Syndrome are divided into four categories: Asthenopic, Ocular surface related, Visual and Extraocular. Asthenopic: such as eyestrain, tired eyes, sore eyes, and dry eyes. Ocular surface related: such as watery eye, and irritated eyes, contact lens problems. Visual: including blurred vision, slowness of focus change, double vision, presbyopia, and sense of foreign body present in the eye. Extraocular: including neck pain, back pain, and shoulder pain. The main objectives of the study is to assess the level of knowledge of adolescents regarding computer vision syndrome in experimental and control group, to determine the effect of structured teaching programme on prevention of computer vision syndrome among adolescents in experimental group and to find out the association between the level of knowledge of adolescents regarding Computer Vision Syndrome.

2. Materials and Methods

2.1 Study design and location.

An experimental study was carried out during a period of two months among school students in Kanyakumari district. A structured questionnaire was developed to assess the level of knowledge on prevention of computer vision syndrome and was distributed with the consent form assuring confidentially for approval of participants to take part in this research.

2.2. Sampling

The sampling method used for this research study was purposive sampling. Participants were selected using a purposive sampling method with those who use computers for more than 2 hours per day were included for the study. The inclusion criteria for the study were students who were willing to participate in the study, students who were using computers for more than 2 hours per day and students who know to write and read in English. The exclusion for the study were students who attended a structured teaching programme on computer vision syndrome earlier and students who were using computers less than 2 hrs.

2.3. Conceptual Frame Work

Conceptual framework selected for this study is based upon the concepts of CIPP (context, input, process, and product)-evaluation model developed by Danie L. Shuffle beams (1999), Professor in western Michigan University. CIPP is an acronym that stands for the four major aspects: C – Context, I – Input, P – Process, and P – Product. The CIPP model advocates that “the purpose is not to prove but to improve”.

Details of the CIPP Model

- **Context:** Environment and needs
- **Input:** Strategies and resources
- **Process:** Monitoring implementation
- **Product:** Outcomes – both quality and significance

2.4. Data collection

This study was conducted among school students in Kanyakumari district. Data were collected within the given period of two months. Before starting the study, the subjects were explained about the study and their willingness to participate in this study was obtained. Confidentiality of their responses was assured. Population in this study was thirty participants who met the inclusion criteria were selected by purposive sampling and the samples were assigned to the experimental group. For the control group, thirty participants who met the inclusion criteria were selected.

The first pretest was conducted among control group with a structured questionnaire to assess the level of knowledge on prevention of computer vision syndrome. After 7 days a post-test...
was conducted with the same tool. Then pretest was done to the experimental group with the same tool to assess the level of knowledge on prevention of computer vision syndrome. A structured teaching programme was given on prevention of computer vision syndrome for the experimental group. The duration of the teaching was one hour. After 7 days a post-test was done with the same tool.

2.5. Statistical tool

The results were analyzed through descriptive statistics, inferential statistics and chi-square to find out the association between variables.

3. Results and Discussion

The data collected for this study were analyzed and interpreted in terms of the objectives and hypothesis. The analysis and interpretation of pre and post-test revealed that in the experimental group, the mean level of knowledge among students was increased from 10.7+1.8 to 18.7+2.2. The mean increase was statistically significant at 0.05 level (t=71.12, df =29).

Comparison of mean posttest knowledge score of the experimental group and control group are 18.7+2.2 and 11+2.4 respectively. This results revealed that there was a significant difference in posttest level of knowledge in both groups at 0.05 level (t=18.3, df=59). Their results showed that there was an increase in the posttest level of knowledge on computer vision syndrome after a structured teaching programme. Thus the research hypothesis "there will be a significant difference in the level of knowledge of students before and after the structured teaching programme was supported.

The demographic variables like gender, the area of residence and duration of computer usage per day had no significant association with the level of knowledge in the prevention of computer vision syndrome.

3.1. Discussion

The result and discussion of the study are based on the findings obtained by statistical analysis. The major findings of the study are as follows. Most of the school students are males (63%) and 70% of the school students are from rural areas. Regarding the duration of computer usage per day is 60% of school students use the computer for greater than 3 hours per day. Computer Vision Syndrome was seen more often in those who use the computer for more than 2 hours continuously per day\textsuperscript{10}.

The level of knowledge of school students regarding computer vision syndrome in experimental and control group shows that the pretest score before a structured teaching programme. Eighty-three percentage of subjects in the experimental group and 80% in the control group had a low level of knowledge on the prevention of computer vision syndrome.

The effect of structured teaching programme on prevention of computer vision syndrome among adolescents in experimental group shows the mean pre and posttest level of knowledge among adolescents regarding prevention of computer vision syndrome in experimental group after structured teaching programme was 10.7+1.8 and 18.7+2.2 respectively. The mean pre and post score in the experimental group showed that a structured teaching programme was effective in improving the level of knowledge among adolescents in the experimental group (t=71.12).

The comparison of posttest of experimental and control group shows the mean posttest in the experimental and control group were 18.7+2.2 and 11+2.4 respectively. The level of knowledge was increased and was statistically highly significant at 0.05 level (t=18.3).

The effectiveness of a questionnaire based intervention programme on the prevalence of arm, shoulder, and neck symptoms in Netherlands. Of the 1673 persons invited to participate in the study, 1183 persons (71%) completed the baseline questionnaire and 741 persons participated at baseline as well as at 12 months follow up. At 12 months follow up, the intervention group showed a significant positive change in receiving information in healthy computer use. The study concluded that some significant positive effects were found as to an increase in receiving education and a decrease in exposure to adverse postures and movements\textsuperscript{11}.
A study conducted to assess the efficacy of office ergonomics education at Washington University. One fifty-four subjects were selected randomly and assigned to one of the three groups. One control group, traditional education group (received one-hour educational section that consisted of lectures and information hand out about office ergonomics) and participatory education group. The group who received education either traditional or participatory reported less pain or discomfort and psycho-social work status following the intervention than those who did not receive the education. The study concluded that those workers in the participatory education intervention group reported a significantly better perception of their health status than those in the control group or traditional education group.

By summing up all the results and above differences, the research hypothesis there will be a significant difference in the level of knowledge of adolescents before and after the structured teaching programme was supported.

3.2. Table and figures

![Conceptual Framework Modified from Shuffle Beam CIPP Model](image_url)

Figure 1. Conceptual Framework Modified from Shuffle Beam CIPP Model.
3.2.1. Distribution of subjects according to demographic variables

Total = 60

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Experimental group</th>
<th>Control group</th>
<th>Chi-square value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>63</td>
<td>18</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>37</td>
<td>12</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Town</td>
<td>9</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Village</td>
<td>21</td>
<td>70</td>
<td>18</td>
</tr>
<tr>
<td>Duration of computer use per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 3 hours</td>
<td>12</td>
<td>40</td>
<td>18</td>
</tr>
<tr>
<td>Greater than 3 hours</td>
<td>18</td>
<td>60</td>
<td>9</td>
</tr>
</tbody>
</table>

The above table 3.2.1 shows that most of the school students were males (63%) and (70%) of the school students were from the village. All other variables were not differently significant. Hence both groups were comparable for interpreting the effect of structured teaching programme on prevention of computer vision syndrome.

3.2.2. Frequency and percentage distribution of Pretest score in the experimental and control group

Total = 60

<table>
<thead>
<tr>
<th>Level of knowledge</th>
<th>Experimental group</th>
<th>Control group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Above average</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(70-100%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average (69-51%)</td>
<td>5</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Below average</td>
<td>25</td>
<td>83</td>
<td>24</td>
</tr>
<tr>
<td>(0-50%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table 3.2.2 shows that in the experimental group 17% of adolescents had average knowledge and 83% had below average knowledge in the pretest. It also shows that in the control group only 20% of adolescents had average knowledge and 80% had below average knowledge in the pretest.

Figure 2. Percentage distributions of pretest score in the experimental and control group.
3.2.3 - Effect of structured teaching programme on prevention of computer vision syndrome in the experimental group.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S. D</th>
<th>Mean difference</th>
<th>Pair Diff.</th>
<th>t</th>
<th>d</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>10.7</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>posttest</td>
<td>18.7</td>
<td>8</td>
<td>8</td>
<td>71.1</td>
<td>2</td>
<td>9</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

The above table 3.2.3 shows that there is a significant difference between pretest and posttest level of knowledge in the experimental group \( t = 71.12 \).

3.2.4. Comparison of knowledge score of post-test level based on the group.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S. D</th>
<th>Mean difference</th>
<th>Pair Diff.</th>
<th>t</th>
<th>d</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>18.7</td>
<td>2</td>
<td>7.7</td>
<td>18.32</td>
<td>5</td>
<td>9</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Control</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above table 3.2.4 shows that there is a significant difference between post-test level of knowledge in the experimental and control group \( t = 18.32 \).

By summing the results and above differences, the research hypothesis shows there will be a significant difference in the level of knowledge of adolescents before and after the structured teaching programme was supported.

3.2.5. Association between the demographic variables with the level of knowledge of adolescents.

Total=60

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S. D</th>
<th>Mean difference</th>
<th>Pair Diff.</th>
<th>t</th>
<th>d</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>18.7</td>
<td>2</td>
<td>7.7</td>
<td>18.32</td>
<td>5</td>
<td>9</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Control</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The above table 3.2.5 shows that there were no significant associations between the selected demographic variables with the pretest level of knowledge on the prevention of computer vision syndrome.

The research hypothesis shows that there will be a significant association between the levels of knowledge of school students regarding computer vision syndrome with selected demographic variables was not supported”.

4. Conclusion

The study findings conclude that there was a significant difference in the level of knowledge of students in the experimental group after a structured teaching programme. But there was no significant association between the level of knowledge among school students on selected demographic variables such as gender, the area of residence and duration of computer use per day.

Limitation of study

The limitation of the study was limited for two months period. The subjects were within the age group of 16-18 years only. The study was limited to the selected schools of Kanyakumari District only.

Recommendation

The recommendation is that only very few studies done in this area. So further studies can be done in the same areas of computer vision syndrome with the following suggestions that the study can be extended to different age groups, conducted in larger samples to generalize the findings, can be conducted as a long-term study, to assess the prevalence of Computer vision syndrome can be conducted in schools, to assess the knowledge, attitude and practice of adolescents regarding the prevention of computer vision syndrome can be done.

References

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