



# Isoflora Eye Spray (Longiflora Isotoma) As An Effort To Prevent Computer Vision Syndrome (CVS) Based On Complementary Actions

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**Abstract.** Computer Vision Syndrome (CVS) is a syndrome that causes eye symptoms due to computer use for more than 3 hours/day. The prevalence of CVS reaches 64-90% with an estimated 60 million sufferers in the world with 1 million new cases each year. Kitolod flowers contain alkaloids, saponins, flavonoids, and tannins which are beneficial for eye health. There is the manufacture of traditional medicines from Kitolod flowers, such as Spray Isolora. The type of research is a pre-experimental one consisting of a pre-posttest design with simple random sampling on 31 samples of active gadgets; computer and laptop users > 3 hours per day at Banjar Panglan, Pejeng Village. Based on research, the use of Isoflora Spray is effective in reducing CVS symptoms in 31 samples (100%). The Wilcoxon test obtained a significant value of 0.000 ( $p < 0.05$ ). So, it was concluded that the application of Isoflora Spray to the eyes reduces complaints from staring at gadgets for too long. Compounds in Spray Isoflora will react to kill bacteria and parasites by causing a slight sting. Within 5-7 minutes, the eyes will be refreshed, eye strain will decrease, it will not dry the eyes, and bacteria or dirt will naturally come out through the eye discharge that CVS symptoms can be overcome.

**Keywords:** Computer Vision Syndrome, Isoflora Eye Spray, Kitolod Flowers.

## 1 Introduction

Computer Vision Syndrome (CVS) is an eye syndrome that causes eye symptoms that are experienced due to prolonged computer use for more than 3 hours a day [1–3]. The prevalence of CVS has reached 64-90% among computer users, with an estimated 60 million sufferers of this disease worldwide, with 1 million new cases occurring each year [4–6]. The main causes of CVS are environmental aspects caused by poor lighting, screen position, viewing distance, user vision such as uncorrected refractive errors, eye movement disorders, and eye disorders [2, 7, 8].

CVS has symptoms that are grouped into 4 which consist of; Asthenopic symptoms, symptoms on the ocular surface, visual symptoms, and extra-ocular symptoms [9, 10]. Asthenopic symptoms are symptoms characterized by eye strain, fatigue, and pain in the eyes. Symptoms of the ocular surface include irritation as well as dry eyes. Visual

symptoms, such as blurred vision, slow eye performance when focusing on an object, and double vision. Meanwhile, extra-ocular symptoms include pain in the neck, pain in the waist, and also pain in the shoulders [5, 11, 12].

The results of research at King Khalid University, Saudi Arabia showed that of the 400 samples of studied, 93% of the subjects experienced CVS [13, 14]. In 2013 in Indonesia, 92.9% of computer users complained of CVS symptoms. CVS sufferers were experienced by 76% of Sam Ratulangi Faculty of Medicine students and 41.33% of the Tribhuwana Tunggal Faculty of Health Sciences [15].

The research related to CVS is still relatively small in Indonesia, apart from the rarity of research, there is no official research that shows drugs to relieve symptoms caused by CVS in the eyes [16]. Herbal plants that can be used to treat CVS symptoms in the eye are the flowers of the Kitolod plant. Kitolod flowers have pharmacological effects as an antibiotic, anticancer, and analgetic and contain alkaloids, saponins, flavonoids, and tannins [17–19]. These ingredients have many benefits for eye health [20–22]. Besides being rich in the benefits of making traditional medicine from Kitolod flowers it is also very simple, one of which is by making Isoflora Spray.

Previous research was conducted by [23] using a research sample of male white wistar rats (*Rattus norvegicus*) with a total sample of 30 rats. The sample was divided into six groups consisting of 4 rats as an experiment, and 1 rat as a backup. Intervention in the study was carried out for 7 days with a frequency of 1 mg/ml and 2 mg/ml 4 times 1 drop per day. This showed the same result as using dexamethasone 0.1% to inhibit corneal neovascularization due to chemical trauma Rotraz© 200EC with the active ingredient amitraz. It is because of the compounds contained in Kitolod leaves namely flavonoids, alkaloids, saponins, and polifeno. The other research by [20] using goat lens showed the ethanolic extract of *H. longiflora* leaf has a potential anticataract effect by ameliorating oxidative stress-related biocompounds. Test results by [23, 24] showed the same result as the research by [21, 25] which states that all extracts of the plant parts tested, such as stems, leaves and flowers, had the same antimicrobial properties against *Staphylococcus Aureus* that cause conjunctivitis at a concentration of 10% w/v.

## 2 Methods

### 2.1 Study Design

This type of research is pre-experimental with One Group Pretest-Posttest Design.

### 2.2 Sample

The population in this study are active users of mobile phones, laptops and computers in the Banjar Panglan area, Pejeng Village. According to [26], in research with a pre-experimental type, the recommended sample size is 10 to 30 samples. Considering the dropout formula of 10%, a total of 31 samples was obtained. Samples were obtained by non-probability sampling technique with purposive sampling.

### 2.3 Instruments

The instruments in this study were questionnaires to find out the identity of the sample, the duration of the respondents staring at the screen per day, the types of CVS symptoms, the CVS scale range suffered by the respondents before and after being given Isoflora Eye Spray therapy, as well as complaints of symptoms in muscles and joints. The CVS scale is expressed as 1-3 (mild), 4-6 (moderate), and 7-10 (severe). This instrument has been tested for validity and reliability. Here's how to make and use Isoflora Eye Spray:

1. Prepare fresh kitolod flowers, without the stalks/stems.
2. Prepare a bowl to be ready (for the flowers after they have been boiled in the pot)
3. Prepare a stove and pot to heat the water.
4. Prepare a 10cc syringe and a 20cc spray container.
5. Wash the kitolod flowers under running water until clean.
6. Prepare 200mL of water/1 kitolod flower.
7. Heat water without kitolod flowers until it boils.
8. After boiling, transfer the water into the bowl that has been prepared and then add the kitolod flowers.
9. After the kitolod flowers have been soaked and left to cool until at room temperature, put the liquid in the refrigerator and let it sit for 1x24 hours. This will reduce the level of pain caused by the ethanol compound in the kitolod flower.
10. After being in the refrigerator for 1x24 hours, put the water soaked with the kitolod flowers into a 20cc spray container using a 10cc syringe. The spray is now ready to use.
11. To refresh the eyes, Isoflora Spray can be collaborated with cotton as an eye mask by spraying the spray onto the cotton and then placing it on the eyes that are experiencing fatigue.
12. Isoflora Spray can last for 1 month in the refrigerator. Keep the Isoflora Eye Spray away from direct heat and scorching sun.

### 2.4 Intervention

At the implementation stage, prior to therapy, CVS was first introduced to respondents and then followed by data collection. The intervention was carried out by giving Isoflora Eye Spray therapy, and then directing the respondent to blink 5 times so that the nerves near the eyes can more easily stimulate Isoflora Eye Spray therapy. After treatment, the researchers again measured the CVS complaint score.

### 2.5 Data Collections

Data collection was carried out directly by researchers by observing CVS complaint scores before and after administration of Isoflora Eye Spray therapy.

## 2.6 Data Analysis

Data analysis was carried out to analyze the differences in CVS complaints before and after being given treatment. The Wilcoxon test is used with the help of the SPSS application on a computer. Decision making; namely if  $p < 0.05$ , it can be said that there is a difference in the scale of complaints between before and after being given treatment. Meanwhile, if  $p > 0.05$ , it can be said that there is no difference in the scale of complaints between before and after being given treatment.

## 2.7 Ethical Considerations

This research has received ethical approval from the Denpasar Health Ministry Polytechnic with the number LB.02.03/EA/KEPK/0269/2023. In addition, there was also informed consent distributed and signed by respondents who agreed to be the sample in this study.

## 3 Results

Based on the 31 samples that have been studied, the sample characteristics are obtained which are described in Table 1.

**Table 1.** Sample characteristics

Information	Frequency (f)	Percentage %
<b>Age</b>		
15-25 years	20	64.5
26-37 years	5	16.1
38 - 48 years	5	16.1
49- 55 years	1	3.2
<b>Amount</b>	<b>31</b>	<b>100</b>
<b>Gender</b>		
Man	15	48.4
Woman	16	51.6
<b>Amount</b>	<b>31</b>	<b>100</b>
<b>Work</b>		
Trader	5	16.1
Student	13	41.9
Farmers/workers	4	12.9
Civil servant	1	3.2
Other	8	25.8
<b>Amount</b>	<b>31</b>	<b>100</b>

### CVS complaints in muscles and joints

Shoulder Pain	9	29.0
Neck Pain	10	32.3
Low back pain	8	25.8
Headache	4	12.9
<b>Amount</b>	<b>31</b>	<b>100</b>

Based on Table 1 it is known that most of the respondents are aged 15-25 years (64.5%). Most of them are female (51.6%). Most of the respondents were students with a percentage of (41.9%). As well as CVS complaints in the muscles and joints, most of them answered neck pain (32.3%).

**Table 2.** Duration of cellphone/laptop/computer use

<b>Duration of Use</b>	<b>Frequency (f)</b>	<b>Percentage %</b>
3-4 Hours/Day	2	6.5
5-6 Hours/Day	14	45.2
7-8 Hours/Day	11	35.5
9-10 Hours/Day	4	12.9
<b>Amount</b>	<b>31</b>	<b>100</b>

Table 2 shows that the average frequency of using mobile phones/laptops/computers is the highest for 5-6 hours/day or around (45.2%). While the duration of using cellphones/laptops/computers is the least at 3-4 hours/day (6.5%).

**Table 3.** CVS complaints in the eye

<b>CVS complaint</b>	<b>Frequency (f)</b>	<b>Percentage %</b>
Eye irritation	2	6.5
Watery eyes	4	12.9
Dry eyes	6	19.4
Eyestrain	5	16.1
Red eye	2	6.5
Sore eyes	4	12.9
Strained eyes	3	9.7
Blurred vision	1	3.2
Double vision	4	12.9
<b>Amount</b>	<b>31</b>	<b>100</b>

Table 3 showed that most of the respondents' complaints of Computer Vision Syndrome were dry eyes (19.4%) while the least complaint experienced by respondents was blurred vision (3.2%).

**Table 4.** CVS complaint scale

<b>Information</b>	<b>Frequency (f)</b>	<b>Percentage %</b>
<b>Before Intervention</b>		
Mild	16	51.6
Moderate	15	48.4
Severe	0	0
<b>Amount</b>		<b>100</b>
<b>After Intervention</b>		
Mild	30	96.8
Moderate	1	3.2
Severe	0	0
<b>Amount</b>		<b>100</b>

Table 4 shows that the scale of Computer Vision Syndrome complaints before being given implementation was: 16 people (51.6%) who were classified as mild scale. 15 people (48.4%) were classified as moderate scale, and there were no respondents with severe complaints. After implementation, there was an increase in respondents who were classified as mild, up to as many as 30 people (96.8%). Meanwhile, on a moderate scale there was a decrease to 1 person (3.2%), and there were still no respondents classified as a severe scale.

**Table 5.** Analysis of the effect of Isoflora Eye Spray (Isotoma Longiflora) as an effort to prevent CVS

<b>Category</b>	<b>Means</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>p</b>
Before	3.68	0.979	2	6	0.000
After	1.87	0.885	1	4	

Based on the interpretation of Table 5, with the Wilcoxon statistical test results obtained P-value = 0.000 < α0.05 then Ho is rejected and Ha is accepted. This concludes that there is an effect of Isoflora Eye Spray (Isotoma Longiflora) as an effort to prevent Computer Vision Syndrome (CVS) based on complementary actions in Banjar Panglan, Pejeng Village.

**Table 6.** Ranks

<b>Pre-Post Test</b>	<b>N</b>	<b>Mean Ranking</b>	<b>Sum of Ranks</b>	<b>P-values</b>
Negative	31a	16.00	496.00	0.000
Positive	0b	0.00	0.00	
Ties	0c			
<b>Total</b>	<b>31</b>			

Based on Table 6, it is concluded that Negative Ranks results 31a (a: post-test < pre-test) that shows the scale of complaints due to CVS after the intervention (administration of Isoflora Eye Spray based on complementary actions) to all respondents has decreased and Positive Ranks 0b (b: post-test > pre-test) shows that after the intervention all respondents did not experience an increase in complaints on the CVS scale, Ties 0c (c: pre-test = post-test). This shows that none of the respondents experienced complaints on the CVS scale remained before and after being given the intervention.

## 4 Discussion

In this study, data assessment focused on respondents with CVS eye symptoms and the CVS complaint scale before and after administration of therapy. Respondents totalled 31 people consisting of 16 women and 15 men. The average duration of using the respondent's cellphone/laptop/computer was 5-6 hours/day or around (45.2%). It therefore could be concluded that all respondents were identified as having experienced Computer Vision Syndrome [2, 3, 5, 6, 8].

Based on research, the incidence of CVS eye symptoms is dominated by dry eyes [10, 12, 27]. Before being given the Isoflora Spray, the scale of complaints in the samples varied, ranging from 2 (mild symptoms) to 6 (moderate symptoms) with an average of 3.68 (mild symptoms). CVS complaints certainly affect the everyday life of the respondents in accordance with the descriptive responses submitted by the respondents. The average respondent complained that the CVS symptoms were quite disturbing to their comfort, including, the respondent needing to wear glasses, experiencing a decrease in work productivity, and if left untreated it could cause prolonged eye injuries.

Research result [1-3, 6, 8] states that the factors that affect the scale and symptoms of CVS vary, including the duration of using the computer, whether there are breaks when using the computer, the position of the eyes when facing the computer screen, and the distance between the eyes and the computer screen. Research result [4, 6, 8, 10] gave a statement that dry eyes are one of the symptoms of CVS which can occur due to a 66% reduction in the blink reflex of smartphone/laptop/computer users. People with CVS symptoms only blink 3 to 6 times a minute. Whereas in normal circumstances, you should blink 15 to 20 times a minute.

After the respondent was given "Spray Isoflora" there was a decrease in the CVS complaint score to the lowest score of 1 (mild symptoms) and the highest score of 4 (moderate symptoms) with an average complaint score of 1.87 (mild symptoms). Based on the decreased score that occurred, the range of CVS complaints felt by patients lies in the mild to moderate range. The average patient said his eyes became more relaxed/fresher and more comfortable to see. Although there are some patients who say they still feel CVS symptoms, they are not as bad as they were before. While being given therapy, some respondents said they felt a slight stinging sensation when the Isoflora Spray liquid was put into their eyes. This response arises because the compounds contained in the Kitolod flower are reacting to kill bacteria and parasites in the eye. This can cause a slight stinging sensation in the eye. Afterward, the bacteria and parasites are expelled through eye discharge.

The test results are in accordance with the test results [17, 20, 21, 24, 28] which states that anti-bacterial compounds are described as natural products (organic matter)

with low molecular weights produced by microbes or plants that are active against other microbes at low concentrations. This includes compounds in the content of Kitolod flowers, namely Phytochemical compounds such as alkaloids, flavonoids, saponins and tannins which can kill or inhibit the growth of microbes such as bacteria, yeast, and parasites in the eye.

After analyzing the research data, it was found that there was a decrease in the complaint scale for all respondents, and there was no increase in the complaint scale or a fixed scale from before and after the implementation of the eye spray (Isotoma Longiflora). In addition, the average respondent complaint scale also decreased from 3.68 before implementation to 1.87 after implementation. Based on the Wilcoxon test, the results showed that the value of  $p = 0.000 < \alpha (0.05)$ , so  $H_a$  was accepted, and it can be stated that there is an effect of Isoflora Eye Spray (Isotoma Longiflora) on reducing the scale of Computer Vision Syndrome (CVS) complaints.

Based on the results of the research that has been carried out, it can be concluded that the content of bioactive substances such as alkaloid compounds, saponins, flavonoids, and tannins in the Isoflora Spray content functions effectively as an antimicrobial that can kill or inhibit the growth of microbes in the eye. Within 5-7 minutes after using the Isoflora Spray, bacteria or dirt in the eye will come out naturally through eye discharge so that the symptoms of CVS in the eye can be overcome.

This is reinforced by the statement by [29] in her journal which stated that in Indonesia there are many plants that have anti-bacterial abilities, one of which is believed by the public to be able to treat conjunctivitis is Kitolod flowers because they contain secondary metabolites as anti-bacterial in the eye.

## 5 Conclusions

Based on the results of research on 31 samples of active user's cellphones, laptops, and computers located in the Banjar Panglan area, Pejeng Village, the results showed that there was a change in the scale of CVS complaints in the samples before and after administration of Isoflora Eye Spray therapy. So, it can be concluded that there is an influence in using the eye spray on CVS complaints experienced by active users of mobile phones, laptops, and computers. With this research, it is expected that UPT Public Health as an Integrated Service Unit can recommend "Spray Isoflora" therapy as an aspect of service to patients with CVS.

In addition, people who experience CVS can apply this therapy regularly every 2 days to get optimal benefits. Students who use laptops every day, especially those who already have some symptoms of Computer Vision Syndrome such as myopic eyes, red eyes, or dry eyes can use Isoflora Spray therapy regularly; every 2 days to get maximum benefits.

This product can be further developed so that it can be applied concurrently with techniques combining traditional and modern medicine as a breakthrough in the health sector that is economical and environmentally friendly.



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