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RESEARCH ARTICLE

Pilot Study on Effect of Warm Compress Application using Optic Care Wear Vs Conventional Method on Level of Symptom Complex among Elderly Clients with Dry Eye Syndrome at Selected Old Age Home, Puducherry

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Abstract

Background/Objectives: Dry Eye Syndrome (DES) is a commonly encountered condition prevalent among the elderly population leading to discomfort and vision impairment. Warm compress application has been identified as a promising treatment approach for managing DES symptoms. The aim of this study was to investigate the effectiveness of warm compress application using Optic Care Wear compared to the conventional method in elderly clients with DES residing in selected old age homes in Puducherry. **Methods**: The research methodology employed in this study was quasi-experimental, with a sample size of 20 elderly clients. The clients were divided into two groups, with 10 clients in the experimental group who received a warm compress using Optic Care Wear, and 10 clients in the control group who received a conventional warm compress application using a clean cotton cloth. Age (≥50), symptoms, and clinical measures associated with dry eye are the parameters considered for the selection of clients in this study. The effectiveness of both warm compress applications was assessed through pre-test and post-test evaluations of OSDI, TBUT, and Schirmer's Test scores, and statistical analyses using paired t-tests and chi-square tests were conducted. **Findings**: Warm compress application using Optic Care Wear resulted in a significant reduction in OSDI scores (12.92% reduction) compared to the conventional method (1.67% reduction). Furthermore, the experimental group manifested substantial enhancements in TBUT ratings (32.50% increase) and Schirmer's Test ratings (36.98% increase) relative to Control Group (TBUT: 13.51% increase, Schirmer's Test: 11.26% increase). **Novelty and applications**: The study's results emphasize the novelty and effectiveness of warm compress application using Optic Care Wear for managing Dry Eye Syndrome (DES) symptoms in elderly clients. Optic Care Wear provides a preferred and valuable therapeutic

tool to enhance the quality of life and vision for elderly clients with DES. Further research is recommended to explore the long-term effects and combination treatments for comprehensive DES management.

Keywords: Dry Eye Syndrome (DES); Dry Eye Disease (DED); Optic Care Wear; Warm Compress; Conventional Method

1 Introduction

Old age is an inevitable and significant phase in the human life cycle, characterized by notable physiological and psychological changes. According to National Policy on Older Persons (1999), individuals aged 60 years or older are recognized as senior citizens or elderly[(1)]. With advancing age, various ailments and diseases become more prevalent, necessitating an increased demand for healthcare services and additional medical resources. In India, the growing elderly population, which comprises over 76.6 million individuals aged 60 and above, accounts for more than 7.7% of the total population[(2)]. Dry eye is a prevalent condition among the complaints encountered by ophthalmologists, with its prevalence varying between 5% to 30% across different age groups worldwide[(3)]. Dry eye in elderly clients can arise due to decreased tear quantity caused by the gradual loss of fatty tissue in the lacrimal apparatus or rapid evaporation of tears from the meibomian gland. Despite the limited number of epidemiological studies focusing on the prevalence of dry eye disease, existing studies found a prevalence rate of 9.9% in India[(4)]. Notably, in Puducherry, the prevalence rate was found to be 15.4% among the geriatric population and 7.7% among the pre-geriatric population[(4)]. As the elderly population continues to grow, understanding and addressing the challenges posed by dry eye syndrome in this demographic become increasingly important for providing adequate and targeted healthcare services.

Dry Eye Syndrome (DES) is a prevalent ocular condition that can significantly impact vision and overall quality of life. Its symptoms often interfere with daily activities, such as reading, writing, or using video display monitors. In India, the population-based cross-sectional study reported a high prevalence of dry eye disease at 26.2%, with Asians showing higher rates compared to Caucasians[(5)]. The prevalence of DES is particularly common among individuals aged $\geq$40 years and is influenced by various extrinsic factors, including geographic location, sunlight exposure, smoking, and indoor smoke, as well as intrinsic factors such as age, sex, hypertension, diabetes, and BMI[(5)]. Prevalence rates of DES have been documented at 30% in central India[(6)] and 34.26% in western India[(7)], while a hospital-based study in north India reported a rate of 32%, predominantly affecting patients with moderate to severe DES[(8)]. Females (54.04%) were found to be more commonly affected than males (45.96%)[(7)], and the prevalence of DES was higher in the elderly compared to younger populations[(9)]. Moreover, DES demonstrated a strong association with uncontrolled diabetes[(10)], and a significant correlation with retinopathy was also observed[(11)]. This multifactorial condition is influenced by various personal, environmental, and chronic illnesses, autoimmune diseases, and injury-related risk factors[(11)]. Different age groups have different causes of dry eye disease however 49% of DES is due to Meibomian gland dysfunction (MGD)[(12)]. Warm compress using intense pulsed light (IPL) show better improvement in treating patients with dry eye disease associated with MGD[(13)]. Warm compress has been shown to have positive effects on tear film lipid layer, blink pattern, and Meibomian gland function in patients with dry eye following corneal refractive surgeries such as SMILE and LASEK[(14)]. The application of the MGDRx thermal eye bag, a type of warm compress, has been found to improve dry eye signs and symptoms in both young and older patients[(15)]. While the literature supports the effectiveness of warm compress for treating dry eye syndrome (DES), there is a recognized need for a specialized and

efficient apparatus designed specifically for warm compress application, and further research is warranted to investigate the long-term effects of this treatment approach in combination with other therapeutic interventions[15].

This study is designed as an experimental investigation aiming to evaluate the impact of warm compress application using Optic Care Wear in comparison to the conventional method on the level of symptom complex experienced by elderly clients with Dry Eye Syndrome residing in selected old age homes in Puducherry. The specific objectives of this study are as follows:

- To screen the symptom complex and dry eye among elderly clients.
- To assess the effectiveness of warm compress application using Optic Care Wear against the conventional method on the level of symptom complex among elderly clients.

2 Methodology

In this study, a quasi-experimental research design was utilized to investigate the effects of warm compress application using Optic Care Wear compared to the conventional method on the symptom complex of elderly clients with Dry Eye Syndrome. The data collection was conducted at two specific locations, namely Hospice Convent and Pondicherry Society for the Care of the Aged. The target population for this research includes elderly clients residing in the selected old age homes in Puducherry. The population is defined as the complete group of clients who meet the specified inclusion and exclusion criteria for participation in the study.

2.1 Inclusion Criteria

- Clients diagnosed with dry eye syndrome.
- Clients who express willingness to participate in the study.
- Both male and female clients.
- Clients who are 50 years of age and above.

2.2 Exclusion Criteria

- Clients currently undergoing treatment for glaucoma.
- Clients who are already receiving treatment for dry eye syndrome.
- Clients who have undergone any recent eye surgery.
- Clients who are not available or unable to participate during the study period.
- Clients with tear levels less than 5mm.
- Clients with hypersensitivity or allergy to rubber materials.
- Clients who are concurrently receiving other interventions such as massages and eye exercises for their condition.

2.3 Sample Size

The study was carried out at two locations, namely Hospice Convent and Pondicherry Society for the Care of the Aged. A total of 20 elderly clients with dry eye syndrome were included in the study, with 10 clients in the experimental group and 10 clients in the control group. The sample selection was conducted using a non-probability convenience sampling technique, whereby participants who met the specified criteria were conveniently chosen for the study.

2.4 Warm Compress using Optic Care Wear [Experimental Group]

The process of warm compress application in this study involves the use of a specific device called Optic Care Wear. This wearable device is designed in the shape of an eye-shaped rubber pouch, which enables the easy and effective application of warm compress. The procedure includes filling the device with hot water, typically at a temperature of 45° C, and then gently placing it over the closed eyelid for a duration of 10 minutes, twice a day, for a total of 3 weeks. The temperature of the hot water used in both groups was measured using the Aqua Temp Pro Digital Thermometer. This method of warm compress aims to provide a convenient and effective means of delivering therapeutic heat to the eyes, which can help to alleviate symptoms associated with Dry Eye Syndrome in elderly clients.

2.5 Warm Compress using Conventional Method [Control Group]

The conventional method for warm compress application in this study entails using a clean cotton cloth. The cloth is dipped into hot water at a temperature of 45° C, then squeezed and folded to form a compress. This warm compress is then intermittently applied over the closed eyelids for a duration of 10 minutes, twice a day, consistently for 3 weeks. This conventional approach aims to deliver therapeutic heat to the eyes and alleviate symptoms associated with Dry Eye Syndrome in elderly clients.

2.6 Data Collection Methods

A total of 20 clients diagnosed with dry eye syndrome were enrolled as participants. The clients were divided into two groups, with 10 clients in the experimental group who received a warm compress using Optic Care Wear, and 10 clients in the control group who received a conventional warm compress application using a clean cotton cloth. Age ($\geq$50), symptoms, and clinical measures associated with dry eye are the parameters considered for the selection of clients in this study. Prior to data collection, the purpose and procedures of the study were thoroughly explained to the participants, and their written informed consent, as well as oral consent, were obtained. Pre-tests were conducted using standardized assessment tools, including the Ocular Surface Disease Index (OSDI) Scale, Tear Break-Up Time (TBUT) scale, and Schirmer test scoring scale, to establish baseline measurements for dry eye syndrome among the participants. Additionally, skin temperature was assessed using a contact Infrared Thermometer.

The intervention phase of the study involved warm compress application using the Optic Care Wear device for experimental group participants, while the control group received the conventional warm compress application using a clean cotton cloth. Both groups underwent their respective warm compress interventions for a duration of 3 weeks. Following the 3-week intervention period, post-tests were conducted using the same assessment tools to measure the outcomes of the warm compress application for each group. The data collected during the pre-tests and post-tests will be analyzed to evaluate the effectiveness of warm compress application using Optic Care Wear compared to the conventional method in alleviating symptoms associated with dry eye syndrome among elderly clients.

Table 1. Study Design

Groups	**Measurement of the dependent variable**	**Intervention**	**Measurement of dependent variables**	**Measurement of dependent variables**	**Measurement of dependent variables**
	Pre-test		**Post-test I**	**Post-test II**	**Post-test III**
Experimental Group	A1	X	A2	A3	A4
Control Group	B1	Y	B2	B3	B4

A1 — Pre-test measurements of clients with dry eye syndrome (Experimental Group).
B1 — Pre-test measurements of clients with dry eye syndrome (Control Group).
X — Intervention using optic care wear.
A2 to A4 — Post-test measurements of clients using optic care wear.
Y — Intervention using the conventional method.
B2 to B4 — Post-test measurements of clients using the conventional method.

2.7 Statistical Analysis

The statistical analysis in this study was conducted using SPSS software. To evaluate the effectiveness of warm compress application using Optic Care Wear versus the conventional method, a Paired t-test was employed. This test is suitable for comparing the pre-test and post-test measurements within each group separately. Furthermore, to compare the effectiveness of both warm compress applications, an Independent t-test was utilized. This test is appropriate for comparing the outcomes between two independent groups, in this case, the experimental group (optic care wear intervention) and the control group (conventional method intervention). To assess the comparison between the groups, OSDI (Ocular Surface Disease Index) Scale, Tear Break-Up Time (TBUT) test, and Schirmer test scoring scales were employed. This test helps to determine the strength and direction of the relationships between variables. These instruments were validated using Cronbach's alpha and demonstrated high reliability with coefficients of 0.89, 0.85, and 0.81 for OSDI, TBUT, and Schirmer tests, respectively. These findings indicate strong internal consistency, affirming the tool's stability and suitability for measuring intended variables in the study. Additionally, the chi-square test will be used to explore the association between the pre-test levels of warm compress

application using Optic Care Wear and selected demographic and clinical variables in both groups. The chi-square test is suitable for analyzing the association between categorical variables. By employing these statistical tests, the study aims to provide valuable insights into the effectiveness of warm compress application using Optic Care Wear compared to the conventional method in managing Dry Eye Syndrome in elderly clients.

3 Results

Table 2 provides a demographic distribution of participants in both the experimental group and the control group. In terms of age distribution, both groups had similar proportions of participants in different age ranges (51 to 60 years — 25%; 60 to 70 years — 55%; above 70 years — 20%). Both groups had an equal distribution of 60% males and 40% females. In terms of occupation, the experimental group had a higher proportion of self-employed clients (70%), while the control group had more housewives (60%). Socio-economic status showed a diverse representation in both groups. Nuclear families constituted 60% of the experimental group and 70% of the control group. In terms of residence, both groups had an almost equal number of participants from urban (40%) and rural areas (60%). The experimental group had participants with smoking (40%) and alcohol habits (20%), while none in the control group had such habits. These demographic factors provided valuable insights into the study's participant population and potential influences on the intervention's effectiveness in managing dry eye syndrome.

Table 2. Demographic Variable Distribution

Demographic variables		Group			
		Experimental Group (n=10)		Control Group (n=10)	
		n	%	n	%
Age	51-60 years	3	30.00%	2	20.00%
	61-70 years	5	50.00%	6	60.00%
	>70 years	2	20.00%	2	20.00%
Sex	Male	6	60.00%	6	60.00%
	Female	4	40.00%	4	40.00%
Occupation	Unemployed	0	0.00%	0	0.00%
	Housewife	0	0.00%	6	60.00%
	Self–employed	7	70.00%	4	40.00%
	Private sector	3	30.00%	0	0.00%
	Government sector	0	0.00%	0	0.00%
Socio economic status	Upper class	0	0.00%	0	0.00%
	Upper middle class	2	20.00%	2	20.00%
	Middle class	4	40.00%	5	50.00%
	Lower middle class	4	40.00%	3	30.00%
	Lower class	0	0.00%	0	0.00%
Type of family	Nuclear	6	60.00%	7	70.00%
	Joint	4	40.00%	3	30.00%
	Extended	0	0.00%	0	0.00%
Area of residence	Rural	4	40.00%	4	40.00%
	Urban	6	60.00%	6	60.00%
Personal Habits	Smoking	4	40.00%	0	0.00%
	Alcohol	2	20.00%	0	0.00%
	Pan masala	0	0.00%	0	0.00%
	Others	2	20.00%	10	100.00%

Table 3 presents the clinical variables of participants in both the experimental group and the control group. Height, weight, temperature, pulse rate, respiratory rate, and blood pressure were measured for each participant. The majority of participants in both groups had heights (50%) between 140-160 cm and weights (40%) between 40-70 kg. Most participants had a temperature of 99°F or 100°F (Experimental Group: 60% and Control Group: 70%). The pulse rates were mostly between 70-80 beats/min (Experimental Group: 70% and Control Group: 60%), and respiratory rates were within 12-20 breaths/min

for the majority (Experimental Group: 70% and Control Group: 80%). Blood pressure levels were predominantly below 120 mmHg (Experimental Group: 70% and Control Group: 60%). None of the participants had a previous history of hospitalization for dry eye syndrome, and most reported an onset of symptoms within the last month (Experimental Group: 70% and Control Group: 80%). When asked about measures taken to relieve dry eye syndrome, "allopathy treatment" (Experimental Group: 30% and Control Group: 20%) and "artificial tears" (Experimental Group: 30% and Control Group: 50%) were the most common responses. Diabetes mellitus was present in a considerable number of participants in both groups (Experimental Group: 30% and Control Group: 20%), while other conditions were less prevalent. This data provides valuable insights into the clinical characteristics of the participants with dry eye syndrome in the study.

Table 3. Clinical Variable Distribution

Clinical Variables		Group			
		Experimental Group (n=10)		Control Group (n=10)	
		n	%	n	%
Height	140-150 cm	5	50.00%	5	50.00%
	151-160 cm	3	30.00%	4	40.00%
	161-170 cm	2	20.00%	1	10.00%
Weight	40 -50 kg	4	40.00%	4	40.00%
	51-60 kg	3	30.00%	2	20.00%
	61-70 kg	3	30.00%	4	40.00%
Temperature	98	0	0.00%	0	0.00%
	99	6	60.00%	7	70.00%
	100	4	40.00%	3	30.00%
Pulse	70-80 beats/min	7	70.00%	6	60.00%
	81-90 beats/min	3	30.00%	4	40.00%
	91-100 beats/min	0	0.00%	0	0.00%
	101-110 beats/min	0	0.00%	0	0.00%
Respirations	12-20 breaths/min	7	70.00%	8	80.00%
	>20 breaths/min	3	30.00%	2	20.00%
Blood pressure	< 120 mmHg	7	70.00%	6	60.00%
	121-140 mmHg	3	30.00%	4	40.00%
	>140 mmHg	0	0.00%	0	0.00%
Previous history of hospitalization on dry eye syndrome	Yes	0	0.00%	0	0.00%
	No	10	100.00%	10	100.00%
Onset of illness (Dry eye) - number of days	< 1 month	7	70.00%	8	80.00%
	>1 month	3	30.00%	2	20.00%
What measures have you taken to relieve dry eye syndrome	Warm compression	0	0.00%	0	0.00%
	Cold compression	0	0.00%	0	0.00%
	Allopathy treatment	3	30.00%	2	20.00%
	Artificial tears	3	30.00%	5	50.00%
	Others	4	40.00%	3	30.00%
Are you having any of the following conditions?	Diabetes mellitus	3	30.00%	2	20.00%
	Hypertension	2	20.00%	2	20.00%
	Thyroid disorder	0	0.00%	0	0.00%
	Vitamin A disorder	0	0.00%	0	0.00%
	Others	2	20.00%	2	20.00%
	Nil	3	30.00%	4	40.00%

Tables 4, 5 and 6 represents the comparative results of OSDI, TBUT, and Schirmer pre-test scores ensure that the symptom levels of both the experimental group and the control group were similar at the beginning of the study. In both groups, the majority of participants had moderate OSDI scores (Experimental Group: 70%, Control Group: 60%), while the remaining

participants had mild symptom complexity (Experimental Group: 30%, Control Group: 40%). Similarly, most participants exhibited marginal TBUT scores (Experimental Group: 30%, Control Group: 80%), with the rest showing low TBUT scores (Experimental Group: 70%, Control Group: 20%). A similar pattern was observed in Schirmer's test scores, with 70% of participants in the experimental group and 80% in the control group having mild scores, and the remaining participants (Experimental Group: 30%, Control Group: 20%) having moderate Schirmer's test scores. The statistical analysis using the chi-square test revealed no significant difference between the experimental group and the control group in terms of OSDI (p=0.64), TBUT (p=0.61), and Schirmer's test scores (p=0.32), confirming the similarity in symptom complex levels at the outset of the study.

Table 4. OSDI Assessment Scores

Level of OSDI	Pre-test					Post-test				
	Experimental Group		Control Group		Chi-square test	Experimental Group		Control Group		Chi-square test
	n	%	n	%		n	%	n	%	
Normal	0	0.00%	0	0.00%		6	60.00%	2	20.00%	
Mild	3	30.00%	4	40.00%	c2=0.22	4	40.00%	3	30.00%	**c2=7.14P=0.03* (S)**
Moderate	7	70.00%	6	60.00%	P=0.64 (NS)	0	0.00%	5	50.00%	
Severe	0	0.00%	0	0.00%		0	0.00%	0	0.00%	

S= Significant P≤0.05 significant
NS= not significant P>0.05 not significant

Table 5. TBUT Assessment Score

Level of TBUT	Pre-test					Post-test				
	Experimental Group		Control Group		Chi-square test	Experimental Group		Control Group		Chi-square test
	n	%	n	%		n	%	n	%	
Normal	0	0.00%	0	0.00%	c2=0.27	7	70.00%	2	20.00%	**c2=5.05P=0.03* (S)**
Marginal	3	30.00%	8	80.00%	P=0.61	3	30.00%	8	80.00%	
Low	7	70.00%	2	20.00%	(NS)	0	0.00%	0	0.00%	

S= Significant P≤0.05 significant
NS= not significant P>0.05 not significant

Table 6. Schirmer's Test Assessment Score

Level of Schirmer	Pre-test					Post-test				
	Experimental Group		Control Group		Chi-square test	Experimental Group		Control Group		Chi-square test
	n	%	n	%		n	%	n	%	
Normal	0	0.00%	0	0.00%		6	60.00%	2	20.00%	
Mild	7	70.00%	8	80.00%	c2=0.95	4	40.00%	2	20.00%	**c2=8.67P=0.01* (S)**
Moderate	3	30.00%	2	20.00%	P=0.32 (NS)	0	0.00%	6	60.00%	
Severe	0	0.00%	0	0.00%		0	0.00%	0	0.00%	

S= Significant P≤0.05 significant
NS= not significant P>0.05 not significant

By establishing this baseline equivalence, the study can confidently attribute any changes in the symptom complex after the intervention to the effectiveness of the warm compress applications, thus providing valuable insights into the efficacy of this intervention for managing dry eye symptoms in the elderly population.

Table 7 represents the pre-test and post-test measurements, along with the mean difference and results of the paired t-test for two groups (Experimental Group and Control Group) undergoing warm compress therapy using optic care wear (Experimental Group) and the conventional method (Control Group) for Dry Eye Syndrome. In the experimental group, there was a statistically significant reduction in the mean OSDI Score from the pre-test to the post-test, with a mean difference of 6.20 (t = 4.08, p = 0.01**). Conversely, in the control group, there was no significant change in the mean OSDI Score, showing

a small reduction from 25.40 (pre-test) to 24.60 (post-test) with a mean difference of 0.80 (t = 1.45, p = 0.18). Likewise, the experimental group established a significant increase in the mean TBUT score from 8.00 (pre-test) to 10.60 (post-test) with a mean difference of 2.60 (t = 3.22, p = 0.01**), while the control group exhibited no significant change showing a slight increase from 7.40 (pre-test) to 8.40 (post-test) with a mean difference of 1.00 (t = 1.75, p = 0.08). For Schirmer's Test, the experimental group significantly increased from 7.30 (pre-test) to 10.00 (post-test) with a mean difference of 2.70 (t = 3.55, p = 0.01**). But, in the control group, there was no significant change in the mean Schirmer's Test Score, with a small increase from 7.10 (pre-test) to 7.90 (post-test) and a mean difference of 0.80 (t = 1.71, p = 0.10). The analysis reveals that warm compress therapy using optic care wear (Experimental Group) had a significant positive effect on OSDI Score, TBUT Score, and Schirmer's Test Score, as evidenced by the significant mean differences and p-values ($p < 0.01$). However, the conventional approach (Control Group) failed to produce noteworthy variations in OSDI Score, TBUT Score, or Schirmer's Test Score, as demonstrated by the absence of significant p-values ($p > 0.05$).

Table 7. Pre-test and Post-test Scores

Scale	Groups	Pre-test		Post-test		Mean Difference	Student paired t-test
		Mean	SD	Mean	SD		
OSDI Score	Experimental Group	26.00	5.83	19.80	1.93	6.20	**t=4.08 p=0.01**(S)**
	Control Group	25.40	5.64	24.60	4.81	0.80	t=1.45 p=0.18(NS)
TBUT Score	Experimental Group	8.00	1.56	10.60	2.50	2.60	**t=3.22 p=0.01**(S)**
	Control Group	7.40	2.06	8.40	2.17	1.00	t=1.75 p=0.08(NS)
Schirmer's Test Score	Experimental Group	7.30	1.41	10.00	1.33	2.70	**t=3.55 p=0.01**(S)**
	Control Group	7.10	1.37	7.90	2.08	0.80	t=1.71 p=0.10(NS)

To evaluate the efficacy of warm compress therapy, the mean scores of the three assessment tools before and after implementation were compared. This comparative analysis enables the assessment of effectiveness by examining scores across different measurement scales. The changes in scores before and after the intervention reveal the impact of both warm compress methods on the symptomatology of dry eye syndrome in the experimental group and the control group.

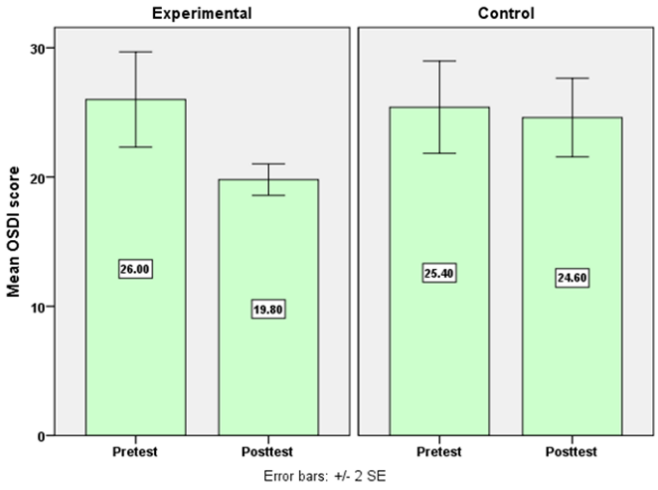

Fig 1. Experimental Group and Control Group OSDI Reduction Score

Figure 1 compares the OSDI scores between the experimental group and the control group before and after the intervention. In the experimental group, the OSDI reduction percentage is 12.92%, whereas it is only 1.67% in the control group. These findings suggest that the warm compress application using optic care wear in the experimental group resulted in a substantial reduction in OSDI scores and a significant improvement in symptom severity compared to the control group.

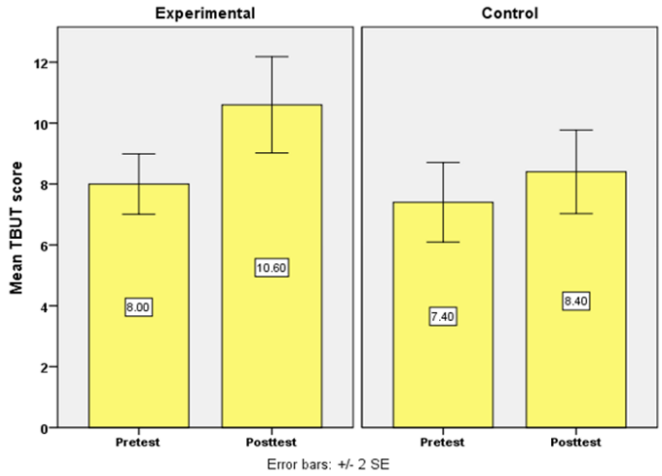

Fig 2. Experimental Group and Control Group TBUT Gain Score

The TBUT scores for both groups before and after the intervention are compared in Figure 2. According to this comparative analysis, both groups reported improvements in tear film stability after the intervention. However, the experimental group demonstrated a considerable improvement in tear film stability after warm compress application using optic care wear, as evidenced by a substantial increase in the mean TBUT score (32.50%) from the baseline. In contrast, the control group demonstrated a slight increase in the mean TBUT score (13.51%) from the baseline, indicating some improvement in tear film stability after the conventional warm compress application in the control group. These findings suggest that warm compress application using optic care wear was more effective in enhancing tear film stability in the experimental group, making it a preferred intervention for managing tear film instability associated with dry eye syndrome.

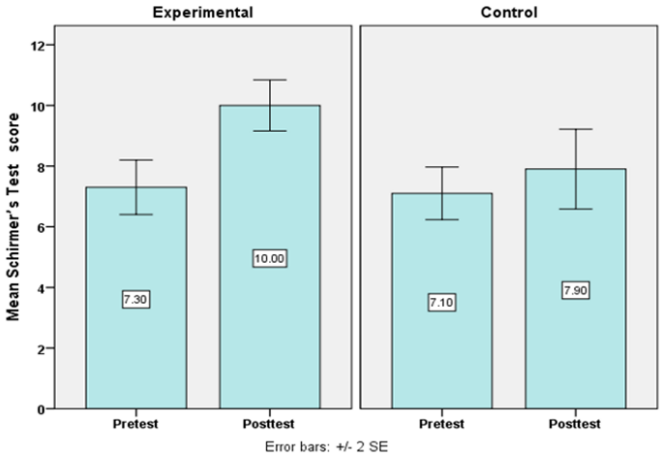

Fig 3. Experimental Group and Control Group Schirmer's Test Score

Figure 3 presents a comparison between the Schirmer's Test scores of the experimental group and the control group before and after an intervention. The results indicate that the mean Schirmer's Test score in the experimental group significantly increased (36.98%) from the baseline following a warm compress application using optic care wear, demonstrating a substantial improvement in tear production. Conversely, the control group only exhibited a slight increase (11.26%) in the mean Schirmer's Test score from the baseline after using conventional warm compress application, indicating some improvement in tear production. These findings suggest that the warm compress application using optic care wear is a more effective intervention for managing tear production-related issues associated with dry eye syndrome in the experimental group.

4 Discussion

The finding of our study reveal interesting patterns in the severity of dry eye symptoms among elderly clients selected for this study. According to the post-test OSDI scores, 40% of the clients measured normal OSDI scores, while a majority (35%) had mild levels of symptomatology. Interestingly, 25% of the participants measured moderate OSDI levels even after the intervention. These results are consistent with the study which assesses the impact of dry eye using OSDI[16]. Furthermore, the post-test assessment of tear film stability using TBUT scores showed that 45% of the clients were identified with normal tear film stability, while 55% had marginal TBUT scores. In the post-test none of the participants had low TBUT scores however 45% of the participant had low levels in the pre-test assessment before the intervention. Additionally, Schirmer's Test, which assesses tear production, indicated that 40% of the clients had normal tear production scores, while 30% demonstrated mild scores and 30% had moderate scores. This is aligned with the study evaluating ocular surface properties in epidemic keratoconjunctivitis (EKC) patients found that the tear break-up time (TBUT) score was 3.59 ± 2.29 seconds and 6.00 ± 1.83 seconds, while the Schirmer's test score was 10.94 ± 8.42 mm and 16.76 ± 9.05 mm in two groups, respectively[17]. A notable observation in the study is that a significant proportion of the OSDI, TBUT, and Schirmer's test scores shifted toward normal levels when comparing the pre-test and post-test assessments. This finding strongly suggests the effectiveness of warm compress applications in treating Dry Eye Syndrome (DES). The improvements in these scores indicate that warm compress therapy using both optic care wear and the conventional method had a positive impact on the symptomatology and tear film stability among elderly clients with DES. These results highlight the potential of warm compress as a valuable and non-invasive therapeutic approach for managing DES and improving the overall eye health and comfort of the affected individuals. This finding confirms the previous research by the author, which concluded that warm compress application was effective in reducing the level of dry eye among elderly clients using the conventional method[18].

The study compared the effectiveness of warm compress application using optic care wear and the conventional method in two groups. The experimental group showed a significant reduction in OSDI scores (12.92% reduction) compared to the control group (1.67% reduction). Upon analyzing the TBUT scores, it was observed that the experimental group experienced a substantial improvement with a mean gain of 2.60 seconds (32.50% increase) in tear break-up time. In comparison, the control group showed a more modest gain of 1.00 seconds (13.51% increase). In terms of Schirmer's Test scores, the experimental group demonstrated a significant increase with a mean gain of 2.70 mm (36.98% increase) in tear production. On the other hand, the control group showed a more modest gain of 0.80 mm (11.26% increase). These findings suggest that warm compress application using optic care wear was more effective in improving dry eye symptoms in the experimental group, highlighting its potential benefits for managing Dry Eye Syndrome in elderly clients. This result supports the study findings that confirm the effectiveness of warm compress therapy in managing dry eye symptoms using a device similar to optic care wear[19]. The study findings support a significant improvement in elderly clients with dry eye syndrome who received warm compress using optic care wear compared to those who received the conventional method.

4.1 Limitations of the Study

These findings shed light on utilizing optic care wear in the management of DES in elderly clients. However, to draw more definitive conclusions and generalize these findings, further studies with larger sample sizes and diverse populations are warranted. Such research will contribute to a better understanding of DES in the elderly and aid in the development of more targeted and effective interventions to improve their ocular health and overall quality of life.

5 Conclusion

The study reveals that the use of warm compress application with Optic Care Wear resulted in a significant reduction of OSDI scores by 12.92% in the experimental group, while only a 1.67% reduction was observed in the control group. Besides, the warm compress group had a substantial improvement in tear break-up time, with a mean gain of 2.60 seconds (32.50% increase), while the control group only had a modest gain of 1.00 seconds (13.51% increase). Additionally, the results revealed that tear production significantly increased in the experimental group, with a mean gain of 2.70 mm (36.98% increase) in Schirmer's Test scores, while the control group exhibited a more modest gain of 0.80 mm (11.26% increase). These findings underscore the novelty and efficacy of warm compress application using Optic Care Wear in managing Dry Eye Syndrome in elderly clients, providing substantial improvements in symptom relief and tear film stability. Therefore, this method will be a preferred intervention over the conventional approach, offering promising efficacy in the management of Dry Eye Syndrome in elderly clients. It would be prudent for researchers to consider exploring the long-term effects of warm compress therapy with a larger sample size in the future to develop more conclusive findings. As the elderly population continues to expand, it is essential to

invest in innovative and efficient therapeutic devices such as Optic Care Wear to cater to their specific needs and enhance their eye health.

References

1) National Policy for Older Persons Year 1999. . Available from: https://socialjustice.gov.in/writereaddata/UploadFile/National%20Policy%20for%20Older%20Persons%20Year%201999.pdf.
2) World Population Prospects: The 2017 Revision. 2017. Available from: https://population.un.org/wpp/publications/Files/WPP2017_KeyFindings.pdf.
3) Rajendra P, Maurya. Dry eye disease: An overview. *Indian Journal of Clinical and Experimental Ophthalmology*. 2018;4(4):433–434. Available from: https://www.ijceo.org/journal-article-file/7897.
4) Krishnamurthy L, Subramanian T, Behera G, Ramesh J, Radhika V. Evaluation of Dry Eye Disease in Geriatric and Pre-Geriatric Middle-Aged Subjects Attending a Tertiary Care Hospital in Puducherry. *Journal of Current Medical Research and Opinion*. 2019;02(08):213–220. Available from: https://doi.org/10.15520/jcmro.v2i08.143.
5) Tandon R, Vashist P, Gupta N, Gupta V, Sahay P, Dipali D, et al. Association of dry eye disease and sun exposure in geographically diverse adult (≥40 years) populations of India: The SEED (sun exposure, environment and dry eye disease) study - Second report of the ICMR-EYE SEE study group. *The Ocular Surface*. 2020;18(4):718–730. Available from: https://doi.org/10.1016/j.jtos.2020.07.016.
6) Mittal S, Mittal D. To Evaluate the Prevalence and Risk Factors of Dry Eye Disease in a Hospital based Population in Central India. *Scholars Journal of Applied Medical Sciences*. 2020;8(6):1456–1466. Available from: https://saspublishers.com/article/1904/.
7) Shilpy N, Patel DB. Prevalence of Dry Eye Disease in Western India. *International Journal of Contemporary Medical Research [IJCMR]*. 2019;6(7):2454–7379. Available from: http://dx.doi.org/10.21276/ijcmr.2019.6.7.37.
8) Chatterjee S, Agrawal D, Sanowar G, Kandoi R. Prevalence of symptoms of dry eye disease in an urban Indian population. *Indian Journal of Ophthalmology*. 2021;69(5):1061–1066. Available from: https://doi.org/10.4103/ijo.ijo_1796_20.
9) Mohan N, Vandana Parasar, Singh A, Kusumesh R. Prevalence and risk factors of dry eye among patients of a tertiary care centre in eastern india. *Paripex - Indian Journal of Research*. 2021;10(9):5–7. Available from: https://www.worldwidejournals.com/paripex/recent_issues_pdf/2021/September/prevalence-and-risk-factors-of-dry-eye-among-patients-of-a-tertiary-care-centre-in-eastern-india_September_2021_8612235827_6000260.pdf.
10) Gannur AG, Patil MG, Lingadalli PB, Golewale ZH. Estimation of Prevalence of Dry Eye, and Ocular Surface Changes, in Patients of Diabetes Mellitus, in Vijaypur District, India. *Journal of Evolution of Medical and Dental Sciences*. 2021;10(32):2559–2564. Available from: https://link.gale.com/apps/doc/A673736893/AONE?u=anon~dd448f80&sid=googleScholar&xid=6fc0efb3.
11) Rouen PA, White ML. Dry eye disease: prevalence, assessment, and management. *Home healthcare now*. 2018;36(2):74–83. Available from: https://doi.org/10.1097/nhh.0000000000000652.
12) Donthineni PR, Das AV, Basu S. Dry eye disease in children and adolescents in India. *The Ocular Surface*. 2020;18(4):777–782. Available from: https://doi.org/10.1016/j.jtos.2020.07.019.
13) Gao YF, Liu RJ, Li YX, Huang C, Liu YY, Hu CX, et al. Comparison of anti-inflammatory effects of intense pulsed light with tobramycin/dexamethasone plus warm compress on dry eye associated meibomian gland dysfunction. *International Journal of Ophthalmology*. 2019;12(11):1708–1713. Available from: https://doi.org/10.18240/ijo.2019.11.07.
14) Zhou X, Shen Y, Shang J, Zhou X. Effects of warm compress on tear film, blink pattern and Meibomian gland function in dry eyes after corneal refractive surgery. *BMC Ophthalmology*. 2021;21(330):1–11. Available from: https://doi.org/10.1186/s12886-021-02091-2.
15) García-Marqués JV, Talens-Estarelles C, Martínez-Albert N, García-Lázaro S, Cerviño A. Evaluation of the MGDRx eyebag treatment in young and older subjects with dry eye symptoms. *Journal Français d'Ophtalmologie*. 2022;45(1):20–27. Available from: https://doi.org/10.1016/j.jfo.2021.08.009.
16) Barber L, Khodai O, Croley T, Lievens C, Montaquila S, Ziemanski J, et al. Dry eye symptoms and impact on vision-related function across International Task Force guidelines severity levels in the United States. *BMC Ophthalmology*. 2018;18(260):1–9. Available from: https://doi.org/10.1186/s12886-018-0919-7.
17) Vural GS, Selver OB, Veral A, Palamar M. Multi-parametric evaluation of ocular surface disorders during healing process of viral conjunctivitis. *International Ophthalmology*. 2022;42:1419–1425. Available from: https://link.springer.com/article/10.1007/s10792-021-02130-3.
18) Manopriya V, Renuka K. Effectiveness of Warm Compress on Level of Dry Eye Among Elderly Clients in Selected Old age Homes, Chennai. *International Journal of Scientific Research*. 2020;9(9):75–76. Available from: https://doi.org/10.36106/ijsr/3120239.
19) Monte NI, do Monte Rebecca Renata Lapenda, de Araújo NVG, Borges DLMA, Borges DMMA, Costa ULA, et al. Pulsed intense light to treat dry eye syndrome. *GSC Biological and Pharmaceutical Sciences*. 2019;9(3):35–40. Available from: https://doi.org/10.30574/gscbps.2019.9.3.0221.