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# Comparison of Two Dry Eye Questionnaires in Postmenopausal Women With and Without Dry Eye

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**ABSTRACT:** Dry eye disease is a public health issue especially in postmenopausal women. The aim of this study was to compare the visual and ocular symptoms scores in postmenopausal women with and without dry eye using the 5-item Dry eye questionnaire (DEQ-5) and Ocular surface disease index (OSDI) and to correlate the results between the DEQ-5 and OSDI in postmenopausal women with and without dry eye. Fifty-five participants (33 dry eye subjects and 22non-dry eye subjects) completed the two questionnaires (DEQ-5 and OSDI). The OSDI questionnaire was used to group postmenopausal women with dry eye into subgroups. Fluorescein tear break up time was used to assess tear stability. DEQ-5 scores, OSDI scores and FBUT values were compared using Mann Whitney U test. The correlations between both questionnaires scores were evaluated using the Spearman coefficient. The total OSDI score was significantly different between the 2 groups (Non dry eye (NDE) = 9.90 ± 12.75 and dry eye (DE) = 30.71± 16.45). The OSDI sub scores (ocular symptoms score, vision related functions and environmental triggers) were higher for the dry eye group. The total DEQ-5 score was also significant between the 2 groups. (NDE = 3.17 ± 2.26 and DE = 6.19 ± 3.63). The DEQ-5 sub score (eye discomfort, and watery eye) yielded higher results for the dry eye group. Spearman's rho test showed significant correlation between the OSDI score and DEQ-5 score. ($r^2 = 0.57$, $p = 0.000$). Our study therefore revealed that any of the two questionnaires could be used in diagnosis of dry eye disease in postmenopausal women. However, the 5-item dry eye questionnaire with just 5 questions can be recommended for screening among postmenopausal as this questionnaire has fewer questions

**Keywords**: Dry eye disease, Post-menopausal women, Tear breakup time, Questionnaires

## Introduction

Dry eye disease is a common ocular surface disease which is accompanied by a lot of discomfort resulting from abnormal tear quantity and quality or decreased tear film stability (Lu *et al.,* 2018). It has been seen as a growing public health problem (Li *et al.,* 2012) with prevalence of dry eye ranging from 7.4% in Australia (McCarty *et al.,* 1998) to 33.7% in Taiwan (Lin *et al.,* 2003). According to epidemiological studies from the women's health study and physician's health study, the prevalence of dry eye in the United State is about 7% in women and 4% in men over the age of 50years (Schaumberg *et. al*., 2003).

Menopause is the time of the final menstrual period, followed by 12 months of amenorrhea. Post-menopause describes the period following the final menses (Soules *et. al*., 2001).Dry eye is the most common problem in postmenopausal women (Radadia and Sapre**,** 2016). According to Peck *et al*. (2017), postmenopausal women have higher incidence of dry eye disease. This has been linked to the changes in balance of sex hormone (Peck *et al*., 2017). Dry eye disease symptoms have severe effect on patient's activities and day to day living. These symptoms

include discomfort, blurred vision, burning sensation, irritation and photophobia. Most commonly, these dry eye symptoms are complained of before clinical signs are observed (Chalmers *et al.,* 2005) and one of the major goals in dry eye treatment is elimination of these symptoms. Assessing these symptoms is therefore very important in diagnosing as well as management of dry eye (Lu *et al*., 2018). In assessing these symptoms, valid and reliable measures are needed. Dry eye questionnaires have been found to be useful tools in the evaluation of the subjective symptoms of dry eye (Amparo *et al.,* 2015). There are different types of dry eye questionnaire However, in this study, the ocular surface disease index (OSDI) and dry eye questionnaire-5 (DEQ-5) questionnaires were used in assessing postmenopausal women.

The OSDI is the most common questionnaire used in the evaluation of dry eye. It is a 12-item questionnaire designed to provide a rapid assessment of symptoms related to dry eye and their severity. The questions are related to experience during the previous week regarding ocular symptoms, the severity, how these affect visual function and the ocular response to environmental triggers. The OSDI questionnaire was graded on a scale from 0 to 4, where 0 indicates "none of the time"; 1, "some of the time"; 2, "half of the time"; 3, "most of the time"; 4, "all of the time (Wood and Mian, 2016). The DEQ-5 has questions related to visual disturbance. They include the frequency of visual changes, how noticeable the visual disturbance is in the morning and at night, as well as how much the visual fluctuation bothers the respondent. The aim of this study was to assess the visual and ocular symptoms reported by postmenopausal women with and without dry eye using the DEQ-5 and OSDI and to compare the results from the DEQ-5 and OSDI questionnaire.

## Methods

The study was conducted in compliance with ethical committee of the Edo State Hospital management Board and the tenets of the Declaration of Helsinki (Ethical Principles for Medical Research Involving Human Subjects). Informed consent was obtained from all the subjects after proper explanation on the nature and aims of the study. Data was collected at the Eye Department of the Stella Obasanjo hospital from patients who have been diagnosed of dry eye disease. The study included Post–menopausal women (menses ceased more than 12 months before the start of the study) above 50 years of age. Exclusion criteria included women whose menses ceased due to autoimmune disorders, chemotherapy, pelvic irradiation, women who wear contact lenses, women who had any clinically significant lid or conjunctival abnormalities, neovascularization, or corneal opacities, women who were diabetic and women who have had ocular surgery in the past one year.

The diagnosis of dry eye was based on the TFOS DEWS II Diagnostic Methodology report criteria "Symptoms from screening using dry eye questionnaire and at least one positive result from markers of homeostasis which include non-invasive breakup time, osmolarity (measured prior to breakup time if fluorescein tear break-up time (FBUT) used) and ocular surface staining with fluorescein and lissamine green (observing the cornea, conjunctiva and eyelid margin) constitute the diagnosis of DED. (Wolffsohn *et al.,* 2017). A brief case history which involved an ophthalmic and systemic history of each subject was conducted. External eye examination was done to examine the external ocular and anterior segment structures. Fundoscopy using the direct ophthalmoscope was also carried out. Subjects who met the selection criteria were recruited for the study. Participants were then assisted to complete the ocular surface disease index (OSDI) questionnaires and the 5-item dry eye questionnaire. The OSDI questionnaire was used to group postmenopausal women with dry eye into subgroups. Tear stability was assessed with fluorescein tear break up time (FBUT).

### Results

The mean age (mean ± SD) of the non-dry eye subjects (n=22) was 57.91 ± 4.42years and dry eye subjects (n=33) was 61.36 ± 7.94. The dry eye group exhibited a shorter tear breakup time. There was a significant difference ($p = 0.0001$) between tear breakup time in dry eye (DE) and the non-dry eye (NDE) group.

**Table 1:** Summary of tear breakup time measures

| Clinical Measures | Tear Breakup Time |
|---|---|
| **NDE group** | 11.36 ± 4.12 |
| **DE group** | 7.67 ± 2.07 |
| **P (α = 0.05) (NDE vs DE)** | **0.0001** |
| **Mild DE** | 7.62 ± 1.996 |
| **Moderate DE** | 7.00 ± 2.268 |
| **Severe DE** | 8.33 ± 2.062 |
| **P (α = 0.05) (NDE vs mild DE)** | **0.002** |
| **P (α = 0.05) (NDE vs moderate DE)** | **0.005** |
| **P (α = 0.05) (NDE vs severe DE)** | **0.034** |

The total OSDI score was significantly different between the 2 groups (Non dry eye (NDE) = 9.90 ± 12.75 and dry eye (DE) = 30.71± 16.45). The dry eye group consisted of 16 mild, 8 moderate and 9 severe. The OSDI sub scores (ocular symptoms score, vision related functions and environmental triggers) were also significantly different between the dry eye group and non-dry eye group with higher scores for the dry eye group and lower scores for the non-dry eye group. The vision related functions however higher for the dry eye group did not show any significant difference between the two groups.

The total DEQ-5 score was significant between the 2 groups. (NDE = 3.17 ± 2.26 and DE = 6.19 ± 3.63). The DEQ-5 sub score (eye discomfort, and watery eye) were significant however there was no significant difference between the two groups in the eye dryness sub score. 26 of the dry eye patients complained of eye discomfort, 18 complained of eye dryness and 27 complained of watery eyes as compared to NDE group were only 18 complained of eye discomfort, 4 complained of dryness and 7 complained of watery eyes.

Spearman's rho test showed significant correlation between the OSDI score and DEQ-5 score ($r^2 = 0.57$, $p = 0.000$).

**Table 2:** Summary of ocular surface disease index scores

| OSDI Score | Total Score | Ocular Symptoms | Vision Related Functions | Environmental Triggers |
|---|---|---|---|---|
| **NDE group** | 9.90 ± 12.75 | 2.36 ± 2.40. | 1.18 ±1.99 | 0.46 ± 0.91 |
| **DE group** | 30.71 ± 16.45 | 7.42 ± 3.70 | 2.52 ± 2.21 | 2.09 ± 2.52 |
| **P (α = 0.05) (NDE vs DE)** | **0.000** | **0.000** | **0.018** | **0.001** |
| **Mild DE** | 19.506 ± 2.94 | 5.25± 1.39 | 2.06 ± 1.61 | 0.81 ± 0.98 |
| **Moderate DE** | 29.71 ± 5.35 | 7.38 ± 2.92 | 3.13 ± 2.80 | 2.13 ± 2.95 |
| **Severe DE** | 51.51± 17.38 | 11.33 ± 4.12 | 2.78 ± 2.64 | 4.33 ± 2.65 |
| **P (α = 0.05) (NDE vs mild DE)** | **0.000** | **0.03** | 0.16 | **0.000** |
| **P (α = 0.05) (NDE vs moderate DE)** | **0.001** | **0.000** | 0.17 | **0.016** |
| **P (α = 0.05) (NDE vs severe DE)** | **0.002** | **0.002** | 0.35 | **0.02** |

**Table 3: Summary of 5 question dry eye questionnaire score (DEQ-5 score)**

| DEQ-5 Score | Total Score | Eye Discomfort | Eye Dryness | Watery Eye |
|---|---|---|---|---|
| **NDE group** | 2.64 ± 1.81 | 1.11 ± 1.02 | 0.44 ± 0.78 | 0.72 ± 0.96 |
| **DE group** | 5.88 ± 3.70 | 1.78 ± 1.07 | 1.00 ± 1.12 | 1.66 ± 0.902 |
| **P (α = 0.05) (NDE vs DE)** | **0.001** | **0.001** | 0.06 | **0.008** |
| **Mild DE** | 4.31± 2.84 | 1.56 ± 1.10 | 0.67 ± 0.91 | 1.67 ± 1.09 |
| **Moderate DE** | 6.12 ± 2.23 | 1.91 ± 1.04 | 1.36 ± 1.36 | 1.73 ± 0.65 |
| **Severe DE** | 8.44 ± 4.77 | 2.67 ± 0.58 | 1.67 ± 0.58 | 1.33 ± 0.58 |
| **P (α = 0.05) (NDE vs mild DE)** | 0.06 | 0.09 | 0.49 | 0.333 |
| **P (α = 0.05) (NDE vs moderate DE)** | **0.001** | **0.003** | 0.40 | **0.001** |
| **P (α = 0.05) (NDE vs severe DE)** | **0.000** | **0.001** | **0.003** | **0.033** |

## Discussion

Dry eye disease is a very common ocular surface disease which is accompanied by different symptoms which can be confusing during diagnosis and treatment (Amparo et al, 2016). There is a high incidence of this disease among postmenopausal women and so identification of the symptoms in these women is very important (Peck *et al*., 2017). According to Wood and Mian, (2016), dry eye questionnaires are one of the most repeatable diagnostic tests for dry eye and are also helpful in screening, diagnosis, assessment of treatment and also grading of the severity of the disease. The Ocular Surface Disease Index (OSDI) is a commonly used 12 questioned validated questionnaire related to experience during the previous week regarding ocular symptoms, the severity, how these affect visual function and the ocular response to environmental triggers, while the DEQ-5 is a 5 questioned questionnaire which assesses the frequency of visual symptoms and how notable these changes are in the morning and night. Our study assessed the dry eye symptoms in postmenopausal women with dry eye and without dry eye using the OSDI questionnaire and the DEQ-5 questionnaires. A statistically significant higher OSDI scores (total score and sub scores) for the DE and the dry eye subgroups were observed when compared to the NDE subjects. This is consistent with works done by other researchers on dry eye. Li *et al*. (2012) in their study also showed a significantly higher OSDI score and sub score among the dry eye patients than in the control group. The study is also in line with the work by Schiffmann *et al.* (2000), were their OSDI scores and sub scores were higher in the DE and subgroup than the NDE. The ocular symptoms frequently complained of include sensitivity to light, gritty sensation, blurred vision and poor vision. The OSDI questionnaire helps to analyses the ocular symptoms, vision related functions and environmental triggers and so helps to quantify assessment of dry eye symptoms and the impact of these functions on vision related functioning.

The five-item dry eye questionnaire (DEQ-5) also gave a significantly higher score and sub score among the DE compared to the NDE which had lower score. For the dry eye group, 26 patients complained of eye discomfort, 18 complained of eye dryness and 27 complained of watery eyes. The DEQ-5 scores showed that the DE group exhibited a higher intensity of symptoms than the NDE group. This study is in line with study done by Chalmers and Begleys, (2008), where they had higher scores in the dry eye group when compared to the non-dry eye group using DEQ-5.

Our study also compared reported symptoms by postmenopausal women with dry eye disease as assessed by the OSDI questionnaire and DEQ-5 questionnaire. There was a significant correlation between the OSDI score and the DEQ-5. This result is in line with that done by Caffery *et al*., (2011), where the DEQ-5 questionnaire correlated well with the OSDI questionnaire. Our study therefore shows that any of the two questionnaires can be used in diagnosis of dry eye disease in postmenopausal women. Also, according to the dews report in (Wolffsohn *et al*, 2017), the OSDI or the DEQ-5 could be used to assess symptoms for dry eye patient. However, the 5-item dry eye questionnaire with just 5 questions can be recommended for screening among these postmenopausal as this questionnaire has fewer questions and so will take shorter time. It will also reduce the stress on these women as they are elderly.

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