RESEARCH ARTICLE

Exploring the impact of Islamic prayer ('salat') on tear film parameters: An observational study

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Abstract

Objective: To explore the impact of 'salat' on the comfort, stability, and quality of tear film.

Method: The observational, comparative study was conducted in June 2024 at the College of Applied Medical Sciences in Riyadh, Saudi Arabia, and included subjects aged 18-40 years who were randomly recruited. The subjects were asked to wash ('wudu') in preparation for 'salat'. The measurements were carried out before 'salat', and again once they had performed 'salat' (four 'rakat'). The standard patient evaluation of eye dryness questionnaire was used to assess patient comfort first. The non-invasive tear breakup time and tear ferning tests were then used to assess the stability and quality of the tear film, respectively. The tests were performed on the subjects' right eyes with a 5-minute gap. Data was analysed using SPSS 22.

Results: Of the 100 subjects with a mean age of 22.3±4.5 years, 62(62%) were females and 38(38%) were males. Significant differences were found in the median scores related to eye dryness, tear breakup time, and tear ferning before and after 'salat' (p<0.05).

Conclusions: Islamic prayer ('salat') was found to have a positive effect on tear film parameters.

Keywords: Dry eye syndromes, Eye abnormalities, Tears, Faith-healing, Religion. (JPMA 76: 840; 2026)

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Introduction

As the initial refractive component of the eye, the tear film is regarded as its foremost anterior surface. The tear film is very important for eye health and vision. It keeps the surface of the eye clean and smooth, and acts as the first barrier against foreign bodies. Changes in the thickness and regularity of the tear film cause aberrations in the optical system.[1] The stability of the tear film is determined by the amount of mucus produced by goblet cells. Tear instability can be caused by either excessive tear evaporation or a deficiency in tear secretion. Epithelial cell integrity is a crucial factor in maintaining the stability of the tear film.[2]

Various methods are available to assess the ocular tear film and diagnose dry eye.[3-5] In addition, various questionnaires, such as the standardised patient evaluation of eye dryness (SPEED), can be used to detect the comfort and severity of dry eyes.[6] The crucial role played by these tests is to gain insight into the ocular tear film and evaluate the underlying cause of dry eye symptoms. Also, they can be utilised to assess severe conditions that may result in significant damage to the ocular surface and deterioration of vision.

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Islamic prayer ('salat') is obligatory for Muslims, and is performed five times a day. 'Salat' involves both physical and spiritual aspects, in which body positions change. This practice is mandatory and is regularly observed by millions of Muslims worldwide. Through various postures, such as standing, bowing, sitting on the shins, prostration, and head rotation, 'salat' can help regulate a person's internal and external aspects. It can positively impact health.[7] A survey conducted on 4,404 Muslims found that consistent 'salat' leads to enhanced health, favourable health-related habits, more frequent use of preventive services, and higher satisfaction with care.[7] For example, the ocular intraocular pressure (IOP) acts as a risk factor for developing glaucoma. 'Salat' leads to an intermediate increase in ocular IOP. However, it decreases again after only two minutes.[8] A similar observation has been noticed after a fish yoga pose.[9] In 'salat', individuals are supplicated to Allah, which induces peace and psychological serenity.

To the best of our knowledge, the potential influence of 'salat' on tear film parameters has not yet been explored. The current study was planned to fill the gap in the literature by examining the impact of 'salat' on the comfort, stability, and quality of tear film.

Subjects and Methods

The observational, comparative study was conducted in June 2024 at the College of Applied Medical Sciences in Riyadh, Saudi Arabia, and included subjects aged 18-40 years who were randomly recruited. After approval from the ethics review board of King Saud University, Riyadh, the

sample size was determined based on a study investigating the effect of positions in Muslim prayer on IOP in healthy subjects compared to those with glaucoma.[10] The sample comprised subjects of either gender aged 18-40, not having undergone any ocular surgery, and not having any ocular disease for years, who were randomly recruited. Those excluded were smokers, diabetics, pregnant or breastfeeding women, and those with refractive errors or thyroid gland disorders. Written informed consent was obtained from all the participants.

The subjects were asked to wash ('wudu') in preparation for 'salat'. The measurements were taken before 'salat', and then again after the subjects had performed four 'rakat'. Data was collected using SPEED, followed by the non-invasive tear breakup time (NITBUT)[3] and tear ferning (TF)[4] tests. Each test was performed on the subjects right eye with a 5-minute gap. The tests were conducted by the same examiner under controlled conditions.

The SPEED questionnaire is a tool that ophthalmologists use to monitor the frequency and severity of dry eye symptoms over time. Its purpose is to evaluate and record the progression of dry eye symptoms quickly. The questionnaire has eight questions that assess how often and how severe dry eye symptoms on a scale ranging 0-28. A score between 5 and 7 indicates moderate dry eye symptoms, while a score of 8 or higher indicates severe dry eye symptoms.[6]

The NITBUT was assessed using the EASYTEAR view+ instrument (EASYTEAR S.R.L., Via Maioliche, Trento, Italy), which was both practical and compact. The NITBUT was evaluated in seconds and represented the duration between the last blink and the initial appearance of a dry spot on the tear film. The evaluations were performed in triplicate, and the mean score was recorded. A NITBUT value <10 seconds was used to define dry eye.

The TF test required the collection of a small sample (1μL) of tears from the lower meniscus of the right eye using a glass capillary tube (10μL). The sample was dried for 10 minutes at 20°C and humidity <20%. TF images were captured using an Olympus DP72 digital microscope (Olympus Corporation, Tokyo, Japan) at 10× magnification. The TF patterns were graded based on the five-point TF grading scale. A grade of ≥2 was considered indicative of dry eye.

Data was analysed using SPSS 22. Data was found to be non-normally distributed using the Kolmogorov-Smirnov test ($p<0.05$). The Wilcoxon signed-rank test was employed to examine whether there were any significant differences between various parameters within the same group. Spearman's correlation coefficient (r) was employed to test the association among various parameters. The scores were represented using median values with interquartile range (IQR). P<0.05 was considered significant.

Results

Of the 100 subjects with mean age 22.3±4.5 years, 62(62%) were females and 38(38%) were males. Significant differences were found in the median scores of SPEED ($p<0.001$), NITBUT ($p<0.001$) and TF ($p=0.004$) among the participants before and after 'salat'. The SPEED scores indicated an improvement in comfort in 51(51%) subjects after 'salat', and remained unchanged in 38(38%). Tear film stability improved in 74(74%) subjects, and it was found to be reduced in 26(26%) subjects after 'salat'. TF grade

Table: Median (IQR) values for the SPEED, NITBUT, and TF scores for the participants before and after 'salat' (n=100).

Tear film parameter	Before 'salat'	After 'salat'	*p*-value*
SPEED	6.0 (9.0)	4.0 (7.0)	<0.001
NITBUT (s)	6.4 (4.2)	8.8 (5.7)	<0.001
TF	1.5 (0.6)	1.4 (0.9)	0.004

* Significant difference (Wilcoxon signed-rank test); SPEED: Standard patient evaluation of eye dryness, NITBUT: Non-invasive tear breakup time (seconds), TF: Tear ferning (grade).

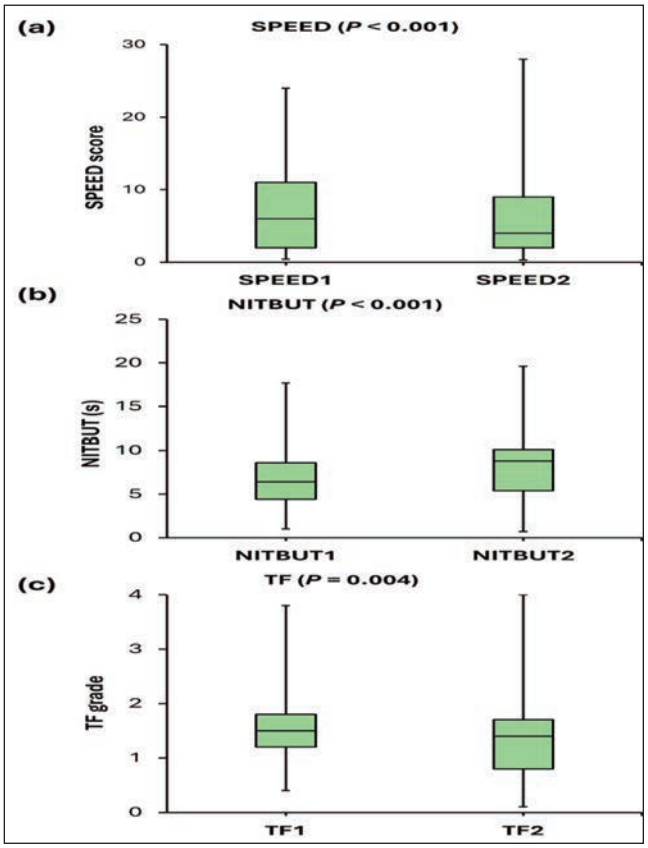

Figure-1: Side-by-side boxplots of (a) SPEED, (b) NITBUT, and (c) TF scores before and after 'salat'.
SPEED: Standard patient evaluation of eye dryness, NITBUT: Non-invasive tear breakup time, TF: Tear ferning.

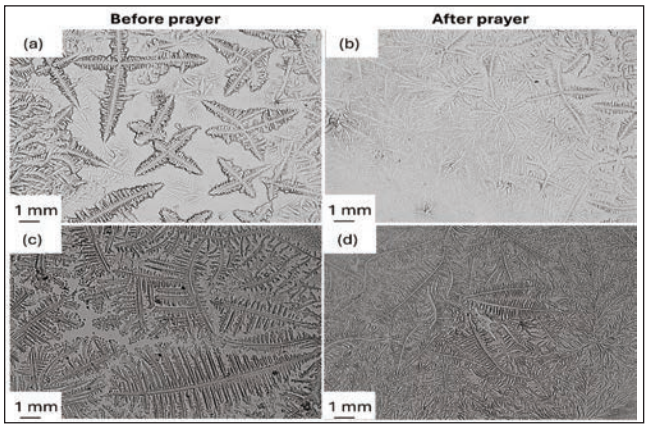

Figure-2: TF images from two subjects before (a and c) and after (b and d) 'salat'.
F: Tear ferning.

indicated an improvement in tear quality of 67(67%) subjects, it remained unchanged in 15(15%), and showed worsening in 18(18%) after 'salat'. SPEED and TF scores were significantly lower after 'salat', while the NITBUT scores were significantly higher (Table). Side-by-side boxplots for SPEED, NITBUT and TF scores among the subjects before and after 'salat' were generate (Figure 1). TF images from the same subjects before and after 'salat' were also captured (Figure 2).

Pearson correlation coefficient (r) between the SPEED scores before and after 'salat' was strong (*r*=0.881), while the correlation was moderate (r=0.694) for TF grade, and weak (*r*=0.363) for NITBUT before and after 'salat'.

Discussion

'Salat' is the second pillar of Islam and a duty for all Muslims. They must perform it five times daily, which involves specific physical movements and the recitation of the Quran. 'Salat' is not only a form of supplication, but also an act of submission to Allah. It serves as a coping strategy that can help with mental and emotional stress.[11]

The current study, to our knowledge, is the first to investigate the effect of 'salat' on tear film parameters using the SPEED questionnaire and NITBUT and TF tests. The comfort (SPEED scores), stability (NITBU scores), and quality of tear film (TF grades) significantly improved after 'salat'. During the 'salat', the body is bowed, and the head is positioned lower than the heart, which can increase blood supply and improve cognitive and motor functions.

'Salat' involves a sequence of movements that include standing, prostrating and sitting. Research suggests that 'salat' might decrease the risk of developing cardiovascular disease.[12] The physical movements involved in 'salat' are comparable to a mild form of exercise. The repetitive standing-sitting postures that occur throughout the day may be beneficial in preventing deep vein thrombosis (DVT).[13]

The practice of 'salat' is often seen as a type of meditation because it activates the parasympathetic nervous system, and reduces anxiety by promoting relaxation through decreased sympathetic activity.[14] 'Salat' and physical activities that replicate 'salat' movements could be considered an alternative form of treatment for individuals with erectile dysfunction. Prayer may serve as a complementary intervention for religious and spiritual disturbances in healthcare, potentially leading to reduced anxiety and depression, higher successful pregnancy rates, and improved physical functioning.[15]

Religious rituals, such as 'salat' in Islam, are thought to effectively manage stress and provide emotional encouragement within the Muslim community.[16-19] 'Salat' contributes to reducing work-related stress and improving life satisfaction among Muslim nurses.[20] It may help prevent oxidative stress in older women.[21] Also, it has a favourable effect on the physical and mental wellbeing, mindfulness and focus of individuals with schizophrenia.[22] 'Salat' positively impacts mental, neurological and physical health.[23] Therefore, 'salat' is seen as a strategy that promotes psychological, physical and neurological wellbeing. A study revealed that reciting the Quran can help relax the body and improve focus during 'salat'.[24]

'Salat' offers various health benefits resembling those of yoga. When performed correctly and regularly, it enhances flexibility, muscle strength and endurance, and contributes to overall health.[25] Additionally, 'salat' has been shown to improve mental health among college students.[26] It is essential to raise awareness about these benefits and conduct further studies to develop exercise programmes for individuals with medical constraints.

The current study has limitations of a relatively small sample that was recruited from a single geographical location. Besides, the sample had a disproportionate number of female participants compared to males. Also, a limited range of tests was used to evaluate tear film parameters. The mechanism by which 'salat' enhances tear film comfort, stability and quality requires further investigation.

Conclusion

Islamic prayer ('salat') was found to have a positive effect on tear film parameters. Comfort, stability and quality of tear film improved significantly after 'salat'. However, a more comprehensive study is needed to understand the mechanism by which 'salat' positively affects tear film parameters.

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Conflict of Interest: None.

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Author Contribution:

MSA, AA, BHA & GAREH: Concept, design, data acquisition, analysis, interpretation, drafting, revision, final approval and agreement to be accountable for all aspects of the work.