International Journal of Medical and Health Research
ISSN: 2454-9142, Impact Factor: RJIF 5.54
www.medicalsciencejournal.com
Volume 3; Issue 2; February 2017; Page No. 32-34

Assessment of age and gender related changes on tear production

[1] Raj Kumar, [2] Amita Pardesi

[1] Professor, Department of Physiology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India
[2] Assistant Professor, Department of Physiology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

Abstract
Background: Tear production decreases with age and in several conditions. There are various tests available to measure tear secretion. The Schirmer's test is widely use for this purpose and the tear film breakup time (BUT) test is currently in use to measure tear film stability. The present study was conducted to estimate the age and gender-related changes in the results of Schirmer's and tear film BUT tests in study population.
Materials & Methods: This study included 100 subjects of age ranged 20-60 years. All subjects underwent a complete ophthalmic examination. The Schirmer's and the tear film BUT tests were performed in both eyes of each subject. Tear film BUT was undertaken after instilling one drop of fluorescein (2% strip Alcon-Co) into the lower fornix and subjects were instructed to blink several times for a few seconds. The modified Schirmer's basal and reflex tear secretion test was performed after resting period for 20 min in both eyes using standard Whatman number 41 filter paper strip, 5 mm wide and 35 mm long. Wetting was measured in millimeters after 5 minutes. Thus by doing this, both the reflex and basal tear production was calculated.
Results: Out of 100 subjects, males were 50 and females were 50. The difference was non - significant (P – 1). The mean age of males was 42± 20.2 years and mean age of females was 41± 22.4 years. The mean schirmer test value in right and left eyes of males was 18.37 seconds and 21.01 seconds respectively. The mean schirmer test value in right and left eyes of females was 20.71 seconds and 19.55 seconds respectively. The difference was non - significant ($P > 0.05$). The mean tear film break- up time (TBUT) in right and left eyes of males was 18.99 seconds and 18.12 seconds respectively. The mean tear film break- up time (TBUT) in right and left eyes of females was 17.34 seconds and 17.86 seconds respectively. The difference was non - significant ($P > 0.05$). There was significant decrease in both TBUT and Schirmer's test values with increasing age in both genders.
Conclusion: There was variation in tear production in left and right eyes of both genders. There was significant decrease in tear production and tear film break up time in both males and females.

Keywords: schirmer, tears, tear film break-up time

1. Introduction
Vision is one of important sense that we have. Tears play important role in maintaining the clarity of cornea, in providing a clear vision, in the defense mechanism of the eye, and in producing soothing effect to the eyes. Precorneal (tear) film is spread across the eye and it has three layers namely, lipid layer, aqueous layer and mucous layer. Lipid layer (secretes lipid) acts as a hydrophobic barrier and prevents the overflow of tears. Aqueous layer (contains water and tear proteins) acts as a physiological barrier and controls infection to the eyes. Mucous layer (secrete mucin) acts as a hydrophilic layer [1].
Factors like increasing life span of people, environmental pollution, excessive use of TV, computers and air conditioning systems there are increasing incidence of abnormalities of tear physiology. An estimate of tear secretion and tear film stability is regarded as the most important aspects in study of tear physiology [2].
There are various tests available to measure tear secretion. The Schirmer's test is widely use for this purpose and the tear film breakup time (BUT) test is currently in use to measure tear film stability [3]. Women cry 30-64 times a year and men cry just 6-17 times in a year. The tears are secreted every second at the rate of 2 microlitres per minute or 10 ounces each day and are drained by the puncta which are 0.3mm wide. Thus there is variation in secretion of tear based on advancing age and gender.[4] Thus, the present study was conducted to estimate the age and gender-related changes in the results of Schirmer's and tear film BUT tests in study population.

2. Materials & Methods
This study was conducted in the department of Physiology and ophthalmology in year 2015. It included 80 participants of both gender. They were informed regarding the study and written consent was taken. Information such as name, age, gender etc was recorded. Subjects with history of ocular surgery or ocular trauma, any ocular surface disorder, current contact lens use, any topical or systemic drug use, with Diabetes and Hypertension were excluded from the study. They were divided in to 4 age groups. Group I (<20 years) which included 10 males and 10 females. Group II (20-40 years) which included 10 males and 10 females. Group III (40-60 years) which included 10 males and 10 females. Group IV (>60 years) which included 10 males and 10 females.
All subjects underwent a complete ophthalmic examination. The Schirmer's and the tear film BUT tests were performed in both eyes of each subject. Tear film BUT was undertaken after instilling one drop of fluorescein (2% strip Alcon-Co) into the lower fornix and subjects were instructed to blink several times for a few seconds. The tear film was observed using a blue cobalt filter under wide lighting. The interval after the last blinking to the appearance of first black spot was detected. The test was repeated three times, and the median score was

recorded in seconds.

The modified Schirmer's basal and reflex tear secretion test was performed after resting period for 20 min in both eyes using standard Whatman number 41 filter paper strip, 5 mm wide and 35 mm long was folded 5 mm from one end and placed between the lower eyelid and the globe, taking care not to touch the cornea, at the junction between the middle and lateral third of the eyelid. The patient was allowed to blink normally. Wetting was measured in millimeters after 5 minutes. Thus by doing this, both the reflex and basal tear production was calculated. Results were tabulated and subjected for correct inferences. *P* value < 0.05 was considered significant.

3. Results

Table I shows that out of 100 subjects, males were 50 and females were 50. The difference was non - significant (P – 1). Table II shows that mean age of males was 42± 20.2 years and mean age of females was 41± 22.4 years. Fig 1 shows that mean schirmer test value in right and left eyes of males was 18.37 seconds and 21.01 seconds respectively. The mean schirmer test value in right and left eyes of females was 20.71 seconds and 19.55 seconds respectively. The difference was non - significant ($P > 0.05$). Fig 2 shows that mean tear film break- up time (TBUT) in right and left eyes of males was 18.99 seconds and 18.12 seconds respectively. The mean tear film break- up time (TBUT) in right and left eyes of females was 17.34 seconds and 17.86 seconds respectively. The difference was non - significant ($P > 0.05$). Our results show significant decrease in both TBUT and Schirmer's test values with increasing age in both genders.

Table 1: Distribution of subjects

Total - 100		
Male	**Female**	**P value**
50	50	1

Table 2: Age distribution of subjects

Males	Females	P value
42± 20.2	41± 22.4	1

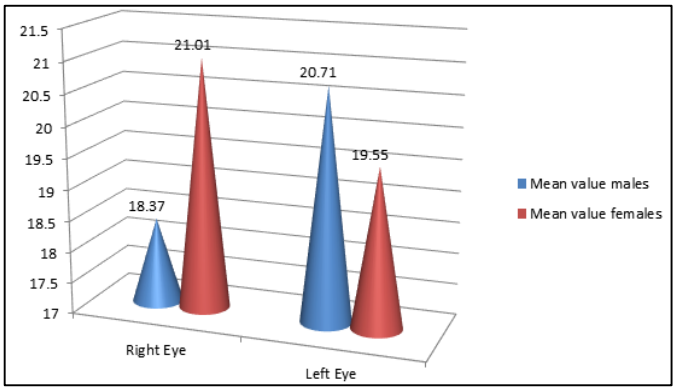

Fig 1: Mean Schirmer test value

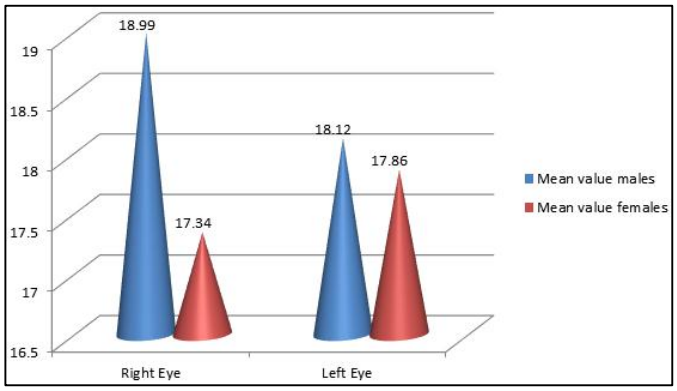

Fig 2: Mean Tear film break- up time (TBUT)

Discussion

Tears are useful because they have important proteins, immunoglobulins including its role in defence of the eye. Tears also have antimicrobial activity due to lactoferrin present in it. Tears wash away the unwanted substances present in the eye. Crying helps in expressing our emotions and also to overcome sorrow. Tear film helps to maintain visual acuity and contains major proteins [5]. The present study was conducted to estimate the age and gender-related changes in the results of Schirmer's and tear film BUT tests in study population.

Our study included 50 males and 50 females. The mean age of males was 42± 20.2 years and mean age of females was 41± 22.4 years. Den S[6] conducted study on age and gender variation in tear production. The mean age of males and females in her study was 46.02 years and 45.51 years respectively.

In present study we found that there was significant reduction in tear production with advancing age in both gender. However, between both eyes the difference was non - significant. Similar findings were seen in study by Patel S et al [7].

We found that there was little variation in mean tear film break-up time (TBUT) in right and left eyes of males and females. Our results show significant decrease in both TBUT and Schirmer's test values with increasing age in both genders. In this study, we found that the tear film BUT and ST values decreased significantly with aging. Earlier studies detected that disorder of the lid margin morphology and decreased Meibomian gland secretion are very common findings among the elderly patients. These problems lead to the increase of surface tension and early evaporation of tear film [8, 9].

Decreased serum androgen level may cause a disorder of Meibomian gland functions and evaporative dry eye. The demonstration of androgen treatment to increase tear production in mice with Sjogren syndrome also substantiates this idea. However, it is known that in women reduced sex hormone levels after menopause cause dryness in all mucosal tissues as well as affecting the tear production negatively [10].

Conclusion

There was variation in tear production in left and right eyes of both genders. There was significant decrease in tear production and tear film break up time in both males and females.

References

1. Lemp MA. Report of the national eye institute / industry workshop on clinical trials in dry eyes. CLAOJ. 1995; 21:221-232.
2. Jones LT. The lacrimal secretory system and its treatment. Am J Ophthalmol. 1966; 62:47–60.

3. Kanski JJ. In: Lacrimal gland. Clinical Ophthalmology. 3rd edn. Betterworth Heinemann: London, 1994, 21.
4. Shimmura S, Shimazaki J, Tsubota K. Results of a population-based questionnaire on the symptoms and lifestyles associated with dry eye. Cornea. 1999; 18:408–411.
5. Hykin PG, Bron AJ. Age-related morphological changes in lid margin and meibomian gland anatomy. Cornea. 1992; 11:334–342.
6. Den S, Shimizu K, Ikeda T, Tsubota K, Shimmura S, Shimazaki J. Association between meibomian gland changes and aging, sex, or tear function. Cornea. 2006; 25:651- 655.
7. Patel S, Wallace I. Tear meniscus height, lower punctum lacrimale, and the tear lipid layer in normal aging. Optom Vis Sci. 2006; 83:731-739.
8. Parvin D et al. Tear Film Break-up Time in Bipolar Disorder. Iran J Psychiatry. 2012; 4:191-193.
9. Nanavaty A, Vasavada AR, Gupta PD. Dry Eye Syndrome. Asian J. Exp. Sci. 2006; 20:63-80.