

## **AWARENESS OF DRY EYES DISEASE AMONG DENTAL STUDENTS -A SURVEY**

**Running title:** A survey on Dry Eyes Disease among dental students

### **Abstract:**

**Introduction:** Dry eye is a highly prevalent disorder, affecting 85% of the adult students worldwide, does not have effective therapy, and causes significant loss of productivity at work.

**Aim:** This study aims to assess the knowledge and awareness of dental students about dry eye disease.

**Materials and Methods:-**A questionnaire based study, comprising 12 questions was circulated to 100 people through an online google form. The study begins, the study detail was explained to the participants. The sample size of this study was 100. The data were collected and statistically analyzed.

**Results:-**In this study, 96% of the students were aware that lack of sleep causes Dry Eyes Disease and 4% of the students were unaware of it. Around 83% of the students were aware that dry eye is reversible and 17% of the students were not aware of it. The overall result was positive, most of them were aware of the dry eye disease. This proves an outright positive result.

**Conclusion:** - The present study shows that the students under 75% were aware of Dry Eyes Disease but 25% were unaware of dry eye disease. There is no sufficient awareness among dental students. So, by this survey, we create more awareness among dental students.

**Keywords:** Awareness; Dry eye disease; dental students, innovative method.

### **Introduction:**

Dry eye disease (DED) is a persistent ocular pathology and a vital global health problem that exhibits a plethora of symptoms such as burning, photophobia, tearing, and grittiness. One of the etiology of dry eye is visual Display Terminal use (1). Working on a computer monitor, laptops, or digital displays for hours has become a part of the modern work day. Patients with DED (Dry eye disease) experience difficulties in daily routine activities thus compromising their

quality of life (2). Dry eye occurs when either the eye does not produce sufficient tears or when the tears evaporate too rapidly. A severe form of the dry eye disease is also known as keratoconjunctivitis sicca (3).

Dry eye etiology includes diminished tear production and increased evaporation of tears. Dry Eyes Disease are caused by a diversity of reasons that suspend the healthy tear film. Tear film unpredictability and ocular surface inflammation give rise to symptoms of discomfort, visual disturbance, eye dryness, irritation, foreign body sensation, light sensitivity, and itching, all of which eventually reduce a person's quality of life(4) .Frequently , the tear film has been thought to comprised of three discrete layers, with an innermost mucin layer covering the corneal and conjunctival epithelium, an intermediate aqueous layer produced by the lacrimal glands, and an outermost lipid layer, the product of the meibomian glands of the eyelids; this concept has been revised substantially(5). The contemporary concept of the tear–the ocular surface structure is that of a metastable tear film consisting of an aqueous gel with a gradient of mucin content decreasing from the ocular surface to the under- surface of the outermost lipid layer(6). The latter structure interacts with the underlying aqueous and mucin components, retarding evaporative loss of aqueous tears and contributing to the stability of the tear film between blinks(7).

Essentially, Dry Eyes Disease can be a lifestyle problem; prolonged gazing and reduced blinking due to activities such as reading and exposure to air-conditioning can result in instability of the tear film(8). This distribution normally retains the surface of your eyes lubricated, smooth, and clear. **Patients with dry eye disease are more likely than the general students to experience symptoms of anxiety and depression.** Risk factors for the evolution of dry eye disease incorporate advanced age, female sex, hormonal imbalance, autoimmune disease, abnormal corneal innervation, vitamin deficiency, environmental stress, contact lens use, infection, medication use, and ophthalmic surgery. Dry Eyes Disease can be caused by deficiency of the tear film components and can be systemic diseases, including Sjogren syndrome, Lupus, and Stevens - Johnson syndrome (9). Majority of people who have Dry Eyes Disease incident mild irritation with no long-term effects. However, if the condition is left untreated or becomes severe, it can produce complications that can cause eye damage, resulting in impaired vision (10).

Complications of dry eye lead to eye inflammation, abrasion of the corneal surface, corneal ulcers, and vision loss. There is a need for more than one modality of treatment for

lenient-to-average dry eye patients, aside from the utilization of topical eye drops. Indeed only a small portion of dry eye sufferers use artificial tears regularly. Wrap-around glasses that fit close to the face may decrease tear evaporation. Standard objective tests for dry eye disease also have shortcomings (11). The Schirmer test, which has been in extensive clinical use for more than a century, has been criticized for its variability and its tendency to exhibit wide intrasubject, day-to-day, and visit-to-visit variation (12). The tear emissions reduce in more advanced diseases, the results become more reproducible. This study aims to assess the knowledge and awareness of dental students about dry eye disease.

### **Materials and methods:**

An online survey was conducted with a self-administered questionnaire with a sample size of 100 participants comprising the dental students. Before the initiation of the study, the ethical approval was given by the institutional review board. The questionnaire consists of questions that help in socio-economic data, questions that help in providing awareness among the participants, and also consist of questions related to facts. The questionnaire was validated in a by 3 pathologists. Measures such as a selection of participants randomly, steps to prevent asking irrelevant questions, placing restrictions over the participants are followed to minimize the sampling bias. The questionnaire was circulated using the online platform Google Forms. Descriptive analysis was carried out using the statistical software SPSS VERSION 23. The results were analyzed and represented in a pie chart and bar chart.

### **Results and Discussion:**

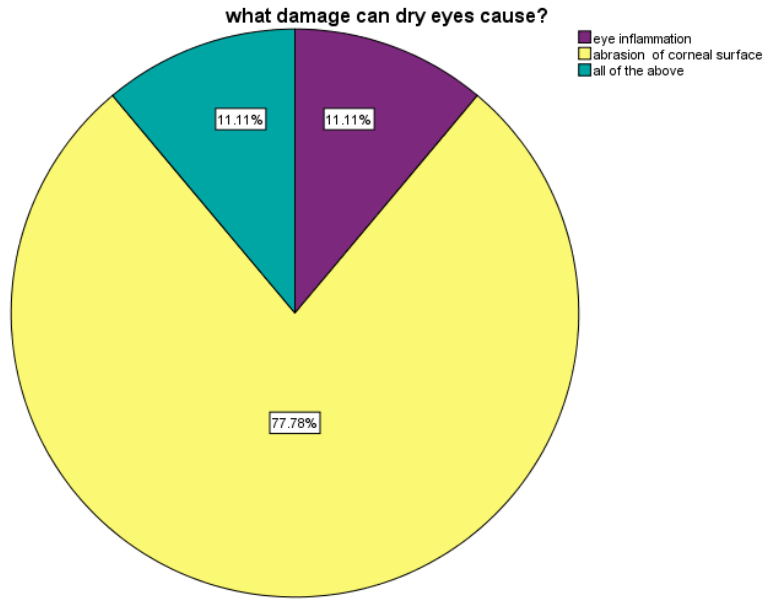


Figure 1: Pie chart representing the percentage distribution of awareness of the causes of dry eye damage. The majority of participants (77%) responded to the abrasion of the corneal surface (yellow), (11%) responded to eye inflammation (violet) and (11%) responded to all of the above (violet).

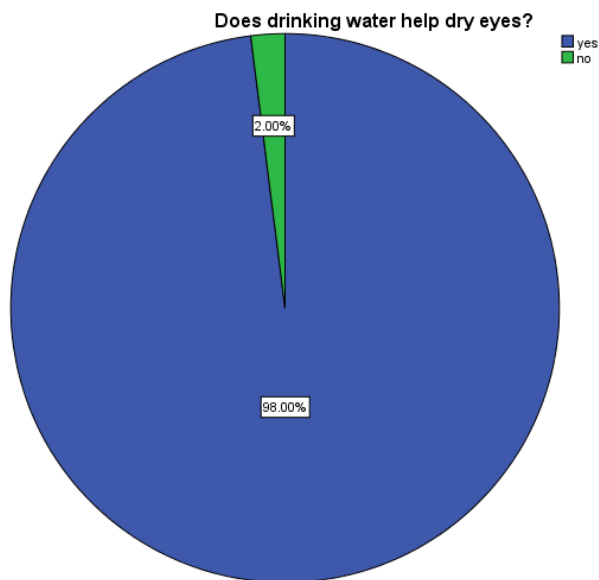


Figure 2: Pie chart representing the percentage distribution of awareness among drinking water helps the dry eye. Majority of participants (98%) responded yes (blue); (2%) responded no (green).

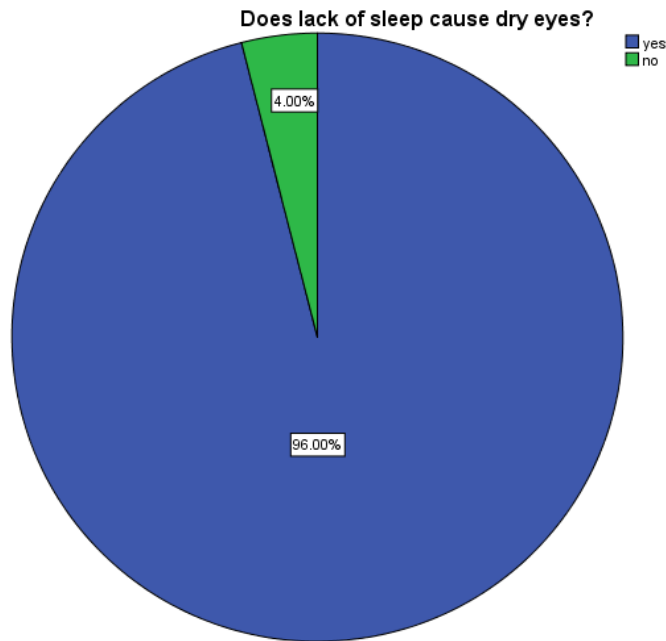


Figure 3: Pie chart representing the percentage distribution of awareness among lack of sleep causes Dry Eyes Disease. Majority of participants (96%) responded yes (blue); (4%) responded no (green).

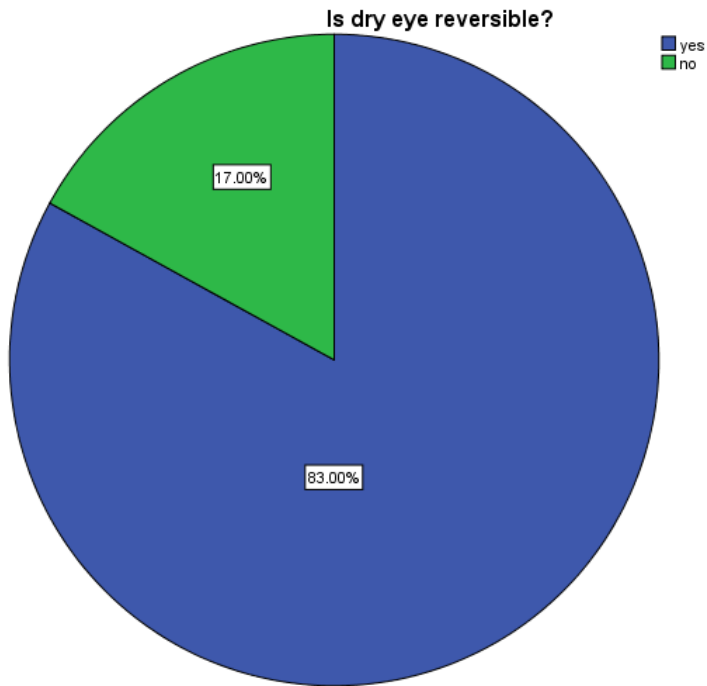


Figure 4: Pie chart representing the percentage distribution of awareness among Dry Eyes Disease is reversible. Majority of participants (83%) responded yes (blue); (17%) responded no (green).

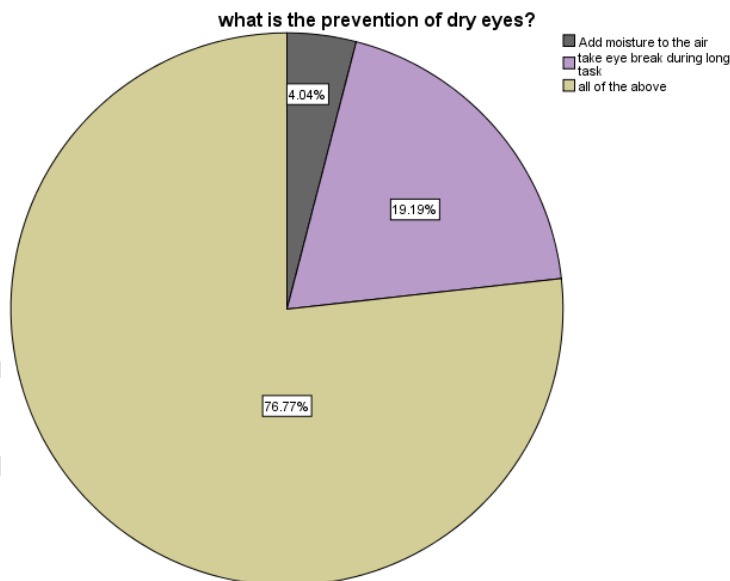


Figure 5: Pie chart representing the percentage distribution of awareness among prevention of Dry Eyes Disease. The majority of participants (76%) responded to all of the above (ye); (19%)

responded to take eye during long tasks (light violet); (4%) responded to add moisture to the air (grey).

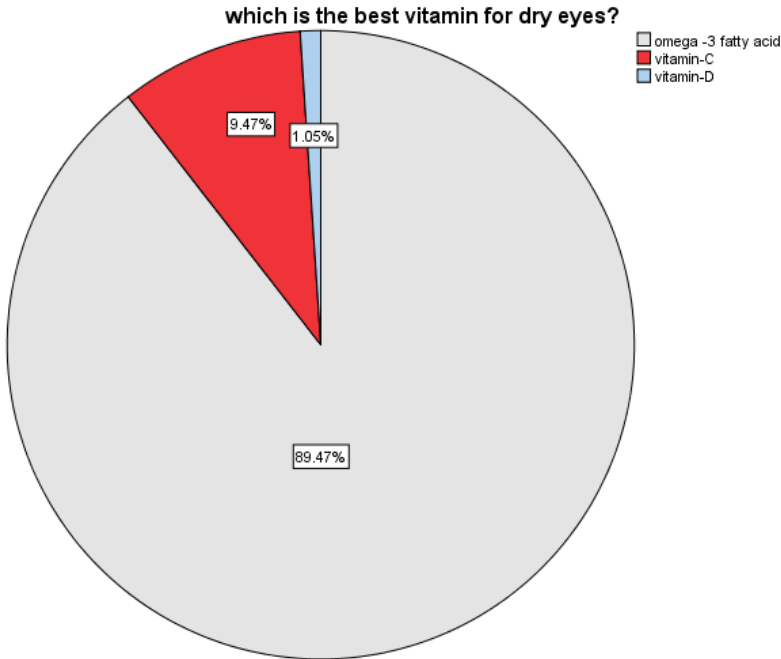


Figure 6: Pie chart representing the percentage distribution of awareness among best vitamins for Dry Eyes Disease. Majority of participants (89%) responded to omega-3 fatty acids (white); (9%) responded to vitamin C (red); (1%) responded to vitamin-D (blue).

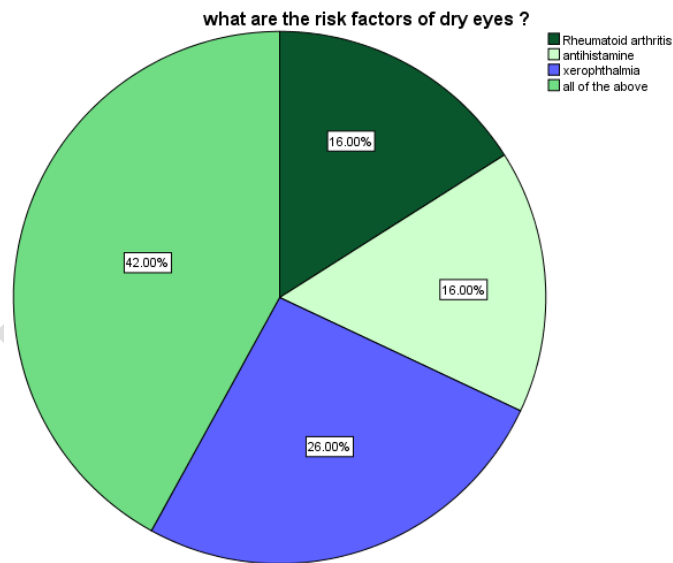


Figure 7: Pie chart representing the percentage distribution of awareness among risk factors of Dry Eyes Disease. Majority of participants (42%) responded to all of the above (apple green);

(26%) responded xerophthalmia (blue); (16%) responded antihistamine (sage green); (16%) responded rheumatoid arthritis (dark green).

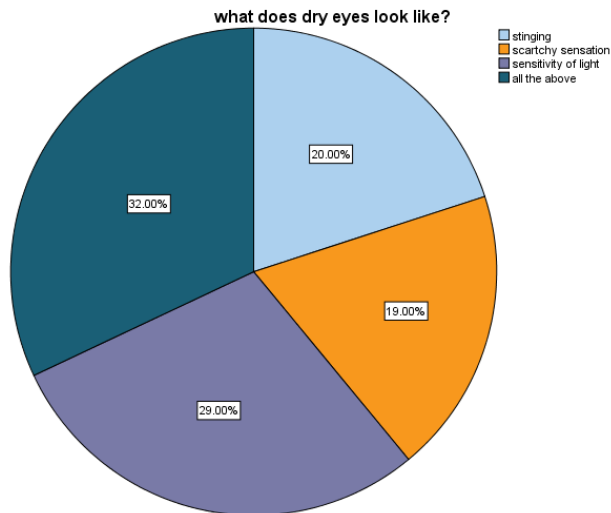


Figure 8: Pie chart representing the percentage distribution of awareness among Dry Eyes Disease look. Majority of participants (32%) responded to all of the above (olive green); (29%) responded to sensitivity of light (grey); (20%) responded to stinging (light blue); (19%) responded to scratchy sensation (orange).

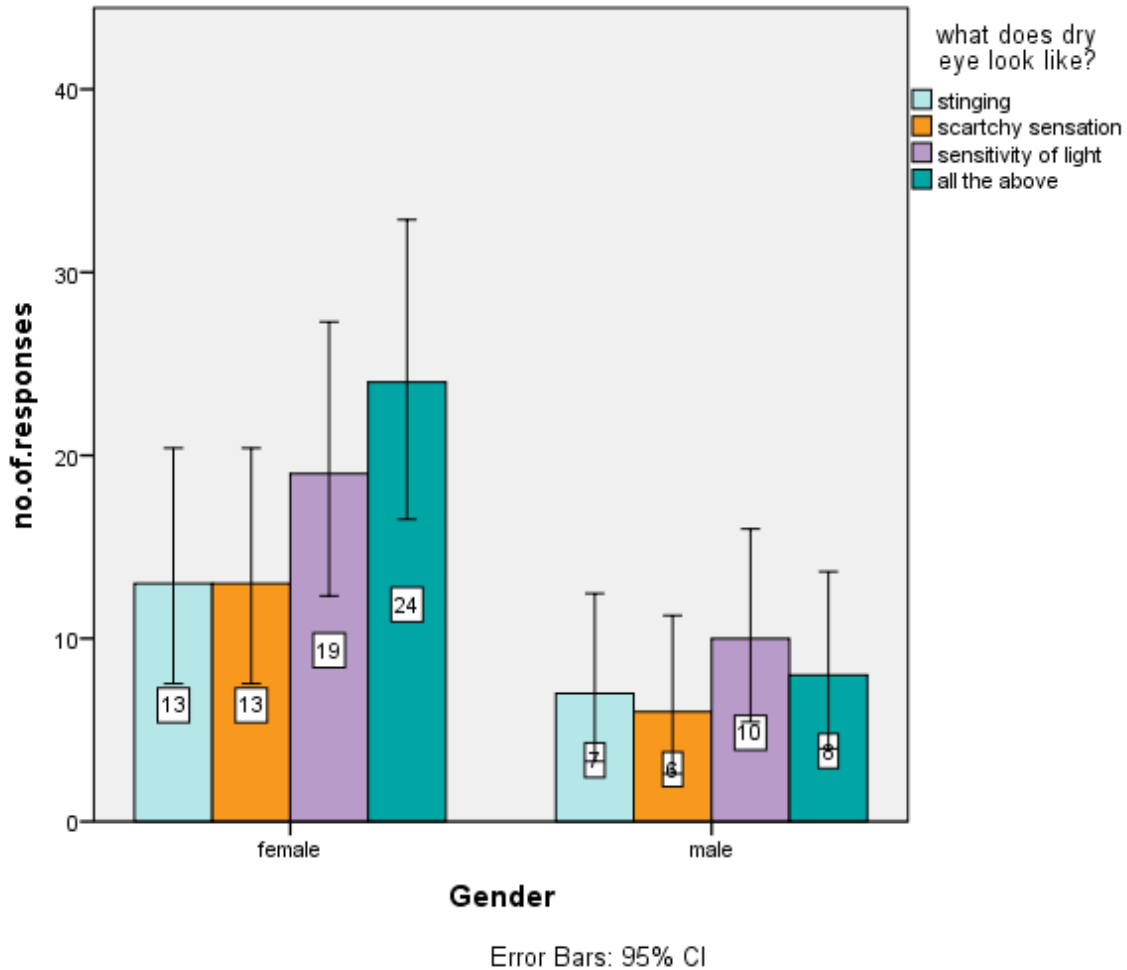


Figure:9 Bar chart represents the association between gender and awareness of dry eye look. The X-axis represents gender and Y-axis represents the percentage of participants who were aware 32% responded to all of the above (olive green) ; 29% responded to the sensitivity of light (grey); 20% responded stinging (light blue); 19% responded to scartchy sensation (orange).Pearson's Chi-Square: 0.836, p-value: 0.174 (>0.05) hence not statistically significant.

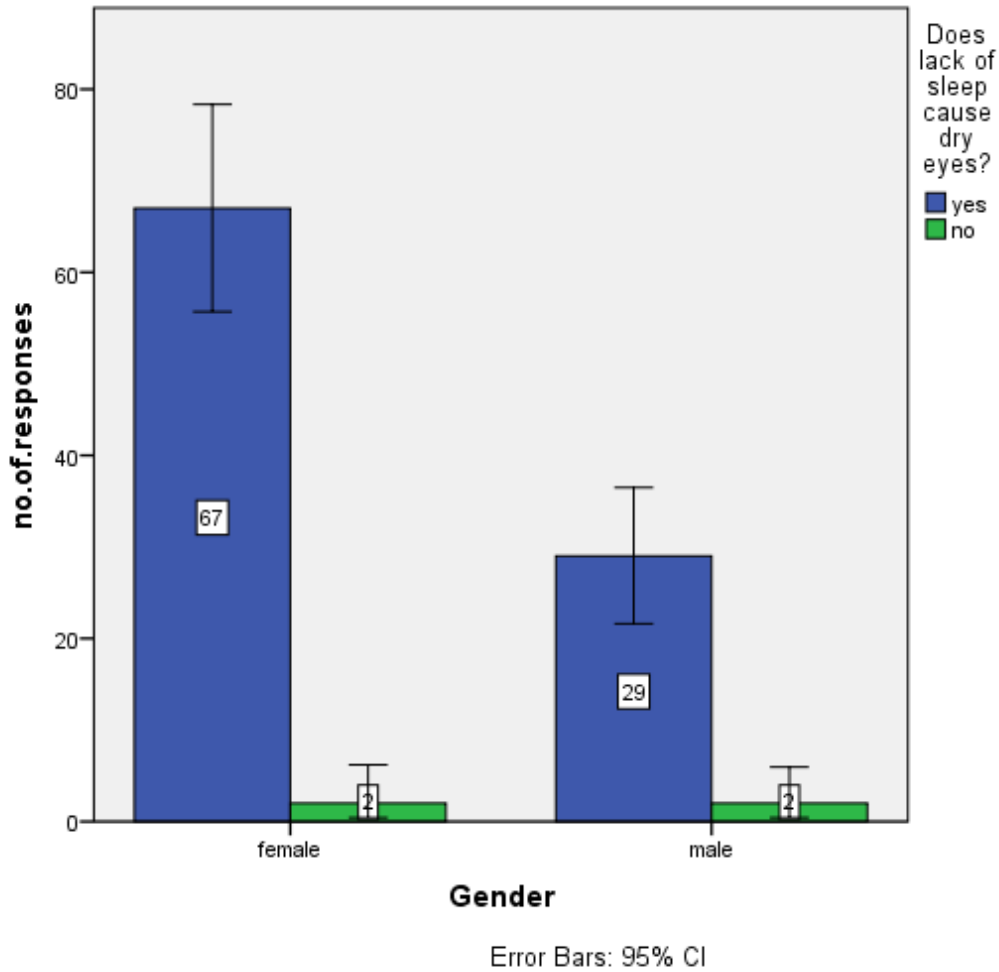


Figure 10: Bar chart represents an association between gender and awareness of lack of sleep causes Dry Eyes Disease. The X-axis represents gender and Y-axis represents the percentage of participants who were aware 96% responded yes (blue); (4%) responded no (green). Pearson's Chi-Square: 0.528, p-value: 0.130 ( $>0.05$ ) hence not statistically significant.

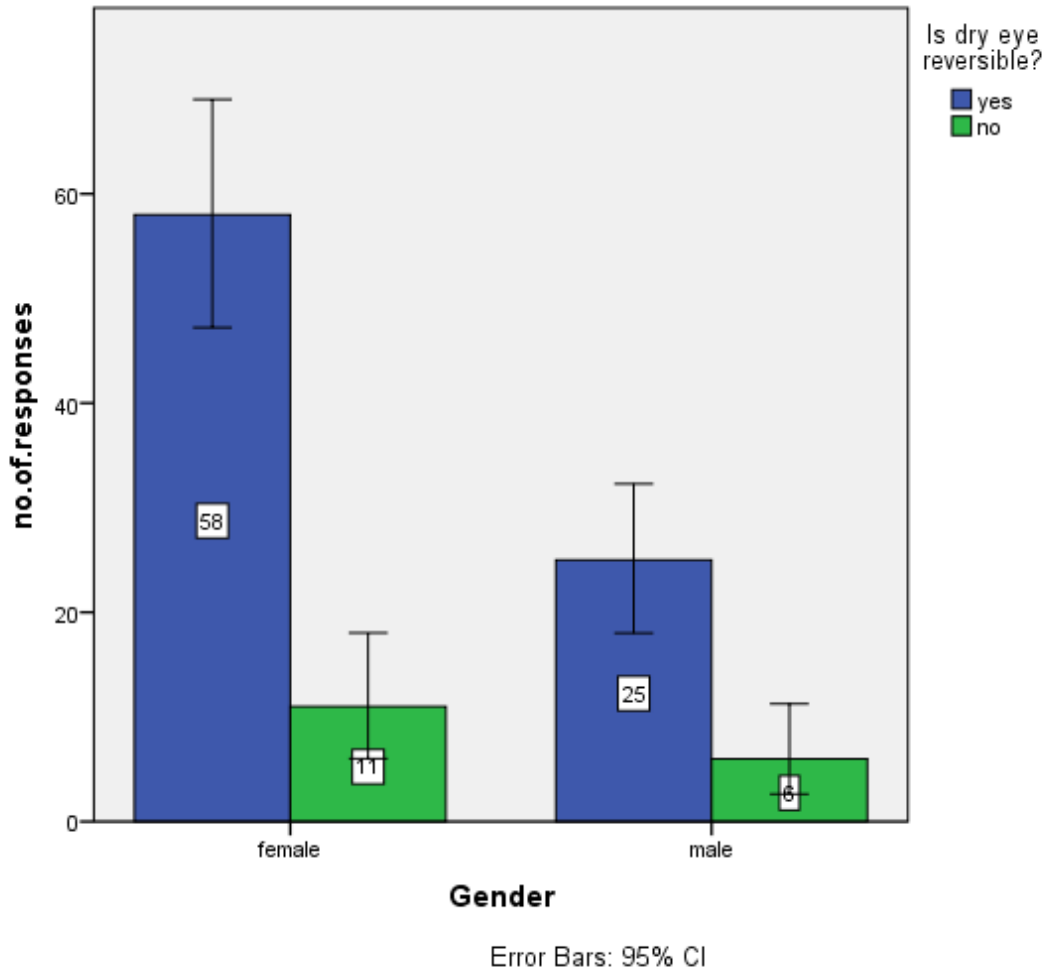


Figure 11: Bar chart represents an association between gender and awareness of Dry Eyes Disease is reversible. The X-axis represents gender and the Y-axis represents the percentage of participants who were aware 83% responded yes (blue); 17% responded no (green). Pearson's Chi-Square: 0.373, p-value: 0.285 ( $>0.05$ ) hence not statistically significant.

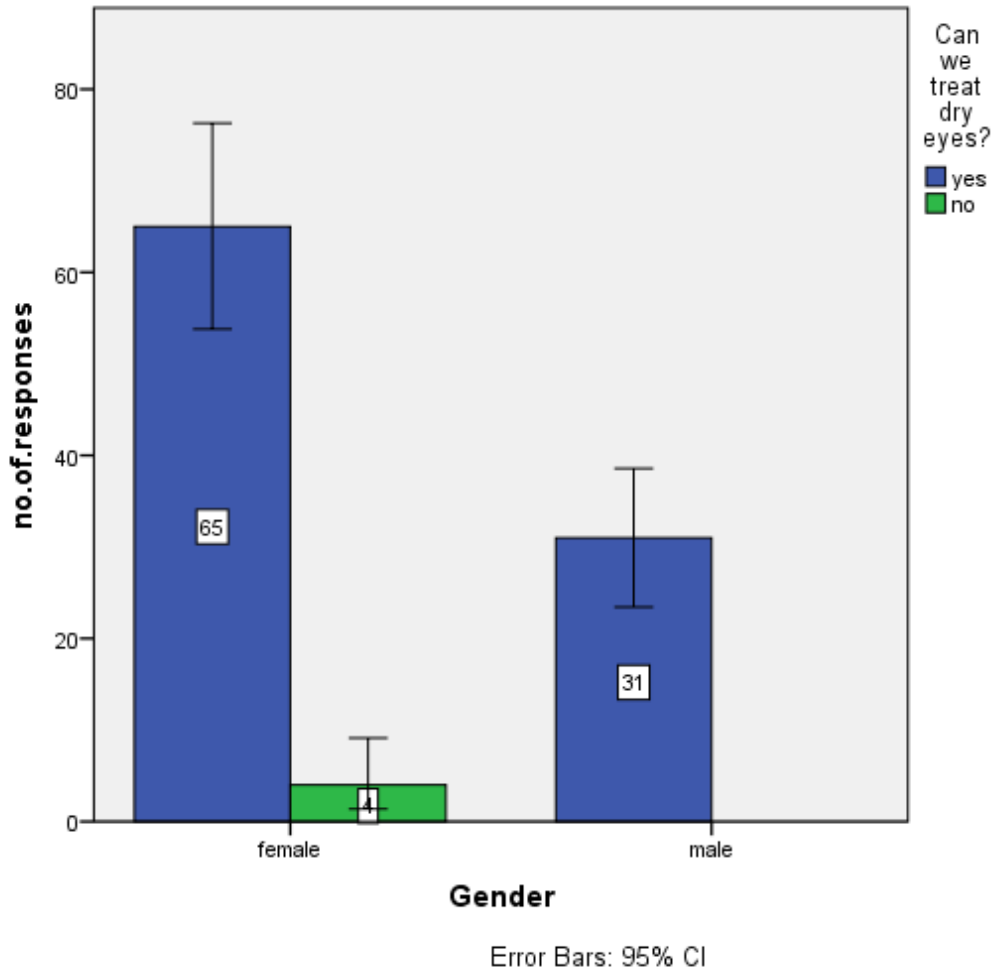


Figure 12: Bar chart represents an association between gender and awareness of Dry Eyes Disease can be treated. The X-axis represents gender and Y-axis represents the percentage of participants who were aware 96% responded yes (blue); 4 % responded no (green). Pearson's Chi-Square: 0.382, p-value: 0.536 ( $>0.05$ ) hence not statistically significant.

In the present survey, many of them were aware of the importance of dry eye disease. The survey results were collected and statically analyzed. The majority 77% of the survey population responded to the abrasion of the corneal surface, (11%) responded to eye inflammation and (11%) responded to all of the above for dry eye damage (figure1). Similar findings were not found in a previous study (33).

Around 98% of participants were aware that drinking water helps the dry eye and 2% were unaware of it (figure 2), which was similar to the findings of the previous study (34). Around 96% of people were aware that lack of sleep causes dry eyes and 4% were unaware of it (figure: 3) which was similar to the statement proved in the previous study (35). Around 83% of people were aware that dry eyes are reversible and were unaware of it (figure 4) which was homogenous to the existing studies (36).

The prevention of Dry Eyes Disease was that 76% responded to all of the above, 19% responded to take eye during long tasks, 4% responded to add moisture to the air. Majority of the participants prefer all the above (Figure: 5), which was also stated by previous studies (37). The best vitamins for dry eye was that 89% responded to omega-3 fatty acids, 9% responded to vitamin C, 1% responded to vitamin-D. Majority of the participants preferred omega-3 fatty acids (figure 6), which was similar to findings of the previous studies (38).

The risk factors of Dry Eyes Disease was that 42% responded to all of the above; 26% responded to xerophthalmia; 16% responded antihistamine; 16% responded to rheumatoid arthritis. Majority of the participants (figure 7). A similar finding was also found in a previous study (39).

The Dry Eyes Disease look was that 32% responded to all of the above ; 29% responded to sensitivity of light ; 20% responded stinging ; 19% responded to scratchy sensation .Majority of participants prefer all of the above (figure8) as shown by the previous study. In this study, an association between gender and awareness of dry eye look was done using the Chi-Square test. Out of 69% of the participants were aware, females were more aware than males (figure: 9). Association between gender and awareness lack sleep causes Dry Eyes Disease as done using Chi-Square test. Out of 75% of the participants were aware, females were more aware than males (figure: 10), Association between gender and awareness of Dry Eyes Disease is reversible as done using the Chi-Square test. Out of 73% of the participants were aware, females were more aware than males (figure: 11) Association between gender and awareness Dry Eyes Disease can be treated as done using Chi-Square test. Out of 96% of the participants were aware, females were more aware than males (figure: 12). These findings were well correlated with the previous study(40).

The limitation of the present study is less the number of sample sizes, only a particular students was included. In future to assess awareness about the importance of dry eye among the large scale dental students and different sample students may be included.

### **Conclusion:**

The present study shows that the students under 75% were aware of Dry Eyes Disease but 25% were unaware of dry eye disease. There is no sufficient awareness among dental students. So, by this survey, we create more awareness among dental students.

### **Reference:**

1. Dandona R, Dandona L, Naduvilath TJ, McCarty CA, Rao GN. Awareness of eye donation in an urban students in India [Internet]. Vol. 27, Australian and New Zealand Journal of Ophthalmology. 1999. p. 166–9. Available from: <http://dx.doi.org/10.1046/j.1440-1606.1999.00196.x>
2. Borrelli M, Frings A, Geerling G, Finis D. Gender-Specific Differences in Signs and Symptoms of Dry Eye Disease [Internet]. Vol. 46, Current Eye Research. 2021. p. 294–301. Available from: <http://dx.doi.org/10.1080/02713683.2020.1801758>
3. Wang Y, Lv H, Liu Y, Jiang X, Zhang M, Li X, et al. Characteristics of symptoms experienced by persons with dry eye disease while driving in China [Internet]. Vol. 31, Eye. 2017. p. 1550–5. Available from: <http://dx.doi.org/10.1038/eye.2017.88>
4. Bron AJ, Willshire C. Tear Osmolarity in the Diagnosis of Systemic Dehydration and Dry Eye Disease. *Diagnostics (Basel)* [Internet]. 2021 Feb 25;11(3). Available from: <http://dx.doi.org/10.3390/diagnostics11030387>
5. Rolando M. Discrimination of subtypes of dry eye disease: aqueous tear-deficient dry eye and evaporative dry eye [Internet]. *Ocular Surface Disorders*. 2013. p. 33–33. Available from: [http://dx.doi.org/10.5005/jp/books/12072\\_5](http://dx.doi.org/10.5005/jp/books/12072_5)
6. Shokr H, Wolffsohn JS, Trave Huarte S, Scarpello E, Gherghel D. Dry eye disease is associated with retinal microvascular dysfunction and possible risk for cardiovascular disease. *Acta Ophthalmol* [Internet]. 2021 Feb 11; Available from: <http://dx.doi.org/10.1111/aos.14782>
7. Zigler T, Zigler J. Rethinking Dry Eye Treatment: Lifestyle Changes to Control Dry Eye - Version 2. Dr. Travis Zigler and Dr. Jenna Zigler; 2019.

8. Davey P-G. Fabry disease: a survey of visual and ocular symptoms [Internet]. *Clinical Ophthalmology*. 2014. p. 1555. Available from: <http://dx.doi.org/10.2147/opth.s66748>
9. Schaumberg DA, Sullivan DA, Buring JE, Reza Dana M. Prevalence of dry eye syndrome among US women [Internet]. Vol. 136, *American Journal of Ophthalmology*. 2003. p. 318–26. Available from: [http://dx.doi.org/10.1016/s0002-9394\(03\)00218-6](http://dx.doi.org/10.1016/s0002-9394(03)00218-6)
10. Fujishima H, Toda I, Shimazaki J, Tsubota K. Allergic conjunctivitis and dry eye. *Br J Ophthalmol*. 1996 Nov;80(11):994–7.
11. Liesegang TJ. Hormone replacement therapy and dry eye syndrome. Schaumberg DA,\* \* Division of Preventive Medicine, Brigham and Women's Hospital, Harvard Medical School, 900 Commonwealth Ave E, Boston, MA 02215. USA Buring JE, Sullivan DA, Dana MR. *JAMA* 2001;286:2114–2119 [Internet]. Vol. 133, *American Journal of Ophthalmology*. 2002. p. 435–6. Available from: [http://dx.doi.org/10.1016/s0002-9394\(02\)01368-5](http://dx.doi.org/10.1016/s0002-9394(02)01368-5)
12. Gulati A, Sullivan R, Buring JE, Sullivan DA, Dana R, Schaumberg DA. Validation and Repeatability of a Short Questionnaire for Dry Eye Syndrome [Internet]. Vol. 142, *American Journal of Ophthalmology*. 2006. p. 125–31.e2. Available from: <http://dx.doi.org/10.1016/j.ajo.2006.02.038>
13. Anita R, Paramasivam A, Priyadharsini JV, Chitra S. The m6A readers and aberrations associated with metastasis and predict poor prognosis in breast cancer patients. *Am J Cancer Res*. 2020 Aug 1;10(8):2546–54.
14. Jayaseelan VP, Paramasivam A. Emerging role of NET inhibitors in cardiovascular diseases. *Hypertens Res*. 2020 Dec;43(12):1459–61.
15. Sivakumar S, Smiline Girija AS, Vijayashree Priyadharsini J. Evaluation of the inhibitory effect of caffeic acid and gallic acid on tetR and tetM efflux pumps mediating tetracycline resistance in *Streptococcus* sp., using computational approach [Internet]. Vol. 32, *Journal of King Saud University - Science*. 2020. p. 904–9. Available from: <http://dx.doi.org/10.1016/j.jksus.2019.05.003>
16. Girija ASS, Smiline Girija AS. Delineating the Immuno-Dominant Antigenic Vaccine Peptides Against gacS-Sensor Kinase in *Acinetobacter baumannii*: An in silico Investigational Approach [Internet]. Vol. 11, *Frontiers in Microbiology*. 2020. Available from: <http://dx.doi.org/10.3389/fmicb.2020.02078>
17. Jaisankar AI, Smiline Girija AS, Gunasekaran S, Vijayashree Priyadharsini J. Molecular characterisation of csgA gene among ESBL strains of *A. baumannii* and targeting with essential oil compounds from *Azadirachta indica* [Internet]. Vol. 32, *Journal of King Saud University - Science*. 2020. p. 3380–7. Available from: <http://dx.doi.org/10.1016/j.jksus.2020.09.025>
18. Girija ASS, Smiline Girija AS. Fox3 CD25 CD4 T-regulatory cells may transform the nCoV's final destiny to CNS! [Internet]. Vol. 93, *Journal of Medical Virology*. 2021. p.

5673–5. Available from: <http://dx.doi.org/10.1002/jmv.26482>

19. Jayaseelan VP, Ramesh A, Arumugam P. Breast cancer and DDT: putative interactions, associated gene alterations, and molecular pathways. *Environ Sci Pollut Res Int*. 2021 Jun;28(21):27162–73.
20. Arumugam P, George R, Jayaseelan VP. Aberrations of m6A regulators are associated with tumorigenesis and metastasis in head and neck squamous cell carcinoma. *Arch Oral Biol*. 2021 Feb;122:105030.
21. Kumar SP, Praveen Kumar S, Smiline Girija AS, Vijayashree Priyadharsini J. Targeting NM23-H1-mediated Inhibition of Tumour Metastasis in Viral Hepatitis with Bioactive Compounds from *Ganoderma lucidum*: A Computational Study [Internet]. Vol. 82, *Indian Journal of Pharmaceutical Sciences*. 2020. Available from: <http://dx.doi.org/10.36468/pharmaceutical-sciences.650>
22. Girija SA, Priyadharsini JV, Paramasivam A. Prevalence of carbapenem-hydrolyzing OXA-type  $\beta$ -lactamases among *Acinetobacter baumannii* in patients with severe urinary tract infection. *Acta Microbiol Immunol Hung*. 2019 Dec 9;67(1):49–55.
23. Priyadharsini JV, Paramasivam A. RNA editors: key regulators of viral response in cancer patients. *Epigenomics*. 2021 Feb;13(3):165–7.
24. Mathivadani V, Smiline AS, Priyadharsini JV. Targeting Epstein-Barr virus nuclear antigen 1 (EBNA-1) with *Murraya koenigii* bio-compounds: An in-silico approach. *Acta Virol*. 2020;64(1):93–9.
25. Girija As S, Priyadharsini J V, A P. Prevalence of and complex in elderly students with urinary tract infection (UTI). *Acta Clin Belg*. 2021 Apr;76(2):106–12.
26. Anchana SR, Girija SAS, Gunasekaran S, Priyadharsini VJ. Detection of gene in carbapenem-resistant strains and targeting with biocompounds. *Iran J Basic Med Sci*. 2021 May;24(5):690–8.
27. Girija ASS, Smiline Girija AS, Shoba G, Vijayashree Priyadharsini J. Accessing the T-Cell and B-Cell Immuno-Dominant Peptides from *A.baumannii* Biofilm Associated Protein (bap) as Vaccine Candidates: A Computational Approach [Internet]. Vol. 27, *International Journal of Peptide Research and Therapeutics*. 2021. p. 37–45. Available from: <http://dx.doi.org/10.1007/s10989-020-10064-0>
28. Arvind P TR, Jain RK. Skeletally anchored forsus fatigue resistant device for correction of Class II malocclusions-A systematic review and meta-analysis. *Orthod Craniofac Res*. 2021 Feb;24(1):52–61.
29. Venugopal A, Vaid N, Jay Bowman S. Outstanding, yet redundant? After all, you may be another Choluteca Bridge! [Internet]. Vol. 27, *Seminars in Orthodontics*. 2021. p. 53–6. Available from: <http://dx.doi.org/10.1053/j.sodo.2021.03.007>

30. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. *Clin Oral Investig*. 2019 Sep;23(9):3543–50.
31. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. *J Dent Educ*. 2019 Apr;83(4):445–50.
32. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of *Streptococcus mutans*, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. *Clin Oral Investig*. 2020 Sep;24(9):3275–80.
33. Miljanović B, Trivedi KA, Reza Dana M, Gilbard JP, Buring JE, Schaumberg DA. Relation between dietary n-3 and n-6 fatty acids and clinically diagnosed dry eye syndrome in women [Internet]. Vol. 82, *The American Journal of Clinical Nutrition*. 2005. p. 887–93. Available from: <http://dx.doi.org/10.1093/ajcn/82.4.887>
34. Dana MR, Reza Dana M, Schaumberg DA. Efficacy and tolerability outcomes after punctal occlusion with silicone plugs in dry eye syndrome: Author reply [Internet]. Vol. 132, *American Journal of Ophthalmology*. 2001. p. 600–1. Available from: [http://dx.doi.org/10.1016/s0002-9394\(01\)01000-5](http://dx.doi.org/10.1016/s0002-9394(01)01000-5)
35. Sullivan RM, Cermak JM, Papas AS, Dana MR, Sullivan DA. ECONOMIC AND QUALITY OF LIFE IMPACT OF DRY EYE SYMPTOMS IN WOMEN WITH SJÖGREN'S SYNDROME [Internet]. Vol. 19, *Cornea*. 2000. p. S127. Available from: <http://dx.doi.org/10.1097/00003226-200011002-00184>
36. Balaram M, Schaumberg DA, Reza Dana M. Efficacy and tolerability outcomes after punctal occlusion with silicone plugs in dry eye syndrome [Internet]. Vol. 131, *American Journal of Ophthalmology*. 2001. p. 30–6. Available from: [http://dx.doi.org/10.1016/s0002-9394\(00\)00620-6](http://dx.doi.org/10.1016/s0002-9394(00)00620-6)
37. Lemp MA, Crews LA, Bron AJ, Foulks GN, Sullivan BD. Distribution of Aqueous-Deficient and Evaporative Dry Eye in a Clinic-Based Patient Cohort [Internet]. Vol. 31, *Cornea*. 2012. p. 472–8. Available from: <http://dx.doi.org/10.1097/ico.0b013e318225415a>
38. Pepose JS, Sullivan BD, Foulks GN, Lemp MA. The Value of Tear Osmolarity as a Metric in Evaluating the Response to Dry Eye Therapy in the Clinic and in Clinical Trials [Internet]. Vol. 157, *American Journal of Ophthalmology*. 2014. p. 4–6.e1. Available from: <http://dx.doi.org/10.1016/j.ajo.2013.10.020>
39. Paiva CSD, De Paiva CS, Chen Z, Koch DD, Bowes Hamill M, Manuel FK, et al. The Incidence and Risk Factors for Developing Dry Eye After Myopic LASIK [Internet]. Vol. 141, *American Journal of Ophthalmology*. 2006. p. 438–45. Available from: <http://dx.doi.org/10.1016/j.ajo.2005.10.006>
40. Schiffman RM, Walt JG, Jacobsen G, Doyle JJ, Lebovics G, Sumner W. Utility assessment

among patients with dry eye disease [Internet]. Vol. 110, Ophthalmology. 2003. p. 1412–9.  
Available from: [http://dx.doi.org/10.1016/s0161-6420\(03\)00462-7](http://dx.doi.org/10.1016/s0161-6420(03)00462-7)

UNDER PEER REVIEW