



Research Paper

A Study to Assess the Prevalence of Refractive Errors Among Industrial Workers In Thirubhuvanai At Puducherry

Mrs. L. CATHRINE¹, Ms. D. ARULSELVI² & Dr. G.MUTHAMILSELVI³

¹Tutor in Nursing, Department of Obstetrics and Gynaecology, SMVNC, Puducherry²B.Sc., (Nursing)-IV Year, Sri Manakula Vinayagar Nursing College, Puducherry³Principal of Sri Manakula Vinayagar Nursing College, Puducherry-605107 Corresponding Author: Mrs. L. CATHRINE – Mail ID: lcathrine@smvnc.ac.in

ABSTRACT:

Introduction:

Globally, refractive errors are the prevalent cause for vision impairment and the second most common cause of blindness. According to World Health Organization (WHO), one billion people have vision impairment. Uncorrected refractive error has been documented as one of the root causes of moderate or severe vision impairment or blindness in 123.72 million individuals. The main objective of the study is to assess the refractive errors among industrial workers and associate the refractive errors among industrial workers with their selected demographic variables. The research approach used for this study was quantitative research approach. A descriptive design was adopted for this present study. By using convenient sampling technique, 50 industrial workers were selected for the present study. . The present study was on 50 industrial workers in Thirubhuvanai, Puducherry who meet the inclusion criteria. The present study reveals that majority 38 (76%) of the industrial workers had mild refractive error, 12 (24%) of them had Moderate refractive errors. The study findings concluded that majority of the industrial workers had mild refractive error. There is significant association between gender, religion, socioeconomic status, marital history with refractive errors among industrial workers where $p < 0.05$.

Keywords: Refractive errors, Blindness, Industrial workers

I. INTRODUCTION:

Globally, refractive errors are the prevalent cause for vision impairment and the second most common cause of blindness. According to World Health Organization (WHO), one billion people have vision impairment. Uncorrected refractive error has been documented as one of the root causes of moderate or severe vision impairment or blindness in 123.72million individuals.

Magnitude of refractive errors is quite high in our country and about 27.1 million persons aged 16- 39 years are suffering from refractive errors. The balance of the axial length of the eye and the optical power of the cornea and lens defines refractive status. In 2010, uncorrected refractive errors became considered to be the world's leading cause of blindness. Refractive errors are the most frequent form of impaired vision and the second most manageable cause of blindness in the world.

Myopia, as well as near-sightedness, is the inability to see objects that are far away. Myopia begins whenever the light is refracted in front of the retina instead of just onto the retina. Myopia tends to increase during a person's adolescence and the academic period before stabilizing in their early twenties. Myopia is a significant childhood optical impairment that runs in the family.

Farsightedness, commonly known as hypermetropia, is a disorder in which it is easier to see objects that are further away than it is to see those who have been nearby to you. Hyperopia arises when light is refracted behind the retina rather than onto it. If the eyeball is too short or the cornea has even less curvature, this can happen. People around the world might be affected by farsightedness. Certain children build mild hyperopia, which improves by the time they reach maturity.

Astigmatism is an eyesight problem that is caused by someone with an imperfectly constructed cornea. Along with astigmatism, the cornea resembles rugby or oval rather than a rounded surface. When rays of light approach an astigmatic eye, rays are bent and refracted, producing several concentrate sites on the retina rather

than just a singular focus location. Astigmatism hampers people's capacity to perceive objects both close and far away. When the eyeball is not spherical but uniform, it is labeled regular astigmatism; whenever the cornea is not a sphere but not balanced, it is called irregular astigmatism.

Refractive errors can be treated using Eyeglasses. Prescription glasses are worn to correct your sight when your refractive error becomes a problem, such as when reading or driving. Contacts are thin pieces of flexible plastic that are made according to your prescription, just like glasses. Many people prefer contacts to glasses because they can be worn discreetly. Some people also find contacts to be more practical during physical activity.

Laser eye surgery: During laser eye surgery, your surgeon reshapes the surface of your cornea, the outside part of your eyeball, to allow it to better refract light. This offers permanent results, but it also carries a risk of complications.

Intraocular lens surgery. During intraocular lens surgery, your surgeon will replace your eye's natural lens with a plastic lens called an intraocular lens. This new artificial lens is perfectly shaped and will eliminate any refractive errors in your eye.

Uncorrected refractive errors are known to have many social consequences in addition to the health risks. The social ramifications may include isolation reduced educational and employment opportunities, increased morbidity, economic distress and overall quality of life. Prevention or corrective treatment is possible in 80% of the causes of visual impairment. The WHO and 20 International Non-Governmental Organizations (INGOs) launched the global initiative, "Vision 2020," for reducing preventable blindness. Refractive errors are a priority for this global initiative Vision 2020: The Nine Right to Sight.

NEED FOR THE STUDY

Worldwide level

Globally, the prevalence of refractive errors, specifically myopia, is increasing at an alarming pace. Myopia is affecting 27% of the world population, with an incidence of 32.9% in adult population of Asia. In Pakistan, myopia affects 36.5% of adults and 542.2% of the paediatric population. The global incidence of hypermetropia is recorded as 30.6% with regional incidence of 38.9% in Asia. It has an occurrence of 10.14% among Pakistani adults. In Southeastern Asia, the EPP (Equatorial Plane Position) of astigmatism is about 644.8%. In various investigations, the prevalence of refractive errors was already reported at various rates extending around 6% to 45 percent. It is calculated that more than 22% of the earth's population experiences myopia. Near sightedness prevalence expanded to 70 percent to 80 percent in East Asian countries and 25 percent to 40 percent in Western countries.

The International Agency for the Prevention of Blindness reported that almost 600 million people can't see well in the distance, 43 million people are blind, 295 million people experience moderate to severe vision impairment, 258 million people experience mild vision impairment. 90 million children and adolescents live with sight loss. Of these 2 million are blind, 30 million experience moderate to severe sight loss, 58 million experience mild sight loss. In many regions, the scale and approach of existing service delivery are insufficient to meet current population needs, which projected increase in vision loss by 2050.

At least 3 billion people need on-going access to services to optimise their vision and ability to function in society. 2.6 billion people have myopia, 1 billion people have corrected presbyopia, 146 million people have diabetic retinopathy, 76 million people have early-stage glaucoma.

National level

National Programme for Control of Blindness and Visual Impairment (NPCB&VI) was launched in the year 1976 as a 100% centrally sponsored scheme (now 60:40 in all states and 90:10 in NE States) with the goal of reducing the prevalence of blindness to 0.3% by 2020. It has been reported that main causes of blindness are Cataract (62.6%) Refractive Error (19.70%) Corneal Blindness (0.90%), Glaucoma (5.80%), Surgical Complication (1.20%), Posterior Capsular Opacification (0.90%), Posterior Segment Disorder (4.70%), and others (4.19%). Estimated National Prevalence of Childhood Blindness /Low Vision is 0.80 per thousand. In the "School Children Eye Screening" report for the academic year 2022-23, based on a survey conducted by the **Department of Health and Family Welfare** in March 2023, it was found that out of a total of 62,08,779 children screened 1,73,099 were diagnosed with refractive errors. Belagavi district had the highest number of cases, with 39,997 children affected.

State level

According to an article in the Hindu, 1.73 lakh children in Karnataka were found to be suffering from refractive errors, possibly due to excessive use of mobile phone and TV. In the academic year 2022- 23, the department had a target of 64,48,793 students for eye screening. The department screened 62,08,779 children. The screening revealed that 39,997 children in Belagavidi district suffer from refractive errors. The number for Vijayapura is 13,170, Bruhat Bengaluru Mahanagara Palike (BBMP) limits 10,193 cases, Davangere 6,348, Shivamogga 5,837 and Bidar has 5,677 such cases.

In Puducherry, "THE TIMES OF INDIA" reported that people with blindness and low vision are more vulnerable to Covid-19 infection and have a disadvantage of not receiving sufficient information about the infection, a survey by **Aravind Eye Hospital** in Puducherry showed. Vision impairment has been associated with anxiety, depression, and a lower quality of life. "Such individuals face greater limitations that may make them particularly vulnerable to worse outcomes if they contract Covid-19," said **Annamalai Odayappan**, one of the authors of the paper published based on the survey.

Refractive errors in industrial workers are crucial for ensuring a safe and productive work environment, promoting employee well-being, and complying with occupational health and safety standards. Regular eye examinations and appropriate vision correction measures can contribute to a healthier and more efficient workforce. So, the study is selected to assess refractive errors among industrial workers in Thirubhuvanai at Puducherry.

STATEMENT OF THE PROBLEM

A study to assess the prevalence of refractive errors among industrial workers in Thirubhuvanai at Puducherry.

OBJECTIVES OF THE STUDY

To assess the prevalence of refractive errors among industrial workers in Bright Brothers Limited, Puducherry.

- To associate the refractive errors among industrial workers with their selected demographic variables.

II. RESEARCH METHODOLOGY:

RESEARCH APPROACH:

A quantitative research approach was adopted for the present study.

RESEARCH DESIGN:

A descriptive design was adopted for the present study.

SETTING OF THE STUDY:

The present study was conducted in Thirubhuvanai at Puducherry.

POPULATION:

The study population comprised of all the industrial workers

SAMPLE:

The sample of the study consists of industrial workers working in Bright Brothers Limited in Thirubhuvanai, Puducherry, who meet the inclusion criteria

SAMPLE SIZE:

The sample size consists of 50 industrial workers in Bright Brothers Limited, Thirubhuvanai, Puducherry

SAMPLE TECHNIQUE:

A convenient sampling technique was used to select the sample for the present study.

SAMPLE SELECTION CRITERIA:

Inclusion criteria:

- Industrial workers working in Bright Brothers Limited, Thirubhuvanai, Puducherry.
- Industrial workers who are willing to participate in the study

Exclusion criteria:

- Industrial workers who were not willing to participate in this study.

Workers who are not available at the time of data collection.

MAJOR FINDING

Regarding the age in years, the majority 14 (28%) were in the age group of 20-30 years, 14(28%) were in the age group of 40-50 years and 11 (22%) were in the age group of 30-40 years. With regards to gender, majority 25 (50%) were male and 24 (48%) were female. In the aspect of religion majority, 31 (62%) were Hindu, 1 (3.3%) were Muslim and 10 (20%) were Christian. In the aspect of education status, the data shows majority 14 (28%) were completed 10th, 13 (26%) were illiterate and 9 (18%) were graduate. Regarding family income per month, the data shows that the majority 26 (52%) come under Rs.10000 to Rs.20000 and 18 (36%) were come under Rs.20000/- to Rs30000/-. With regards to marital history majority, 35 (70%) were married and 15 (30%) were unmarried. In the aspect of number of children, 12 (24%) of them had one child and 25 (50%) had two children. Regarding history of eye problem 24 (48%) had eye problems. With regards to past history majority 23 (46%) had past history and 27 (54%) had no past history.

III. RESULTS AND DISCUSSION

The study was conducted to assess the prevalence of refractive errors among industrial workers in Thirubhuvanai at Puducherry. The table 1 reveals the Distribution of the refractive errors among industrial workers. The finding shows that, majority 38 (76%) of them had mild refractive error, 12 (24%) of them had Moderate refractive errors among industrial workers.

The table 2 shows that shows the association of the refractive errors among industrial workers with their selected demographic variables. There is significant association between gender, religion, socioeconomic status, marital history with refractive errors among industrial workers where $p < 0.05$.

Table 1: Distribution of the refractive errors among industrial workers.

n=50

S.NO	REFRACTIVE ERROR	FREQUENCY (n)	PERCENTAGE %
1.	Mild refractive error	38	76%
2.	Moderate refractive error	12	24%
3.	Severe refractive error	0	0%

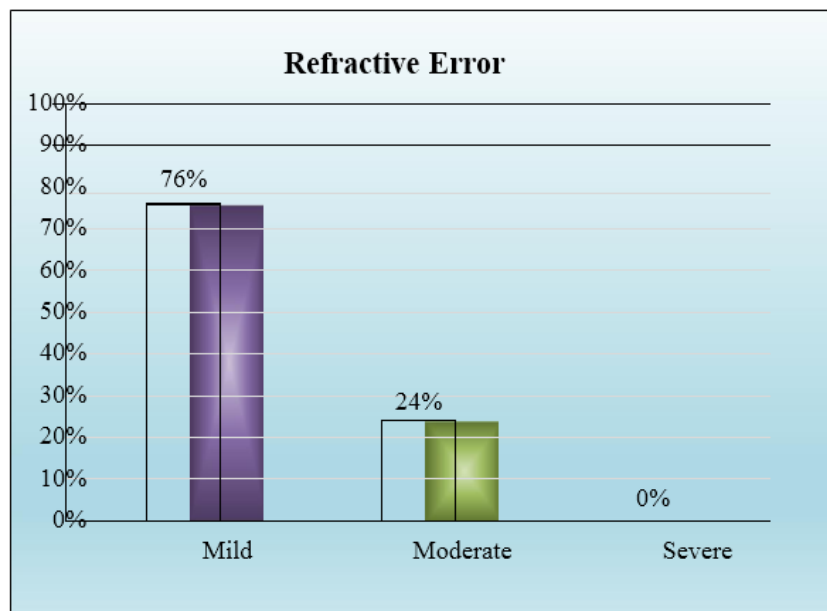


Figure 1: Percentage wise distribution of the refractive errors among industrial workers.

Table 2: Association of the refractive errors among industrial workers with their selected demographic variables.

n = 50

S.No	Demographic variables	Frequency	Percentage
1	Age of the person		
	a) 20- 30 years	14	28%
	b) 30- 40 years	11	22%
	c) 40 – 50 years	14	28%
	d) 50-60 years	11	22%
2.	Gender		
	a) Male	25	50%
	b) Female	24	48%
	c) Transgender	1	2%
	d) others	0	0%
3.	Religion		
	a) Hindu	31	62%
	b) Muslim	9	18%
	c) Christian	10	20%
	d) Others	0	0%

4. Educational status		
a) 10 th	14	28%
b) 12 th	14	28%
c) Graduate	9	18%
d) Illiterate	13	26%
5. Family Income		
a) 10000-20000	26	52%
b) 20000-30000	18	36%
c) 30000-40000	4	8%
d) 40000-50000	2	4%
6. Socioeconomic Status		
a) Higher class	7	14%
b) Middle class	30	60%
c) Poor class	13	26%
d) Below poverty line	0	0%

7. Marital history		
a) Married	35	70%
b) Unmarried	5	10%
c) Widow	10	20%
d) Separated	0	0%
8. Number of children		
a) One	12	24%
b) Two	25	50%
c) Three	8	16%

	d) More than three	5	10%
9.	Family history of eyeproblems		
	a) Yes	24	48%
	b) No	26	52%
	c) Uncertain	0	0%
10	Any past history of eye problem		
	a) Yes	23	46%
	b) No	27	54%

IV. CONCLUSION:

The present study assessed the refractive errors among industrial workers in Thirubhuvanai, Puducherry. The study findings concluded that majority 38 (76%) of them had mild refractive error, 12 (24%) of them had Moderate refractive errors among industrial workers. There is significance association between gender, religion, socioeconomic status, marital history with refractive errors among industrial workers where $p < 0.05$.

V. RECOMMENDATIONS:

- Same study can be conducted with large samples.
- Same study to can be conducted among school children in community area.

BOOK REFERENCE:

- [1]. Basavanthappa. Community Health Nursing. Jaypee Brothers, Medical Publishers Pvt. Limited, Third Edition, 2023.
- [2]. Gangadharan, Shobana, and M. Hemamalini. Community Health Nursing. Elsevier Health Sciences, 2021.
- [3]. Savage, Christine L. Public/Community Health and Nursing Practice. F.A. Davis, 2019.
- [4]. Medical-Surgical Nursing Made Incredibly Easy! Lippincott Williams & Wilkins, Fifth Edition, 2022.
- [5]. Smeltzer, Suzanne C. O'Connell. Brunner and Suddarth's Textbook of Medical-Surgical Nursing. Lippincott Williams & Wilkins, Fifteenth Edition, 2022.
- [6]. Lewis's textbook of Medical Surgical Nursing, 12th Edition, 2023.

JOURNAL REFERENCE

- [7]. Khoshhal, F., Hashemi, H., Hooshmand, E. et al. The prevalence of refractive errors in the Middle East: a systematic review and meta-analysis. *Int Ophthalmology* 40, 1571–1586 (2020).
- [8]. Duthiel, Frédéric; Oueslati, Tharwa; Delamarre, Louis; Castanon, Joris; Maurin, Caroline; Chiambaretta, Frédéric; Baker, Julien S.; Ugbolue, Ukadike C.; Zak, Marek; Lakbar, Ines; Pereira, Bruno; Navel, Valentin (2023-01-03). "Myopia and Near Work: A Systematic Review and Meta-Analysis". *International Journal of Environmental Research and Public Health*. 20 (1): 875. doi:10.3390/ijerph20010875. ISSN 1660-4601. PMC 9820324. PMID 36613196.
- [9]. Foster, P J; Jiang, Y (February 2014). "Epidemiology of myopia". *Eye*. 28 (2): 202–208. doi:10.1038/eye.2013.280. ISSN 0950-222X. PMC 3930282. PMID 24406412.
- [10]. Owji, N; Khalili, MR; Bazrafkan, H; Heydari, M (September 2022). "Long-term outcome of refractive errors in patients with congenital blepharoptosis who have undergone ptosis surgery". *Clinical & Experimental Optometry*. 105 (7): 715–720. doi:10.1080/08164622.2021.1973344. PMID 34538220. S2CID 237573319. 40
- [11]. "Frequently Asked Questions: How do you measure refractive errors?". The New York Eye And Ear Infirmary. Archived from the original on 2006-09-01. Retrieved 2006-09-13.
- [12]. "NETRA: Inverse Shack-Hartmann Wavefront Sensor using High Resolution Mobile Phone Display". Vitor F. Pamplona, Ankit Mohan, Manuel M. Oliveira, Ramesh Raskar. Archived from the original on 2011-12-21. Retrieved 2011-12-13.
- [13]. Schiefer, Ulrich; Kraus, Christina; Baumbach, Peter; Ungewiß, Judith; Michels, Ralf (2016-10-14). "Refractive errors". *Deutsches Ärzteblatt International*. 113 (41): 693–702. doi:10.3238/arztebl.2016.0693. ISSN 1866-0452. PMC 5143802. PMID 27839543.
- [14]. Cochrane, Gillian M.; Toit, Rènée du; Mesurier, Richard T. Le (2010-04-12). "Management of refractive errors". *BMJ*. 340: c1711. doi:10.1136/bmj.c1711. ISSN 0959-8138. PMID 20385718. S2CID 8240093.
- [15]. Wedner, S.; Masanja, H.; Bowman, R.; Todd, J.; Bowman, R.; Gilbert, C. (2008-01-01). "Two strategies for correcting refractive errors in school students in Tanzania: randomised comparison, with implications for screening programmes". *British Journal of Ophthalmology*. 92 (1): 19–24. doi:10.1136/bjo.2007.119198. ISSN 0007-1161. PMID 18156372. S2CID 2157969.
- [16]. Shih, Yung-Feng; Hsiao, C. Kate; Chen, Chien-Jen; Chang, Ching-Wei; Hung, Por T.; Lin, Luke L.-
- [17]. K. (June 2001). "An intervention trial on efficacy of atropine and multi-focal glasses in controlling myopic progression". *Acta Ophthalmologica Scandinavica*. 79 (3): 233–236. doi:10.1034/j.1600-0420.2001.790304.x. ISSN 1395-3907. PMID 11401629.
- [18]. Lee, Jong-Jer; Fang, Po-Chiung; Yang, I-Hui; Chen, Chih-Hsin; Lin, Pei-Wen; Lin, Sue-Ann; Kuo, Hsi-Kung; Wu, Pei-Chang (February 2006). "Prevention of Myopia Progression with 0.05% Atropine Solution". *Journal of Ocular Pharmacology and Therapeutics*. 22 (1): 41–46. doi:10.1089/jop.2006.22.41. ISSN 1080-7683. PMID 16503774.
- [19]. Li, X; Friedman, IB; Medow, NB; Zhang, C (1 May 2017). "Update on Orthokeratology in Managing Progressive Myopia in Children: Efficacy, Mechanisms, and Concerns". *Journal of Pediatric Ophthalmology and Strabismus*. 54 (3): 142–148. doi:10.3928/01913913-20170106-01. PMID 28092397.
- [20]. Walline, JJ (January 2016). "Myopia Control: A Review". *Eye & Contact Lens*. 42 (1): 3– 8. doi:10.1097/ICL.0000000000000207. PMID 26513719. S2CID 24069302.

- [21]. Kandel H, Khadka J, Goggin M, Pesudovs K (2017). "Patient-reported outcomes for assessment of quality of life in refractive error: a systematic review". *Optometry and Vision Science*. 94 (12): 1102–1119. doi:10.1097/OPX.0000000000001143. PMID 29095758. S2CID 21512136.
- [22]. Kandel H, Khadka J, Lundström M, Goggin M, Pesudovs K (2017). "Questionnaires for measuring refractive surgery outcomes". *Journal of Refractive Surgery*. 33 (6): 416–424. doi:10.3928/1081597X20170310-01. PMID 28586503.

NET REFERENCE:

- [23]. <https://www.sciencedirect.com/science/article/pii/S1888429622000437>
- [24]. <https://globusmedicaljournal.com/wp-content/uploads/2022/08/GMSET-111-JJ22- FAZALRAHMAN.pdf>
- [25]. <https://www.ijo.in/article.asp?issn=03014738;year=1990;volume=38;issue=2;spage=64;epage=65;..>
- [26]. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6984636/>
- [27]. <https://aapos.org/glossary/anisometropia>
- [28]. <https://www.aao.org/eye-health/anatomy/parts-of-eye>