CHAPTER 2

REVIEW OF LITERATURE
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2.1 Low Vision and its causes

Low vision is a visual impairment, not correctable by standard glasses, contact lenses, medicine or surgery that interferes with a person’s ability to perform day to day activities. There are many different conditions that can cause low vision, and each condition affects sight in a different way. The number of people with low vision will increase as a result of the ageing of the world’s population. Therefore, age-related macular degeneration, glaucoma and diabetic retinopathy are increasingly becoming the important causes of low vision.

Many studies, surveys and experiments were conducted previously not only to find out the prevalence and to examine the causes of low vision cum blindness but also to assess the need for the low vision care services globally as well as nationally.

Wolffsohn J S & Cochrane A L\textsuperscript{19} did a study to demonstrate the changes that have occurred in a developed world low vision population over the past three decades and to examine the present rehabilitation of the visually impaired attending a multi-disciplinary low vision clinic. They conducted a retrospective examination of the 22,860 patients’ record those had attended the low vision clinic at Kooyong since its inauguration in 1972 to 1996 and extracted the information on their age, gender, living status, and primary condition causing low vision. In addition, a prospective unified study of 590 patients attending the clinic over a 6-month period in 1998 examined the demographics of the present low vision population and also about the rehabilitation they received. The data of these two studies was compared. The observations were the average age of patients attending the low vision clinic had steadily increased, with 87% over the age of 60 years in the mid-1990s compared to 71% in the mid-1970s. The percentage of female patients attending the clinic had also steadily risen over the past three decades (from 59 to 66%), as had the percentage of patients living alone (from 23 to 41%). The main change in the conditions causing visual impairment in the clinic's low vision population had been the increase in age-related macular degeneration (ARMD). The average presenting distance acuity was 6/38, improving to 6/30(-1) with refraction. One-third of the patients could manage N5 print with the aid of +4.00 near addition lenses.
or less. Over one-half were prescribed magnification aids, with 19% having need for 2 or more to accomplish their desired visual tasks. Two-thirds of the patients made use of staff from multiple disciplines during their visual rehabilitation. Finally, concluded that the low vision population had changed over the past three decades while Major changes that had implications on low vision rehabilitation services were the increasing age of the patients and the preponderance of ARMD.

Khan S A\textsuperscript{20} retrospectively reviewed 410 patients to obtain data on the characteristics of low-vision patients seen at a tertiary eye care hospital, L.V.Prasad Eye Institute, Hyderabad, India. Patients underwent a comprehensive clinical low-vision examination. Two hundred and ninety seven (72%) of 410 patients were male. One-fifth patients were in the 11-20 years age group (21%). Visual acuity in the better eye was <6/18 - 6/60 in almost half these patients (49.3%). One hundred and twenty two patients (29.9%) referred with a visual acuity of $\geq$ 6/18, either had difficulty in reading normal print or had restricted visual fields. The main causes for low vision were found to be retinitis pigmentosa (19%), diabetic retinopathy (13%), Macular diseases (17.7%), and degenerative myopia (9%). Visual rehabilitation was achieved using accurate correction of ametropia (174 patients), approach magnification (74 patients) and telescopes (45 patients) for recognising faces, watching television and board work. Spectacle magnifiers (187 patients), hand/stand magnifiers (9 patients), closed-circuit television (3 patients), overhead illumination lamp (143 patients) and reading stand (24 patients) were prescribed for reading tasks. Light control devices (146 patients) were used for glare control, and cane (128 patients) and flashlight (50 patients) for mobility. The study elucidated the characteristics of low-vision patients and provided information for the development of appropriate low vision services.

Carvalho K M et.al\textsuperscript{21} together initiated a research to determine the causes of low vision in an elderly population attended by a university visual rehabilitation service and to check for the use of prescribed optical aids. A cross-sectional study was carried out on patients aged 60 years or over attending for the first time a university low vision service in 2001. Ophthalmic re-evaluation and interview were performed by means of a structured questionnaire in 2002. The sample comprised 50 subjects aged between 60 and 90 years. Severe low vision ($< \text{ or } \leq 20/200$) was present in 68.0% of patients. The main cause of low vision was age-related macular degeneration (44.0%). Regarding
literacy, 16.0% were illiterate and 72.0% had completed fundamental schooling. Thirty-one patients (62.0%) had been prescribed optical aids; 54.8% of these patients stated that they use them. A majority (70.6%) held a favourable opinion of these aids. On conclusion of the study, the main cause of low vision was reported to be age-related macular degeneration. Approximately half of those receiving prescriptions reported actually using the aids in their daily activities. Making best use of residual vision in the elderly population with visual impairment was considered as a priority to achieve independence necessary for enhanced quality of life.

*Khan S A et.al*⁰² conducted a study to identify the perceived barriers to the provision of low vision services among ophthalmologists in India. Seventy nine ophthalmologists responded to a structured self-administered questionnaire. Information was collected to understand the level of awareness and barriers/constraints to provision of low vision services. Significant factors associated with each barrier/constraint and perceptions on providing low vision care were investigated. They reported that the Lack of training/knowledge [65 (82.3%)], lack of awareness [59 (74.7%)] and non-availability of low vision devices [57 (72.2%)] were perceived as the major constraints / barriers to providing low vision care. At least one significant factor was found for each of the above constraints/barriers in providing low vision care. The perception of lack of awareness as being one of the constraints/barriers was significantly higher [OR 3.97 (95% CI, 1.02 - 7.8)] among ophthalmologists from organisations providing low vision services. The perception of lack of motivation as constraint/barrier was significantly higher [OR 3.62 (95% CI, 1.3 - 10.3)] among ophthalmologists from organisations providing low vision services and/or those involved in VISION 2020: The Right to Sight programmes [OR 3.83 (95% CI, 1.4 - 10.4)]. The likelihood of responding that low vision care is time consuming was greater for those belonging to a teaching institute [OR 7.19 (95% CI, 2.0 - 26.1)], those involved in low vision services [OR 5.45 (95% CI, 1.8 - 16.5)] and those who knew that low vision is a priority in VISION 2020 [OR 15.1, 95% CI, 1.5 -155.4]. They concluded the study with the remark that Ophthalmologists needed more education about the benefits of low vision care in order to increase their level of awareness and knowledge.

In order to estimate the incidence rates and major causes of registered blindness and low vision, research was carried out in Kuwait by *Al-Merjan J I et. al.*²³ Data on age, gender and cause of blindness and low vision were collected from the Visual Disability
Committee while evaluating Kuwaiti citizens applying for a blindness allowance from January 2000 to December 2004. Criteria for legal blindness in Kuwait are visual acuity 6/60 or less in the better eye with best possible correction or a visual field less than 20 degrees around the central fixation point. Incidence rates per 100,000 person years of observation were calculated for both genders in four age subgroups and four severity categories. The causes of registered blindness were classified according to the International Classification of Diseases, 10th edition. The observed results were out of 412 persons registered as blind, 272 were males (66.01%) while 140 were females (33.98%), mean age 28.7 +/-25.2 years, 39.32% below 20 years of age, 31.79% 21-40 years, 18.68% 41-60 years, and 9.95% 61 years and over. Male gender was prevalent for all age subgroups. The overall incidence rate was 9.97 per 100,000 person years of observation, 13.33 for the male and 6.69 for the female patients. The incidence rates rose from 7.35 for those 20 years and younger to 14.80 for the age subgroup 41-60 and 23.16 for those 61 years and above. The rates of severe visual impairment classified in categories 4 and 5 were higher than the rates for categories 2 and 3. Retinitis pigmentosa was the leading cause of blindness, followed by congenital anomalies and optic atrophy. In the subgroup below 20 the rate of optic atrophy was highest, followed by congenital malformations, retinitis pigmentosa and retinopathy of prematurity. In the next age subgroup (21-40 years), the rate of retinitis pigmentosa was three times as high as in the younger subgroup, followed by optic atrophy, congenital malformations and albinism. In the subgroup 41-60 the incidence rate for phthisis bulbi was twice as high as the rates for retinitis pigmentosa and optic atrophy. For those 61 years and older, the incidence rate of phthisis bulbi was almost five times as high as that for optic atrophy. The incidence rates for the male patients were higher for the major causes of disability in all age subgroups. The overall incidence rate of registered blindness for Kuwait was less than in many other national registries. The marked prevalence of the male gender in all age subgroups was specific for Kuwait. The rates of the leading causes of registered blindness reflected the prevalence of the younger subgroups in the registry. Additional data on co-morbidity and dedicated efforts to reveal unrecognized and unregistered blindness, particularly among females, will overcome the limitations of the registry, and will serve to outline the tendencies in avoidable vision loss and monitor the efficacy of the prevention programs in the future.
A study was done by Moll A et.al\textsuperscript{24} to determine the causes of uni- and bilateral low vision in children and young adults visiting clinic and studying in the School for the Blind and Visually Impaired in Lodz. The study group included 271 patients aged from 3 months to 21 years, visually disabled and with unocular reduction of visual acuity to 25% or less. The commonest cause of low visual acuity in the group was found to be optic nerve atrophy (22%) due to peri-natal hypoxia. Other important causes were retinopathy of prematurity (17%) and congenital abnormalities of the eye globe (11%). The main causes of unocular low vision were anisometropia and strabismus.

Kim J et. al\textsuperscript{25} conducted a retrospective study to evaluate the characteristics and the changes of low vision patients over ten years in Korea, and to establish useful data for planning low vision services, active care and rehabilitation. They found more males than females and observed that the age group between 11 and 20-yr-old (18.1%) was the largest age group of the low vision patients. Optic atrophy (28.3%) was main cause of low vision. However, they reported that elderly low vision patients is increasing and macular degeneration is becoming a leading cause of low vision (p<0.05). One thousand five low vision aids (LVAs) were prescribed for 681 patients (1.46±0.62 aids for each patient). Near LVAs were prescribed more than distance LVAs. In most patients, the use of LVAs improved both near and distance visual function. They concluded that in spite of increased number of elderly low vision patients mainly due to macular degeneration, the young patients still remained the majority of patients visiting the low vision clinics. Also rehabilitation using LVAs had improved the visual function of low vision patients but not yet sufficient at large.

Another observational research was performed to ascertain the main causes of visual impairment in children with low vision in Khyber Institute of Ophthalmic Medical Sciences, Peshawar, Pakistan, from June 2006 to December 2007 by Shah M et.al\textsuperscript{26}. The study also aimed at assessing the need of spectacles and low vision devices (LVDs) in children and evaluating visual outcome after using their LVDs for far and near distance. The clinical record of 270 children with low vision age 4-16 years attending the Low Vision Clinic were included. All those children, aged 4-16 years, who had corrected visual acuity (VA) less than 6/18 in the better eye after medical or surgical treatment, were included in the study. WHO’s low vision criteria were used to classify into visually impaired, severe visually impaired and blind. One hundred and eighty nine (70%) were males and 81 (30%) were females. The main causes of visual impairment
included nystagmus (15%), Stargardt's disease (14%), maculopathies (13%), myopic macular degeneration (11%) and oculocutaneous albinism (7%). The percentages of visually impaired, severely visually impaired and blind were 33.8%, 27.2% and 39.0% respectively. Spectacles were prescribed to 146 patients and telescopes were prescribed to 75 patients. Spectacles and telescope both were prescribed to 179 patients while Ocutech telescope was prescribed to 4 patients. The final inference was made that the retinal diseases, nystagmus and macular conditions were mainly responsible for low vision in children. Visually impaired children, especially with hereditary/congenital ocular anomalies benefitted from refraction and low vision services which facilitated the vision enhancement and inclusive education.

A study was performed in Nigeria by Adebusoye LA et al27 with an objective to describe the visual problems among elderly subjects in a hospital setting. Five hundred consecutive patients (311 females and 189 males) aged 60 years and above were interviewed using a structured questionnaire based on the World Organization of Family Doctors (Wonca) format between September 2004 and April 2005. The main outcome measurements were sociodemographic characteristics, visual acuity and ocular problems. The main visual problems reported by the elderly were impaired vision 224 (44.8%) and abnormal sensations in the eyes 64 (12.8%). Cataract 198 (39.7%) was the commonest eye disorder diagnosed by the Family Physician, followed by pterygium 32 (6.4%). Assessment of binocular acuity revealed blindness in 109 (21.8%) and low-vision in 68 (13.6%). It concluded that the prevalence of visual impairment increased significantly with age. Efforts should be made to detect these conditions early and institute treatment promptly.

An effort was made by Schulze Schwering M et al28 to determine the anatomic sites of severe visual impairment and blindness in children in an integrated school for the blind in Malawi, and to compare the results with those of previous Malawian blind school studies in 2011. Children were examined using the standard WHO/PBL eye examination record for children with blindness and low vision. Visual acuity [VA] of the better eye was classified using the standardised WHO reporting form. Fifty-five pupils aged 6 to 19 years were examined, 39 (71 %) males, and 16 (29 %) females. Thirty-eight (69%) were blind [BL], 8 (15 %) were severely visually impaired [SVI], 8 (15 %) visually impaired [VI], and 1 (1.8 %) was not visually impaired [NVI]. The major anatomic sites of visual loss were optic nerve (16 %) and retina (16 %), followed by
lens/cataract (15 %), cornea (11 %) and lesions of the whole globe (11 %), uveal pathologies (6 %) and cortical blindness (2 %). The exact aetiology of VI or BL could not be determined in most children. Albinism accounted for 13 % (7/55) of the visual impairments. 24 % of the cases were considered to be potentially avoidable: refractive amblyopia among pseudophakic patients and corneal scarring. The Optic atrophy, retinal diseases (mostly albinism) and cataracts were the major causes of severe visual impairment and blindness in children in an integrated school for the blind in Malawi. Corneal scarring became the fourth cause of visual impairment, compared to being the commonest cause 35 years ago. Congenital cataract and its postoperative outcome were the commonest remedial causes of visual impairment.

Gao G et. al$^{29}$ conducted a retrospective study to characterize the traits of patients presenting at a low vision clinic in China. The records of 299 patients who visited the Low Vision Clinic of Eye and ENT Hospital Affiliated to Fudan University from January 2009 to May 2014 were reviewed to get information like age, gender, education, occupation, cause of visual impairment and types of low vision aids (LVAs) dispensed. Out of all the patients (193 male; aged from 3 to 96 years, with a mean of $29.74 \pm 25.23$ years), 43.48% experienced moderate visual impairment, 25.42% had severe visual impairment and 21.07% were blind. The four major causes of visual impairment were congenital cataract (14.38%), degenerative myopia (13.71%), juvenile macular degeneration (9.36%) and retinitis pigmentosa (9.36%). The most common causes of visual impairment were congenital cataract (22.67%) in 0-19-year-olds, retinitis pigmentosa (20.62%) in 20-59-year-olds, and age-related macular degeneration (36.54%) in the 60+ group. With the help of LVAs, a significant improvement of distance and/or near vision or visual field was observed in 243 patients, of whom 185 accepted LVAs and 58 patients refused due to high price, inconvenience, young age ($\leq 6$ y), clumsy appearance and ignorance. The most commonly dispensed LVAs were stand magnifiers (21.57%) followed by spectacle-type LVAs (19.21%). The majority of the patients in our low vision clinic were young, the main causes of visual impairment were congenital and hereditary diseases. Stand magnifiers were the most commonly dispensed LVAs while high price was the major reason for refusing LVAs.

Low vision being the important public health problem, a research was designed by Labh R K et. al$^{30}$ to study the profile of low vision patients in a hospital of Nepal. Information related to the patients' profile, visual status, ocular disease and, low vision devices
prescribed were obtained retrospectively from the records of 1,860 visually-impaired patients, regardless of the cause, presenting to the low vision department of the Biratnagar Eye Hospital, Biratnagar, Nepal, over a period of four years. These patients, after a comprehensive ocular examination, underwent low vision examination by an ophthalmologist and a low vision specialist. Out of 1,860 patients, males comprised 1298 (70 %), while 562 (30 %) patients were female. Six hundred and one (32.3%) patients were of less than 20 years while 398(21.4%) were more than 60 years of age. Agriculture (500, 27 %), household work (341, 18 %) and students (308, 17 %) were the common occupations. Retinal diseases were the commonest cause of low vision. They were: macular disorders 408 (22 %), retinitis pigmentosa 226 (12.1 %) and other retinal causes 361 (19.4 %) (diabetic retinopathy, choroidal coloboma, post laser for retinal vasculitis and central retinal/branch retinal vein occlusion, healed macular chorioretinal scar secondary to retinochoroiditis and choroiditis). Refractive error 215 (11.5 %), amblyopia 49 (2.6 %), optic atrophy 144 (7.8 %) and microphthalmos 105 (5.6 %) were the other causes. Uncorrected distance visual acuity was between 6/24 and 6/60 in 509 (27.4 %) and between 5/60 and PL in 1,327 (71.3 %) patients. Similarly, near visual acuity with vision better than 2.50 M (N 20) and worse than 2.50M (N20) was present in 643(34.5%) and 1,217(65.5%) patients. About 67% and 54.5% of the patients had some improvement in their distance and near visual acuity with glasses and low vision aids. Distance spectacles 909 (49 %), near spectacles 106 (5.7 %), hand held magnifiers 78 (4 %) and telescopes 18 (1 %) were the optical devices prescribed. The study concluded that the prevalence of low vision was common among the people of the younger and older age groups while retinal diseases were common among the causes for low vision. Therefore, adequate prescription and availability of low vision devices could improve the visual acuity.

125 patients were selected by geographical aspects (home nearby clinic) from the lab's pool by Rinnert T et. al31 to know the utilization of the LVAs. After a 3 month minimum period of using the low-vision aid (LVA) patients were visited at their homes. Near visual acuity, distance visual acuity, magnification, and contrast sensitivity were studied under domestic and optimized conditions of illumination. Patients were interviewed in detail to investigate their habits of LVA use. an overall number of 94 patients (66 females and 28 males) could be evaluated. The most patients were between 80 and 84 years old. It was found that the vision impairment was attributable mostly to macular degeneration (55%)
and diabetic retinopathy (21%). Visual acuity and contrast sensitivity decreased during the period of investigation. 79% of the patients had a unsatisfactory domestic illumination (< 1000 lx). Only 23% of the patients used their LVA at a fixed location. Main field of using LVA was reading (68%). The LVA were rarely used for writing and other fields of practice. 76% of LVA were used daily, more than 50% for a maximal duration of 1 h/d. Magnifiers were preferably used for short-time activities. Closed circuit television systems (CCTV) had a very good acceptance. Telescopes were characterized by a very high rate of rejection. The number of non-used LVA was approximately a fifth. Reasons were decreased visual acuity, impractical handling, missing introduction by delivering optician (54%) as well as unsatisfactory illumination. Finally concluded that the improved patient care could be obtained by regular check-up visits (6 months), enhanced illumination, low-vision training, home visits, multi-disciplinary care and modified prescription of LVA.

Dandona R et. al32 conducted a population-based, cross-sectional study to assess the prevalence and causes of low vision in a population in southern India for planning low vision services. A total of 10,293 persons of all ages from 94 clusters representative of the population of the Indian state of Andhra Pradesh underwent a detailed eye examination, including measurement of visual acuity with logarithm of the minimum angle of resolution charts, refraction, slit-lamp biomicroscopy, applanation tonometry, gonioscopy, and stereoscopic dilated fundus evaluation. Automated threshold visual fields and slit-lamp and fundus photography were done when indicated using predefined criteria. It was observed that low vision was present in 144 participants, an age, gender, and urban-rural distribution adjusted prevalence of 1.05% (95% confidence interval, 0.82%-1.28%). The most frequent causes of low vision included retinal diseases (35.2%), amblyopia (25.7%), optic atrophy (14.3%), glaucoma (11.4%), and corneal diseases (8.6%). Multivariate analysis showed that the prevalence of low vision was significantly higher with increasing age, and there was a trend for higher prevalence with decreasing socioeconomic status. Extrapolating these data to the estimated 1014 million population of India in the year 2000, 10.6 (95% confidence interval, 8.4-12.8) million people would have low vision. It was inferred that there was a significant burden of low vision in this population, suggesting the need for low vision services.

In order to evaluate the specific needs and types of low vision devices (LVDs) in patients with age-related macular degeneration (AMD) for the effective use of residual vision a
research was performed in southern India by Khan S A et. al. One hundred consecutive patients with diagnosis of AMD were evaluated to ascertain the degree of visual disability. Different LVDs were used to suit the specific needs of individual patients and the distribution of LVDs for distance and near and other rehabilitation measures were stratified for vision \( \geq 6/18 \) and \( <6/18 \). Statistical analysis was performed using chi2 test/Fisher's exact test and paired t-test. The percentage of patients with visual acuity \( <6/18 \) reduced from 72.2% (26/36) to 47.2% (17/36) with the use of standard spectacles (\( P = 0.03 \)). Similarly, the percentage of patients with visual acuity \( <6/18 \) reduced from 85.7% (6/7) to 14.3% (1/7) with the use of a telescope (\( P = 0.029 \)). The optical devices for near tasks included spectacle magnifiers (n = 59), stand magnifiers (n = 19), and hand magnifiers (n = 18). With these LVDs, the near vision improved from 0.13 (decimal notations) to 0.39 (\( P < 0.001 \)). Eighty-six patients were given at least one of the LVDs and 20% were prescribed more than one near device (bifocals, spectacle magnifiers, hand magnifiers, stand magnifiers). Additionally, patients also needed counselling (n = 89) and training on eccentric viewing (n = 39), coin identification (n = 45), and independent mobility (n = 41). The study concluded that the overall management of a patient with AMD must include counselling, prescription of appropriate LVDs and training to utilize the residual vision to its fullest advantage which expected to improve the patient's quality of life.

### 2.2 Low vision population and Quality of life

Low vision people are highly benefitted by the prescription of low vision devices. LVDs not only improve the near but also the distance vision. The quality of life is a measure of standard and life style of a person’s life. Generally, the quality of life is lower in low vision population. The low vision services play a very important role in enhancing the QoL of low vision patients. Various studies have been conducted to understand the change in the quality of life of visually impaired especially low vision patients.

Fintz A C et. al surveyed the patients who sought a low-vision intervention at the Colmar and Strasbourg hospital centres over a period of 9 months to demonstrate the benefits of a low-vision intervention upon the quality of life of visually disabled adults. Patients were asked to complete the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ25) in interview format by telephone, once they had attended the first meeting and again 2 months after the end of the low-vision intervention. The low-
vision intervention led to overall improvement as judged by the 25 items of the questionnaire. Some of the items involving visual function and psychological issues showed significant benefits: the patients reported a more optimistic score concerning their general vision, described better nearby activities, and felt a bit more autonomous. The conclusion was more than mainstream psychological counselling; low-vision services helped patients cope with visual disabilities during their daily life. The low-vision intervention improved physical and technical issues necessary to retaining autonomy in daily life.

Renieri G et. al\textsuperscript{35} did study with an objective to assess the impact of low-vision aids on quality of life. Interviews included a modified version of the National Eye Institute Visual Functioning Questionnaire (Modified German NEI VFQ-25), the Hospital Anxiety and Depression Scale, the Mini-Mental State Examination Blind, and Indicators of the Rehabilitation Status. The questionnaire was administered before and 5 months after low-vision rehabilitation that involved recommendation of devices and instructing patients on how to use them. Out of a total of 88 patients interviewed before low-vision rehabilitation, 50 patients could be reached for the follow-up interview. A huge proportion of the sample reported clinically significant depression (30\%) or anxiety (30\%). There were no differences between participants or dropouts. After fitting of low-vision devices, patients reported a significant improvement in perceived near tasks (P<0.01), social functioning (P<0.01), and reading ability (P<0.001). The magnitude of change was moderate. No significant changes were found in Hospital Anxiety and Depression Scale, Mini-Mental State Examination Blind, and Indicators of the Rehabilitation Status. Low-vision rehabilitation appears to have a broader effect than simply improving visual performance, as it may positively influence social functioning. Even though this study had no control group, the influence of low-vision aids on social functioning has not been reported before and should encourage their use.

Another descriptive cross-sectional study was performed by Adigun K et.al\textsuperscript{36} to provide information on the causes of visual impairment in patients presenting to their family physician, the spectrum of impairment, and its impact on quality of life for these patients. 375 adult patients with ocular symptoms were enrolled in the general outpatient department of the University College Hospital, Ibadan, from July to September, 2009. After recording initial visual acuity, the patients were interviewed using the Vision-Related Quality of Life questionnaire to determine the impact of visual impairment on
their quality of life. Ophthalmic examinations were performed to determine the causes of visual impairment. It was observed that the main causes of visual impairment were cataracts (58.7%), refractive error (19.4%), and glaucoma (2.9%). Visual impairment was found to be associated with advancing age, low education, and unemployment (P<0.001). Most patients (85.1%) were found to have good quality of life overall. Quality of life was found to be poor in the domains of visual function (64.2%) and social interaction (50.9%). Quality of life was found to be related to the degree of visual impairment, ie, blind patients reported poor quality of life (41.4%) when compared with those having low vision(8.6%) or near normal vision (2.4%, P<0.001). The study identified poor quality of life in patients with a higher degree of visual impairment. Family physicians need to identify these visually impaired patients early and make timely referrals.

Do A T et. al37 conducted a survey to know the effectiveness of low vision exams and visual aids in improving patient quality of life in southern rural India. The low vision quality of life (LVQoL) questionnaire measures vision-related quality of life through 25 questions was translated into Tamil and verbally administered to 55 new low vision referral patients before their first visit at the low vision clinic at Aravind Eye Hospital. Low vision aids (LVAs) were prescribed at the discretion of the low vision specialist. 1-month later, the same questionnaire was administered over the phone. About 44 of 55 low vision patients completed baseline and follow-up LVQoL surveys, and 30 normal vision controls matched for age, gender, and education were also surveyed (average 117.34 points). After the low vision clinic visit, the low vision group demonstrated a 4.55-point improvement in quality of life (from 77.77 to 82.33 points, P = 0.001). Adjusting for age, gender, and education, the low vision patients who also received LVAs (n = 24) experienced an even larger increase than those who did not (n = 20) (8.89 points, P < 0.001). Finally, concluded that the low vision services and visual aids can improve the quality of life in South Indian rural population regardless of age, gender, and education level. Thus, all low vision patients who meet the criteria should be referred for evaluation.

The researchers Sturrock B A et. al38 conducted one study to determine the longitudinal impact of specific coping strategies on vision-related quality of life (VRQoL) in patients with low vision. A single-group was administered telephonic- interviews as baseline and at 3 and 6 months with patients (visual acuity < 6/12 in the better eye) recruited from low vision services. The Coping Strategy Indicator (CSI) assessed three
strategies used specifically in relation to vision-related problems: avoidant coping, problem-solving coping, and seeking social support. Vision-related quality of life was assessed using the Impact of Vision Impairment (IVI) questionnaire, which comprised two domains: vision-related functioning and vision-related emotional well-being. Multivariable mixed linear regression including time as an independent variable was used to assess change in VRQoL. The study comprised 162 patients (mean age = 69.8 years, 66% female), most with age-related macular degeneration (42%) and moderate vision impairment (41%; <6/18-6/60). Multivariable mixed linear regression showed that avoidant coping was a significant determinant of decline in vision-related functioning (β = -0.11, 95% confidence interval [CI] -0.22 to -0.01, P = 0.036) and emotional well-being (β = -0.29, 95% CI -0.45 to -0.13, P < 0.001) over a 6-month period. Findings showed that avoidant coping has a detrimental impact on VRQoL over time. Low vision specialists should be aware of their patients' coping strategies and encourage them to engage in active rather than avoidant coping to deal with the impact of their vision impairment.

From the aforementioned review of literature, it is obvious that there are number of studies carried out globally regarding the impact of LVDs in low vision patients but there are very few in Indian sub-continent. In fact, there is none in the northern part of the country. Hence, the present study has been planned to understand the impact of low vision services on the quality of life of low vision patients.