# A CROSS SECTIONAL STUDY OF 150 CASES OF VITILIGO FOR PREVALENCE OF VARIOUS OCULAR MANIFESTATIONS AND ITS DEMOGRAPHIC COMPARISON

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**ABSTRACT**

**BACKGROUND**

Vitiligo is an acquired depigmentation disorder most commonly due to autoimmunity against melanocyte specific antigens resulting in destruction of the melanocytes in small or large circumscribed areas of the skin.

The prevalence of vitiligo is approximately 0.5% and 5% in the world population. Destruction of the Uveal melanocytes and pigment epithelium occurs in vitiligo patients.

The ocular manifestations reported in association with vitiligo are hypopigmented spots on the iris, pigmentation on the anterior chamber, RPE hypopigmentation, uveitis, chorioretinal degeneration, peripapillary atrophy around the optic nerve, pigment clumps, focal hypopigmented spots in retina, choroidal naevi, macular oedema, bilateral exudative retinal detachment, subretinal neovascularisation in peripapillary and extrafoveal region.

**MATERIALS AND METHODS**

Our study is a prospective cross-sectional study which constitutes 150 clinically proven cases of various types of vitiligo. Ocular examinations including vision recording, slit-lamp biomicroscopy, gonioscopy, intra ocular pressure by applanation tonometer, ophthalmoscopy, examination of fundus by 90 D lens were carried out. Other investigations like complete haemogram, urine analysis, blood biochemistry were done.

Demographic factors like age, sex, positive family history, duration of vitiligo, various sites of hypo pigmentation in the body with respect to prevalence of ocular manifestations were analyzed.

**RESULTS**

Our study shows female preponderance with iris hypo pigmentation being the most common ocular manifestation.

Vitiligo vulgaris is the most common type of vitiligo in our study. In the eye, primarily there is involvement of layers consisting of melanocytes. Iris hypo pigmentation changes are the most frequently followed by fundus changes. In the fundus, diffuse hypopigmentation, background tessellation and temporal crescent are seen.

Anterior segment lesions are more compared to posterior segment lesions. The visual loss due to ocular manifestations was not present in our study.

**CONCLUSION**

The anatomical localisations, primarily peri orbital and genital vitiligo are the most alerting features for ocular findings.

**KEYWORDS**

Vitiligo, Iris Hypo Pigmentation, Childhood Vitiligo, Melanocytes, Peri Orbital, Vitiligo Vulgaris.

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## BACKGROUND

Vitiligo is the most common depigmenting disorder. There are three types of vitiligo, segmental, non-segmental and mixed. Non-segmental type is further classified into generalised, localised and mucosal. The prevalence of vitiligo is approximately 0.5% and 5% in the world population.[1,2]

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Throughout the life the course of this skin condition is unpredictable with aggravation and periods of stability.[1,2,3] The exact cause of destruction of melanocytes is not known. The following are said to be involved in it's the etio pathogenesis. They are autoimmune, genetic, biochemical, cytotoxic and neuronal factors.[4]

Destruction of the Uveal melanocytes and pigment epithelium in vitiligo patients was the first evidence produced by Albert et al., in 1979. They reported various abnormalities in 112 vitiligo patients including uveitis, retinal pigment epithelial hypo pigmentation, chorioretinal scars, pigment clumping, and iris transillumination defects. In 1979 a case demonstrating bilateral retinal pigment epithelial changes associated with peri orbital vitiligo and seizure was reported.

Iris hypopigmentation is the major ocular manifestation in vitiligo which parallels with that of Biswas et al.,[5] Other ocular manifestations like pigmentation on the angle of anterior chamber, RPE hypopigmentation, uveitis, chorioretinal degeneration, ring like peripapillary atrophy around the optic nerve, fundal pigmentary disturbances like pigment clumps, focal hypopigmented spots, choroidal naevi, macular oedema, bilateral exudative retinal detachment, subretinal neovascularisation in peripapillary and extrafoveal region.

Melanocytes are distributed in the basal layers of epidermis, and its appendages, eyes, inner ear, and the leptomeninges. Melanocytes in the eye are present within two different layers, the uveal tract and retinal pigment epithelium. Loss of epidermal melanocytes is the pathological hall mark of vitiligo.

Both sexes are equally affected, and there are no apparent difference in rates of occurrence according to skin type or race. It is more noticeable in dark skinned individuals. Histopathologically in the margin of depigmented areas the mononuclear cells have been identified in case of non-segmental vitiligo, especially in rapidly progressing disease. In segmental vitiligo a neuro sympathetic disturbance is considered a key precipitating factor.

Four years later, Albert et al., showed asymptomatic and symptomatic RPE atrophy in 27% of 223 vitiligo patients, they demonstrated a significantly increased prevalence of non-specific RPE hypo pigmentation compared with a controlled population.

The syndromes associated with vitiligo and ocular presentation include VKH syndrome, Alezzandrini syndrome.

The atypical form of Vogt- Koyanayagi- Harada disease or a new uveo meningitic syndrome manifestations as uveo meningeal features with bilateral intermediate uveitis and macular oedema. Bilateral exudative retinal detachment develops after the onset of symptoms with subretinal neovascularisation. The new vessels were located in the peripapillary and extrafoveal regions. They were elevated, grey white in appearance.

The new vessels occurred in areas of pigmentary disturbances which is hyperpigmentation and damages of Bruch's membrane. Chronic recurrent phase of inflammation marked of anterior segment and fundus hyperpigmentary disturbances as risk factors associated with the development of SRNVM in VKH syndrome.

Alezzandrini syndrome in young adult and adolescents consists of oculodermatological features like poliosis, atrophic iris, reduced visual acuity, unilateral tapetoretinal degeneration with ipsilateral facial vitiligo. Hyperacusis and unilateral pigmentary retinitis also associated in this.

Discrete areas of depigmentation with associated pigment hyperplasia clinically appearing to involve the choroid and RPE. Many of these ocular findings in vitiligo are nonspecific in character and are mostly attributed to immunological processes in vitiligo.[2]

Vitiligo vulgaris was the most common clinical types seen, followed by segmental, focal, mucosal types. Whereas acrofacial and mucosal vitiligo have a lower presentation. Periocular and genital vitiligo have been found to be more commonly associated with ocular involvement.[6]

Segmental vitiligo has been reported more frequently in children in most studies[7,8] but not all[9] because of early onset probably in the first decade of life. In 1979, Albert et al., studied destruction of melanocytes and pigment epithelium associated with peri orbital vitiligo.[8]

Jaisankar et al reported segmental vitiligo as the second most frequent presentation followed by focal vitiligo. Koebner phenomenon has been reported to occur in as many as.

11.3-36.7% of all childhood vitiligo patients.[5,9] The increased incidence of koebnerization may be explained by increased proneness to trauma among due to higher morbidity and playfulness in the paediatric population and its occurrence is correlated with the activity of the disease. Female preponderance in childhood vitiligo has been reported in most of the studies except a few.[7]

**Objectives of the Study**

1. To evaluate various ocular manifestations in vitiligo.
2. Determine its demographic comparison in the Department of Ophthalmology, Government Kilpauk Medical College and Hospital.

## MATERIALS AND METHODS

Our study is a cross sectional observational clinical study which constitutes 150 cases of vitiligo confirmed from Dermatology Department, Government Kilpauk Medical College and Hospital, Chennai. The study was conducted from October 2017 to June 2018.

Ocular examination was performed with best corrected visual acuity, assessment by Snellen chart, auto refractometer, slit lamp examination, gonioscopy, dilatation and fundus examination by direct or indirect ophthalmoscope, intra ocular pressure recording by applanation tonometer and fundus photographs. Blood investigation like RA factor, ANA, TC, DC, ESR, blood Sugar, T3, T4, TSH, haemogram, peripheral blood smear also performed routinely in all vitiligo patients.

After the confirmation of vitiligo in our dermatology OPD centre the prevalence of various ocular manifestations in vitiligo was analysed in Ophthalmology OPD. Details regarding the age of onset, gender, site of initial lesion, duration of the disease, family history, type and site of vitiligo, progression, precipitating factors (trauma, illness, chemicals contact, stress), ocular symptom, systemic autoimmune disorders, (thyroid disorders, pernicious anaemia, Addison's disease, connective tissue diseases) were recorded.

The prevalence of visual disturbances with respect to the vitiligo cases was studied. The worsening of the lesions whether corresponds to extensive various ocular structures involvement was also analysed. This will be helpful to intensify the management for vitiligo.

**Inclusion Criteria**

The individual of age group from new born up to 80 years age group were taken into consideration. Both male and female sex group were included in our study.

**Exclusion Criteria**

Patients with systemic diseases such as diabetes mellitus, thyroid and autoimmune disorders were excluded.

**RESULTS**

We found in childhood as well as adult vitiligo cases concerned, the female sex prevalence was more than male.

The female preponderance of subjects corresponds with the study undertaken by Wagoner et al., for observation of new manifestations in vitiligo in 1983. Though vitiligo is known to affect both sexes equally, there are studies showing female preponderance perhaps due to greater cosmetic concern in females.

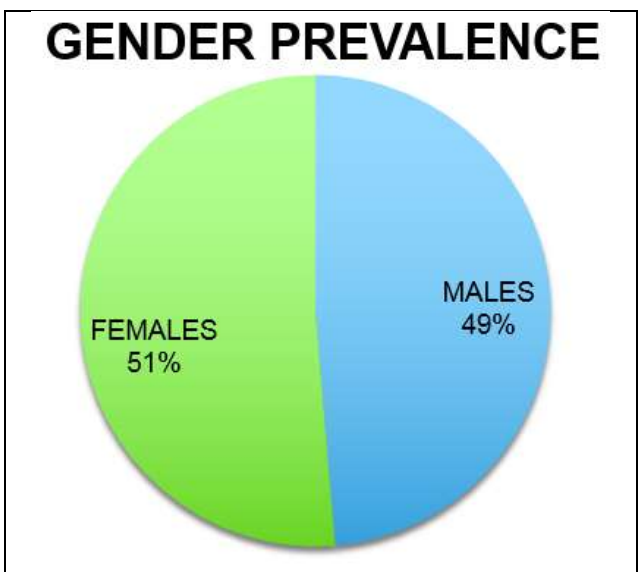


***Figure 1***

| | Male | Female |
|---|---|---|
| Total Number of Cases Studied | 73(48.67%) | 77(51.33%) |
| Childhood Vitiligo | 8(5.33%) | 7(4.67%) |
| Adult Vitiligo | 65(43.33%) | 70(46.67%) |

***Table 1. Sexual Prevalence of Vitiligo***

Eighteen patients were having positive family history of vitiligo occurrence in our study. The proportion of vitiligo patients with as well as without ocular manifestations in the ratio of 1:2.

| Total Number of Vitiligo | With Ocular Manifestations | Without Ocular Manifestations |
|---|---|---|
| Cases Reported | | |
| 150 | 50(33.33%) | 100(66.67%) |

***Table 2. Prevalence of Ocular Manifestations in Vitiligo***

In our study, 66.67% cases had no ocular manifestations which more than the value is attained by Biswas et al., and less than that by Baskaran et al.,[6]

Nordunt and Lerner studied regarding vitiligo without ocular symptomatology explaining the location of destructive lesion which lie in the periphery of retina and not in the macula.[10]

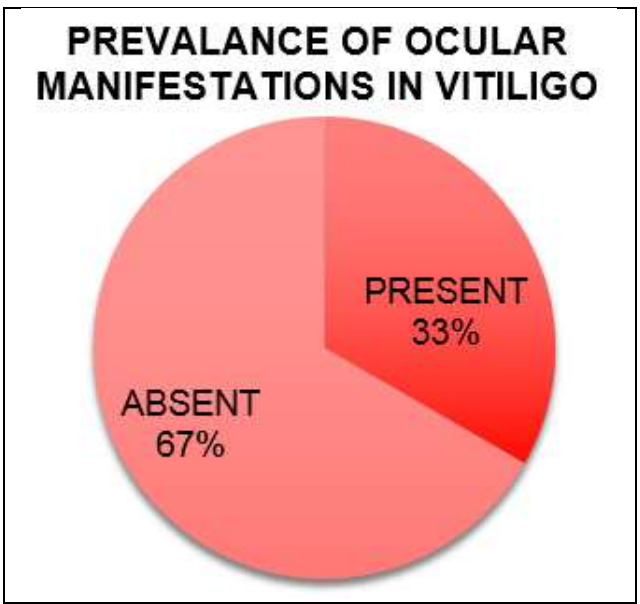


***Figure 2***

| Age in Years | No. of Cases | Eye Manifestation | |
|---|---|---|---|
| | | Present | Absent |
| 1-12 | 15 | 5 | 10 |
| 13-20 | 6 | 2 | 4 |
| 21-30 | 16 | 3 | 13 |
| 31-40 | 24 | 5 | 19 |
| 41-50 | 29 | 14 | 15 |
| 51-60 | 36 | 15 | 21 |
| 61-70 | 17 | 4 | 13 |
| 71-80 | 7 | 2 | 5 |

***Table 3. Comparison of the Prevalence of Ocular Manifestations in Vitiligo Cases with Age***

In our study age prevalence with increased positive ocular manifestations presented between 41-60 years age group.

In our study we observed, among 150 vitiligo cases increased prevalence type were vitiligo vulgaris and genital vitiligo. 33.33% of cases presented with positive ocular manifestations. 94.67% of vitiligo cases presented as genital vitiligo and vitiligo vulgaris. These two types of vitiligo alone contribute 86% of the positive ocular manifestations in our study. All five cases of generalised vitiligo cases presented with positive ocular manifestations.

| Vitiligo Clinical Types | Ocular Manifestations | |
|---|---|---|
| | Present (33.33%) | Absent (66.67%) |
| Genital Vitiligo. 13(8.67%) | 10(6.67%) | 3 |
| Vitiligo vulgaris. 129(86%) | 33(22%) | 96 |
| Generalised vitiligo 5(3.33%) | 5(3.33%) | - |
| Segmental vitiligo. 1(0.67%) | 1(0.67%) | - |
| Acral vitiligo. 1(0.67%) | - | 1 |
| Acro facial vitiligo. 1(0.67%) | 1(0.67%) | 1 |

***Table 4. Prevalence of Ocular Manifestations in Various Clinical Types of Vitiligo***

All the five generalised vitiligo patients in our study showed ocular manifestations in the form of iris hypopigmentation and depigmentation of eyelids indicating clearly that the intensity of vitiligo involvement not associated with ocular involvement vigorously. Where as in 129 cases of vitiligo vulgaris in our study, 33 cases (25.58%) show involvement of ocular manifestations.

According to the types of vitiligo, our study shows increased prevalence with vitiligo vulgaris (86%) and genital vitiligo (8.67%). These two types itself covers 28.67% of positive ocular manifestations from the total of 33.33% level.

Individual assessment of the type of ocular manifestations reveals iris atrophy and fundus changes will be maximum in cases with lesions located on face and genital vitiligo.

**Iris Hypopigmentation in Vitiligo Case**

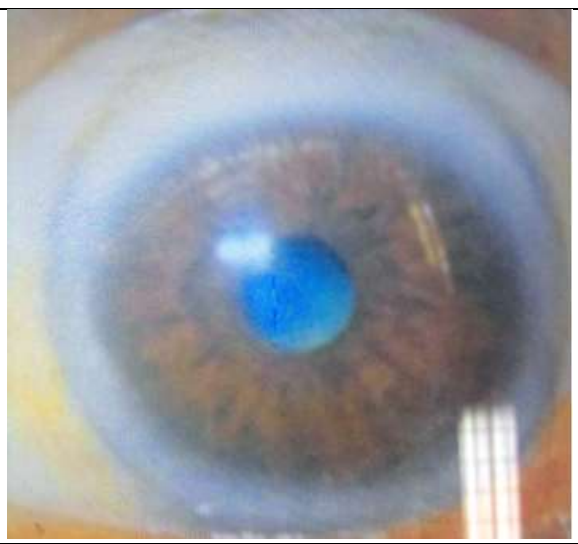

***Figure 3***

| Types of Vitiligo & No. of Cases | No. of Cases with Ocular Manifest | Types of Ocular Manifestation with No. of Cases |
|---|---|---|
| Genital Vitiligo -13 | 10 | Depigmentation of eye lid. (3) |
| | | Iris hypopigmentation. (3) |
| | | Poliosis of eye brows and eye lashes. (2) |
| | | Tessellated fundus with temporal crescent. (2) |
| Generalised Vitiligo-5 | 5 | Depigmentation of eye lid. (5) |
| Vitiligo Vulgaris-129 | 33 | Iris hypopigmentation. (20) |
| | | Tessellated fundus. (6) |
| | | Depigmentation of eye lid with Poliosis of eye brows and eye lashes. (5) |
| | | Temporal crescent with Tessellated fundus (2) |
| Segmental Vitiligo-1 | 1 | Iris hypopigmentation. (1) |
| Acral Facial Vitiligo-1 | 1 | Iris hypopigmentation. (1) |

***Table 5. Various Ocular Manifestations and its Prevalence with Respect to Various Clinical Vitiligo Cases***

Peri ocular and genital vitiligo have been found to be more commonly associated with ocular involvement.

Wagoner et al., and Rosenbaum et al., studies stated that the common ocular manifestation in vitiligo being periocular skin hypopigmentation.[7] Most common fundus changes in vitiligo was RPE depigmentation and Peripapillary atrophy.[11]

| Total Cases | Various Ocular Manifestations | No. of Cases | Male | Female |
|---|---|---|---|---|
| 150 | Depigmentation of eyelids | 8 | 3 | 5 |
| | Poliosis of eye brow and eye lashes | 7 | 3 | 4 |
| | Plus depigmentation of eyelids | | | |
| | Iris hypo pigmentation | 25 | 4 | 21 |
| | Iris transillumination defect. | - | - | - |
| | Plus iris hypo pigmentation | | | |
| | Angle of anterior chamber | Nil | - | - |

| | | | | |
|---|---|---|---|---|
| | Hyper pigmentation | | | |
| | Diffuse or focal hypo pigmented spot. | - | - | - |
| | Tessellated fundus | 6 | 2 | 4 |
| | Temporal crescent | 4 | 1 | 3 |
| | Plus tessellated fundus | | | |
| | Peri papillary atrophy | Nil | - | - |
| | Uveitis | Nil | - | - |
| | Chorioretinal degeneration | Nil | - | - |
| | Chorioretinal scar | Nil | - | - |
| | Loss of visual acuity | Nil | - | - |
| | Photophobia | Nil | - | - |

***Table 6. Comparison of Various Ocular Manifestations with Respect to Sex and Number***

| **Positive Family History of Vitiligo** | | **Ocular Manifestations** | |
|---|---|---|---|
| Number of cases | Percentage | Present | Absent |
| 18 | 12% | 18 | - |

***Table 7. Prevalence of Ocular Manifestations with Respect to Positive Family History of Vitiligo***

***Figure 4. Periorbital Vitiligo in Left Eye Involving Left Lower Eye Lid***

***Figure 5. Vitiligo Vulgaris- Right Medial Aspect of Eyebrow with Poliosis***

| **Face/periorbital** | **Forehead** | **Neck** | **Axilla** | **Upper limb** | **Lower limb** | **Trunk** | **Genitalia** |
|---|---|---|---|---|---|---|---|
| 20 | 8 | 25 | 14 | 25 | 29 | 16 | 13 |

***Table 8. Various Locations of Vitiligo***

Regarding locations of vitiligo, neck, face periorbital, upper limb and lower limb involvement were more in numbers in our study.

| **Duration of vitiligo** | **Vitiligo cases** | **Positive Ocular Manifestation cases** |
|---|---|---|
| **(In months)** | **Numbers** | |
| 1-12 | 15 | 5 |
| 13-24 | 9 | 3 |
| 25-36 | 26 | 4 |
| 37-48 | 26 | 12 |
| 49-60 | 23 | 10 |
| 61-72 | 10 | 3 |
| 73-84 | 17 | 3 |
| 85-96 | 6 | 2 |
| 97-108 | 5 | 3 |
| 109-120 | 5 | 2 |
| >121 | 8 | 3 |

***Table 9. Comparison of Prevalence of Ocular Manifestations in Vitiligo with Respect to Duration of the Disease***

Out of 150 cases of vitiligo, 50% of the patients were presenting with the vitiligo disorder between 25 months to

60 months duration. Among 33.33% of positive ocular manifestation cases from our study, majority (52%) fall among the 25 to 60 months duration of vitiligo disorder.

The female Sexual prevalence is more compared to male as far as the vitiligo affected individuals in our study. Even in childhood vitiligo female sexual prevalence is more than that of male. In ocular depigmentation manifestations in vitiligo cases also the female prevalence is more than male.

Ocular manifestations with respect to childhood and adult vitiligo cases concerned the female sexual prevalence is more than male.

Among the childhood and congenital vitiligo of 15 in numbers, five patients were presented with ocular manifestations. In adult vitiligo genital involvement were 13 in numbers of which 10 cases were presented with ocular manifestations in the form of peri orbital as well as eye lid hypopigmentation, poliosis and iris hypo pigmentation.[12,13]

| Total Vitiligo Cases Studied | Childhood Vitiligo | Percentage of Cases with Positive Ocular Manifestation | Adult Vitiligo | Percentage of Cases with Positive Ocular Manifestation |
|---|---|---|---|---|
| 150 | **15 (10%)** | **33.33% (5 cases)** | **135 (90%)** | **33.33% (45 cases)** |

***Table 10. Comparison of the Prevalence of Presence of Ocular Manifestations in Adult and Childhood Vitiligo***

| | Male | Female |
|---|---|---|
| Out of Total 150 cases of vitiligo gender prevalence | 73(48.67%) | 77(51.33%) |
| Childhood vitiligo | 7(4.67%) | 8(5.33%) |
| Ocular manifestations in children with respect to gender | 2 | 3 |
| Ocular manifestations in adult with respect to gender | 15 | 30 |

***Table 11. Gender Prevalence Comparison in Vitiligo (Adult and Childhood)***

Our study with increased female preponderance corroborates with the study by Wagoner et al., the female preponderance in vitiligo for observation of new manifestations in vitiligo in 1983.[7] The female preponderance is due to greater cosmetic concern as per few studies.[8,9]

| | With Visual Loss | Without Visual Loss | Male | Female |
|---|---|---|---|---|
| Posterior segment lesions | Nil | 10(20%) | 3 | 7 |
| Anterior segment lesions | Nil | 40(80%) | 10 | 30 |

***Table 12. Comparison of Anterior and Posterior Segment Lesions with Respect to Visual Affections***

Our study did not show visual loss due to ocular manifestations in vitiligo. The anterior segment lesions versus posterior segment lesions were in the ratio of 1: 4. In our study the ocular manifestations with respect to adult vitiligo predominantly vitiligo vulgaris or segmental vitiligo are hypo pigmentation over upper and lower eyelid and hypo pigmentation of iris.[14] 80% of cases with positive ocular manifestations have anterior segment lesions and only 20% lesions seen in posterior segment.

## DISCUSSION

Since vitiligo affects all active melanocytes in the body, ocular problems can occur in patients with vitiligo as far as age prevalence is concerned, in our study 60% of ocular manifestations fall between 41 to 60 years age group. Ocular manifestations in vitiligo cases as per sex prevalence is concerned in our study as male: female= 74%: 26%.

Among presence of ocular manifestations 50% contributed as iris hypopigmentation. In our study two male Child vitiligo presented with genital hypopigmentation with poliosis of eye brows and eye lashes. In one female child case along with hypopigmented patch over the upper and lower eye lids, the iris hypopigmentation and the poliosis of eye brows and eye lashes were noted. Out of childhood vitiligo cases in our study, five cases were presented with ocular manifestations.[12,13]

The anterior segment lesions were more than posterior segment lesions as presentation. Visual loss was not reported in our study with any type of vitiligo lesions. Vitiligo vulgaris and genital vitiligo patients only presented with increased prevalence of ocular manifestations in our study. Ocular findings in our study were similar to that of literature.

Anatomical localisation like periorbital and genital vitiligo are the most alerting feature for ocular findings.[2] In our study out of 13 genital vitiligo cases ocular depigmentation association seen in 10 cases. Tessellated fundus seen in 10 cases out of 50 cases of positive ocular manifestations. 20% cases among the positive ocular manifestations suffer from retinal pigmentary epithelium degeneration.[14,15]

Albert et al. found iris hypo pigmentation as the most common ocular finding followed by hyper pigmentation over angle of anterior chamber and RPE hypo pigmentation. Whereas in our study though iris hypopigmentation was the most common ocular finding it is followed by depigmentation of the eyelids, poliosis of eyebrow and tessellated fundus.

In our study out of more than 24 months to 60 months duration of vitiligo presented with 52% of ocular manifestations.

Childhood and adult vitiligo in our study showed preponderance in female. Ocular manifestations were also preponderance in female than male.[16] Commonest ocular manifestations in vitiligo patients in our study were iris hypo pigmentation and depigmentation of eyelids. Eighteen patients were having positive family history of vitiligo.[17]

In our study, we have excluded the association of autoimmune disorders, hypothyroidism, alopecia, diabetes mellitus. Hence, we were not able to get ocular manifestations like uveitis probably because of non-reflection of immunological process in our study cases.[18]

## CONCLUSION

Our study revealed multiple ocular findings in vitiligo. Anatomical localisation primarily peri orbital vitiligo and genital vitiligo showed increased prevalence of ocular manifestations. Most of the cases have no ocular complaints in our study.

Presence of positive family history, female gender associated with increased ocular manifestations were seen in our study. Increased prevalence of anterior segment lesions (80%) compared to posterior segment manifestations (20%) were reported. In our study, none of the vitiligo related ocular manifestations have resulted in loss of vision.

Routine periodical detailed ophthalmological examination has to be done in all vitiligo cases so that visual loss causing ocular manifestations associated with vitiligo can be detected in early stage itself and visual loss can be prevented.

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