

Original articles

## **VISUAL FUNCTION AND SUBJECTIVE PERCEPTION OF PATIENTS WITH FULL THICKNESS MACULAR HOLE**

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### **ABSTRACT**

**Background:** Patients with full thickness macular hole face difficulties in their day to day life because central part of retina, i.e. macula is affected which is responsible for maximum central vision. Not only vision but it is also responsible for depth perception, color vision and contrast. So, patients having full thickness macular hole will have central scotoma which leads to problems in seeing central part or straight ahead view. These all factors simultaneously affect quality of life of patients.

**Methods:** 20 patients with unilateral full thickness macular hole were enrolled in this study. All Visual functions like visual acuity, contrast sensitivity, visual field,

colour vision, stereopsis has been assessed to find out the affection of macular hole on their day to day activities. Quality of life has been assessed with the help of NEI-VFQ questionnaire – 25.

**Results:** Unilateral involvement with full thickness macular hole face difficulties during driving, reading, seeing stops or breaks, etc. because of damage in macula, not only visual acuity of patient is deteriorated but visual functions were affected which simultaneously lead to decrease in quality of life of patients.

**Conclusion:** Primary health-care providers play an important role in early detection and referral of patients with Full Thickness Macular Hole. Delay in detection and referral may lead to visual disability and thus impairment of the patient's quality of life.

**Introduction:** A macular hole is a small gap that opens at the centre of the retina, in an area called the macula. The retina is the light-sensitive film at the back of the eye. In the centre is the macula – the part responsible for central and fine-detail vision needed for tasks such as reading, etc. In the early stages, a macular hole can cause blurred and distorted vision. Straight lines may look wavy or bowed, and may have trouble in reading. In advance cases, it may see a small black patch or a "missing patch" in the centre of your vision<sup>[1-10]</sup>. Surgery is usually needed to repair the hole. This is often successful, but it has the possible

complications of treatment. Vision will never completely return to normal, but it's usually improved by having surgery. The usual natural history of a Full Thickness Macular Hole, if untreated, usually results in poor central visual acuity with normal peripheral vision. It subserves central 15-20 degree of visual field. Prevalence of Full Thickness Macular Hole (FTMH) is 0.07% with 7.8 persons per 1,00,000 populations per year. It usually occurs in the 6<sup>th</sup> decade of life. <sup>[11-12]</sup>

**Stages of Full Thickness Macular Hole (FTMH):<sup>17-19</sup>**

- Stage 0: Persistent traction on fovea prior to anatomic changes to the fovea
- Stage 1a: Foveal detachment, clinically visible orange pigment on the fovea
- Stage 1b: Foveal elevated to the perifoveal level, clinically visible yellow ring on the fovea
- Stage 2: FTMH of size < 400 µm
- Stage 3: FTMH of size > 400 µm, presence partial vitreomacular adhesion
- Stage 4: FTMH of size > 400 µm, presence of posterior vitreous detachment

**Purpose of this study:**

Most of the studies have shown that patients with full thickness macular hole will have impact on visual functions like visual acuity, contrast sensitivity, colour vision, scotoma and on their day to day activities. So the purpose of this study is to measure all visual functions and also assess the quality of life of patients to get idea about subjective perception of patients with full thickness macular hole.

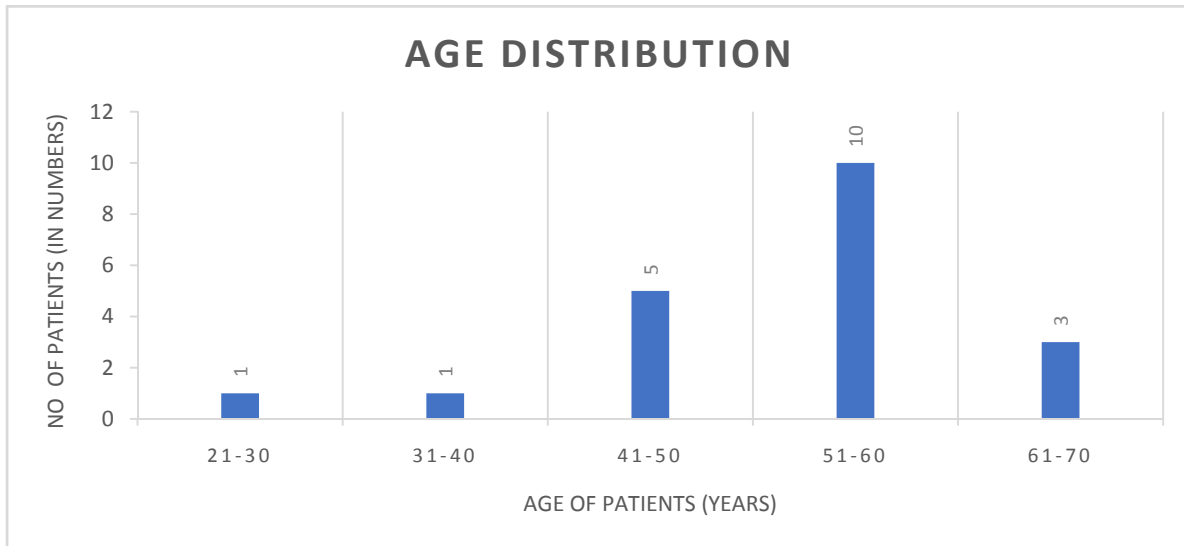
## **Materials and Methodology:**

This was cross-sectional questionnaire based study which includes 20 patients having unilateral involvement of full thickness macular hole. Basic ocular preliminary examination has been performed. Following all visual functions like visual acuity, contrast sensitivity, colour vision, stereopsis, and Visual field has been measured. After measurement of visual functions; subjective perception of patients has been assessed with the help of NEI-VFQ questionnaire. Patients who had unilateral involvement of full thickness macular hole and visual acuity less than 6/18 in best Seeing Eye are included in this study.

NEI-VFQ is a validated questionnaire, NEI VFQ which consists of 25 questions which include general health and vision(part 1),difficulty with activities (part 2) and responses to vision problems(part 3).Part 1 scoring is done according to 1: Excellent 2: Very good 3: Good 4: Fair 5: Poor. Part 2 & 3 scoring is done according to 1: No difficulties at all 2: A little difficulty 3: Moderate difficulties 4: Extreme difficulties 5: Stopped doing this because of eye sight. The questionnaire has been explained to the patient(s) and gave verbal instruction and helped whenever required. Patients were not comfortable with English, so questions are asked in Gujarati for their convenience.

**Results:**

**Graph: 1: This graph shows the age distribution in years**



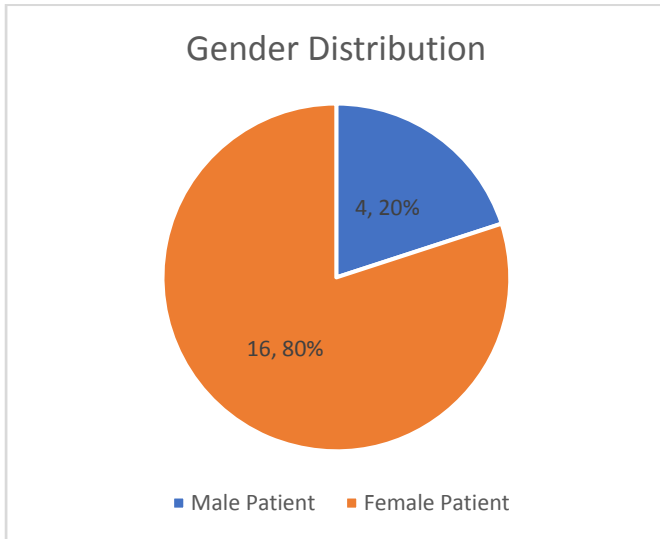
**Table: 1: shows the distribution of age according to age group.**

<u>Age</u> <u>(Years)</u>	<u>Number of Patients</u>	<u>Percentage</u>
<b>21-30</b>	1	5%
<b>31-40</b>	1	5%
<b>41-50</b>	5	25%
<b>51-60</b>	10	50%
<b>61-70</b>	3	15%

According to current study, 50% of patients affected with FTMH are in the age group of 51 Years – 60 Years. It has been seen that most of the patients; 80%, were

fall under the age group of 40-70 years. Only 2 (10%) patients fall below age of 40 years; which suggest that older age group is being affected more with FTMH.

**Graph 2: Gender Distribution**

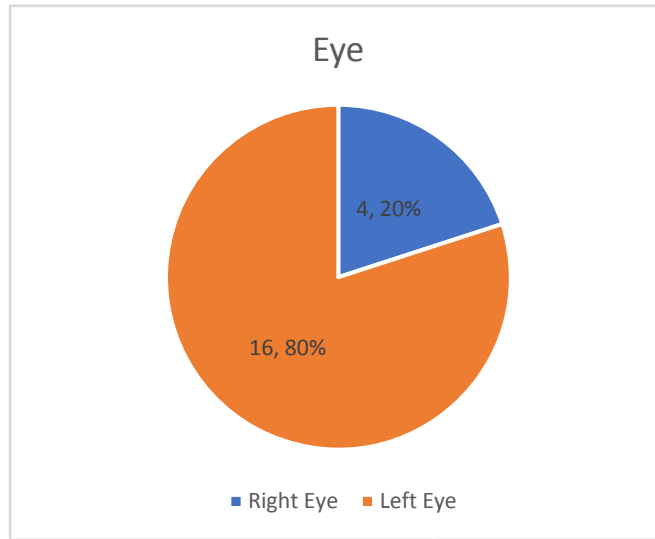


**Table 2: Gender Distribution**

<b>Total Patients</b>	<b>Male Patients</b>	<b>Female Patients</b>
<b>20</b>	4	16

Out of 20 patients, 80% were female patients and 20% were male patients affected by FTMH. So, female are at a higher risk of FTMH than male persons.

**Graph 3: This graph shows ratio of affected Eye in percentage.**

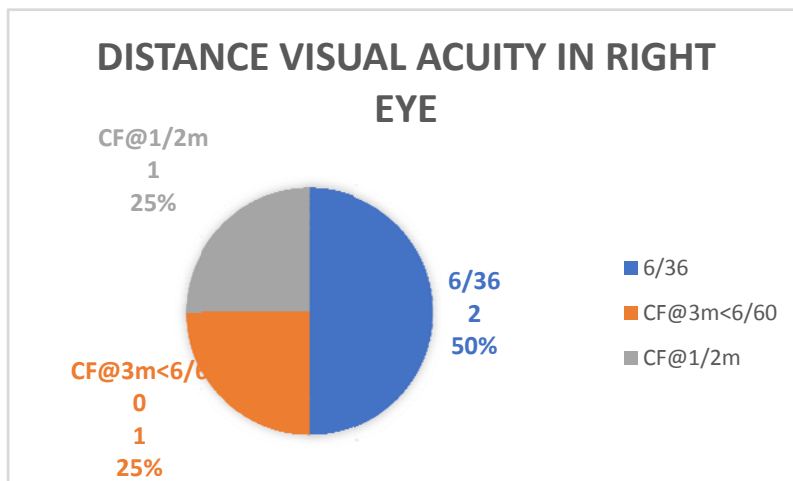


**Table 3:**

Total Patients	Right Eye	Left Eye
20	4	16

In this study, it has been seen that 80% of patients have FTMH in left eye whereas, only 20% of patients were have affection in right eye

**Graph 4(A): This graph shows the distance visual acuity in right eye**

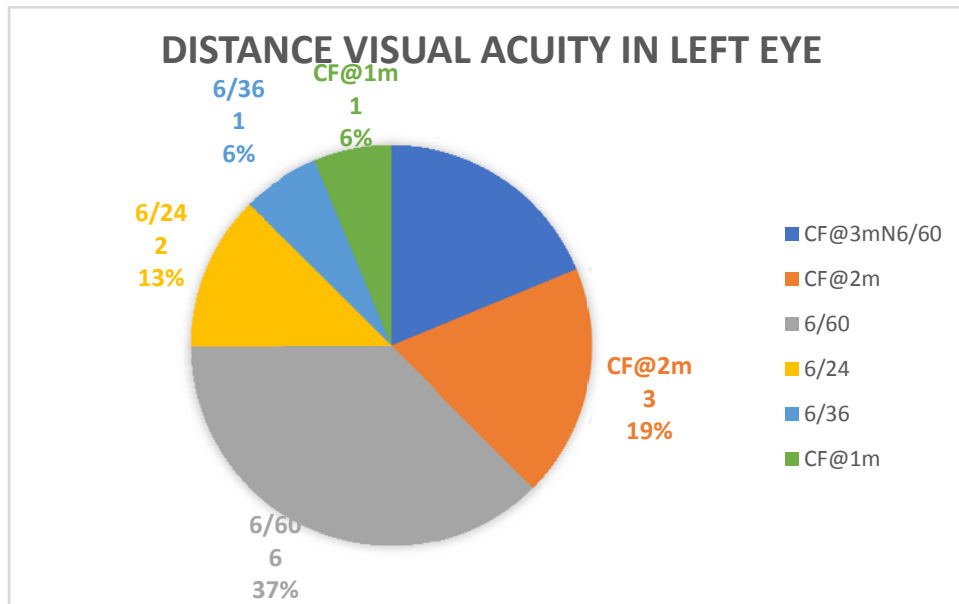


**Table: 4(A)**

Number of Patients	Visual Acuity of right eye affected with FTMH
2	6/36
1	<a href="#">CF@3m&lt;6/60</a>
1	<a href="#">CF@1/2m</a>

According to this study, all FTMH patients affected in right eye have decreased visual acuity; in which, 50% of patients have visual acuity of 6/36 and rest 50% have CF (Counting Finger) vision which gives idea of patients Facing difficulties on seeing street signs, roads, bus numbers, etc.

**Graph 4(B): This graph shows the distance visual acuity in left eye**



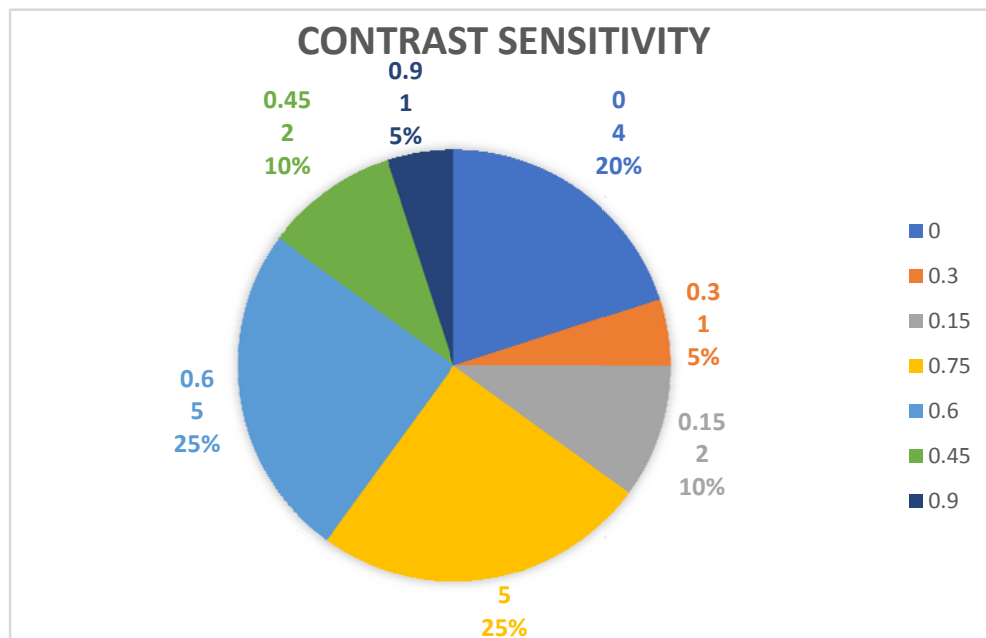


**Table 4(B):**

Number of Patients	Visual Acuity of left eye affected with FTMH
3	<a href="#">CF@3m&lt;6/60</a>
3	<a href="#">CF@2m</a>
6	6/60
2	6/24
1	6/36
1	<a href="#">CF@1m</a>

According to the study, patients having FTMH in left eye, has majority of the patients; 37% had the visual acuity of 6/60, 19% had the visual acuity of cf@3m<6/60,19% had the visual acuity of cf@2m,13% had the visual acuity of 6/24,6% had visual acuity of 6/36 and 6% had visual acuity of cf@1m.

**Graph 5: This graph explains the contrast sensitivity in patients with FTMH**

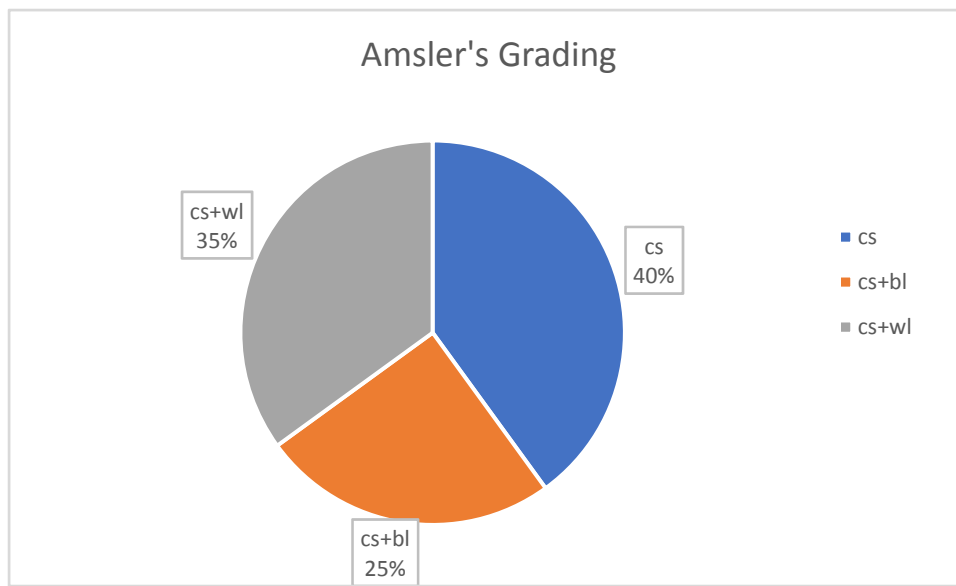


**Table 5:**

<b>Number of Patients</b>	<b>Contrast Sensitivity</b>
<b>4</b>	<b>0</b>
<b>1</b>	<b>0.3</b>
<b>2</b>	<b>0.15</b>
<b>5</b>	<b>0.75</b>
<b>5</b>	<b>0.6</b>
<b>2</b>	<b>0.45</b>
<b>1</b>	<b>0.9</b>

According to the study, out of 20 patients 5 patients had contrast sensitivity score of 0.75, 5 patients had the contrast sensitivity score of 0.60, 2 patients had the contrast sensitivity score of 0.15, 2 patients had score of 0.45, 4 patients had the score of 0 and remaining patients had contrast sensitivity score of 0.90.

**Graph 6: This graph shows the Amsler's grading in percentage**



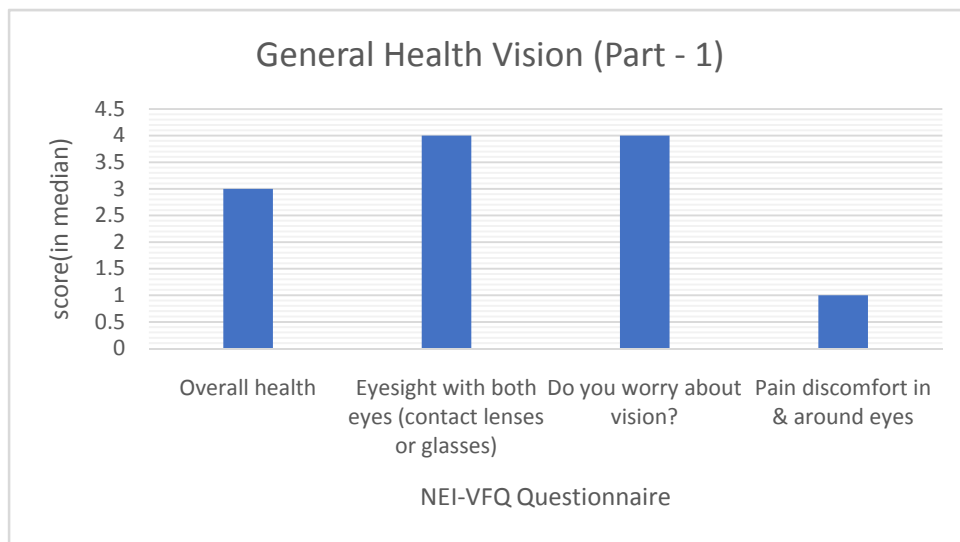
**Table 6:**

Number of Patients	Amsler's Grading
8	CS
5	CS+BL
7	CS+WL

Out of 20 patients 40% of patients are affected by central scotoma (CS), 35% of patients are affected by central scotoma with wavy lines(CS+WL) and 25% of patients are affected by central scotoma with broken lines (CS+BL).

**Graph7:**

This graph explains the overall health of the patients, eye sight (contact lens or glasses), worrying about the vision and pain and discomfort In and around the eyes



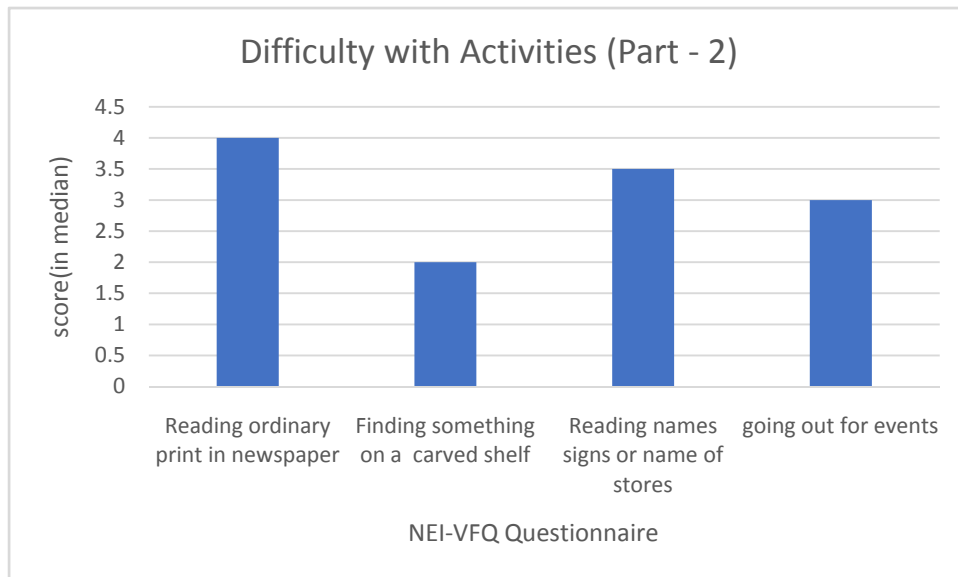
**Table 7:**

General Health Vision (Part - 1)	Overall health	3
	Eyesight with both eyes (contact lenses or glasses)	4
	Do you worry about vision?	4
	Pain discomfort in & around eyes	1

In this study, out of 20 patients, majority of the patients were having difficulty in vision (with contact lens or glasses) and worried about their vision. Few of them were having pain and discomfort in and around the eyes.

**Graph 8:**

This graph explains difficulty in daily activities:



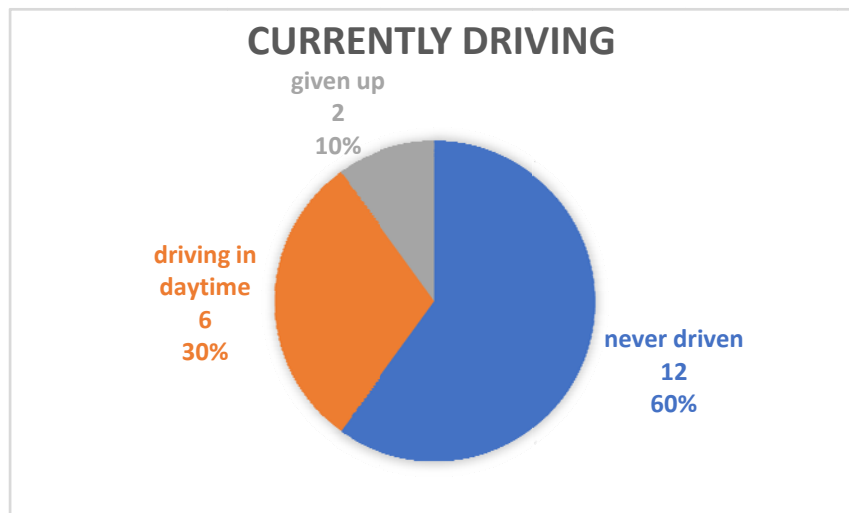
**Table 8:**

Difficulties in activity (Part - 2)	Reading ordinary print in newspaper	4
	Finding something on a crowded shelf	2
	Reading names signs or name of stores	3.5
	Going out for events	3

According to the current study, majority of the patients were having the difficulty reading in near and distance. Some patients had the difficulty in going out for events and few of them had difficulty of finding something in crowded shelf.

**Graph 9:**

This graph explains difficulty in driving:



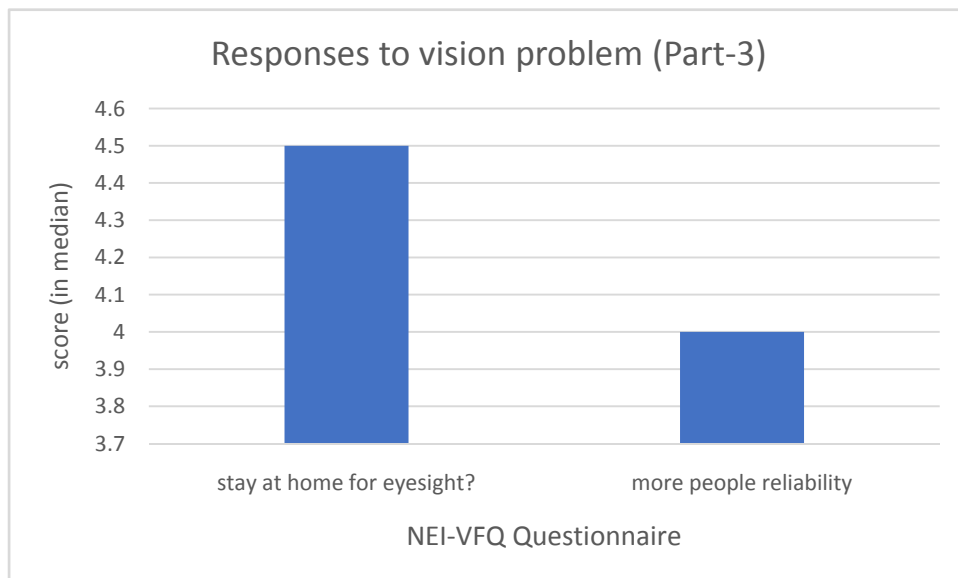
**Table 9:**

<b>Number of Patients</b>	<b>Currently Driving</b>
<b>12</b>	never driven
<b>6</b>	driving in daytime
<b>2</b>	given up

According to the study 60% of patients have never driven the car, 30% of patients were having the difficulty in driving in the day time and 10% of the patients had gave up their driving just because of the eye problem.

**Graph 10:**

This graph shows the responses of vision problem



**Table: 10**

Responses to vision problem (Part-3)	Stay at home due to eyesight?	4.5
	More people reliability	4

According to the study, out of 20 patients, majority of the patients stay at home due to their eye problems and some patients have more people reliability.

**Discussion:**

The retina is the light-sensitive film at the back of the eye. In the centre is the macula – the part responsible for central and fine-detail vision needed for tasks such as reading. In the early stages, a full thickness macular hole can cause blurred and distorted vision. Straight lines may look wavy or bowed, and you may have trouble reading small print.

Patients having FTMH had difficulty in reading in distance and near, difficulty in driving, difficulty for going out for events, difficulty in climbing up the stairs, difficulty to perform day to day activities.

In the current study, all 20 patients (16 women and 4 men; mean age, 59 years) with full thickness macular holes (FTMH), had unilateral involvement. Patients diagnosed with FTMH, functional improvement in visual acuity, contrast

sensitivity, colour vision remains unsatisfactory as well as health related quality of life remain unsatisfactory. The current study shows that there was Decrease in visual acuity, severity of Metamorphosis, drop in contrast sensitivity and normal colour vision and binocularity is also affected.

NEI-VFQs questionnaire study suggests that there was reduced quality of life because of full thickness macular hole. The VFQ-25 comprises of 25 items where in patients are expected to assess the level of difficulty to visual symptoms or day-to-day activities. Each item is assigned to one of the 12 subscales: General health, General vision, Ocular pain, Near activities, Distance activities, Social functioning, Mental health, Role difficulties, Dependency, Driving, Colour vision, Peripheral vision.

TaiichiHikichi (MD), Clement L Trempe (MD) studied on 169 of 149 patients with FTMH to ascertain the risk factors of enlargement of the hole and subsequent decrease of visual acuity. They found that visual acuity decreased by 2 or more Snellen's lines. According to the current study, out of 20 patients with FTMH there was decreased visual acuity in all patients which correlates with the current study.



Sunanda Mitra studied on contrast sensitivity in which, sensitivity functions were evaluated in 30 patients with macular disease; out of which 18 patients had FTMH which resulted that there was loss in contrast sensitivity in the central visual field. According to the current study also, out of 20 patients having FTMH, contrast sensitivity was dropped in all 20 patients.

Kristian Kroyer, Ulrich Christensen studied that metamorphopsia is present in FTMH patients. According to the current study broken lines, wavy lines, and central scotoma had also been noticed which is the types of metamorphopsia.

To summarize the current study quantitatively indicated all 20 patients had unilateral involvement. 80% of patients had FTMH in Left eye. Out of 20 patients examined 80% were female patients, most of them (50%) in the age group of 51-60 years. Metamorphopsia is an important factor not only in visual functioning, but also in the subjective visual function in patients with FTMH.

The difficulties in visual ability will directly have an impact on daily living activities. Early intervention of macular hole is very important to prevent impact on macular part which indirectly protect the residual vision and maintain their quality of life. From the current study as well as from the literatures, it has been clear that FTMH occurs in older age group. These age groups are highly dependent on their vision solely as these life stages are such that they have to

work by their own and passes their time with the help of watching TV, reading books or novels and roam around alone. As because of their visual functions affected, their independency has been stolen and person will become visually handicap. So, early detection of this disease is very important to protect their residual vision as well as their quality of life after surgery.

Limitations of this study is sample size is limited.

### **Conclusion:**

Primary health-care providers play an important role in early detection and referral of patients with FTMH. FTMH is a complicated condition and its visual prognosis depends on multiple factors. However, early surgical intervention has been documented to have high success rate and therefore better visual outcome when compared to late intervention. Delay in detection and referral may lead to visual disability and thus impairment of the patient's quality of life.

### **Awareness regarding macular hole**

- If anyone have blurred or distorted vision, or there's a black spot in the centre of vision, visit ophthalmologist as soon as possible.
- If anyone have a macular hole and that don't seek help, then central vision will probably get gradually worse.

- Relatively early treatment (within months) may give a better outcome in terms of improvement in vision.
- Sometimes hole may close and heal by itself, so ophthalmologist may want to monitor it before recommending treatment.

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