Treatment and management of “open angle glaucoma” among patients from various hospitals of Lahore

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Abstract: Glaucoma is an eye disease in which the optic nerve is damaged in a characteristic pattern. This can permanently damage vision in the affected eye and lead to blindness if left untreated. The study aimed to observe patient compliance with prescribed drug regimen in open angle glaucoma and its management. A descriptive study was conducted using a structured questionnaire on a sample of 100 patients using convenient sampling technique.It was concluded that open angle glaucoma is an irreversible disease; it can be treated to prevent further vision loss by using different medications but can not be treated completely to get normal vision.

Key words: Open angle glaucoma, Intraoccular pressure, Optic nerve, Blindness

Introduction

Glaucoma is an eye disease in which the optic nerve is damaged in a characteristic pattern. This can permanently damage vision in the affected eye and lead to blindness if left untreated. It is normally associated with increased fluid pressure in the eye [1].

Glaucoma is a global health problem expected to affect 60.5 million people by 2010 [2].Glaucoma affects individuals through the full age span. It is estimated that up to two-third of people with glaucoma are undetected. Once established, glaucoma is progressive and usually relentless, and the damage to the eyes irreversible [3].

Open angle glaucoma is a chronic, age-related optic neuropathy characterized by at least one eye having a defined visual field abnormality combined with an optic disc appearance compatible with the functional loss. It occurs in persons whose eyes have no visible reason for fluid obstruction through the trabecular meshwork by gonioscopy [4].Open-angle glaucoma is the most common type of glaucoma. It is among the most prevailing eye diseases. Once diagnosed it should be treated instantaneously as if delayed it can lead to blindness. Globally, glaucoma is the second leading cause of blindness according to the World Health Organization.

Open angle glaucoma affects the optic nerve and involves slowly progressing visual field defects. The disease is defined as an optic nerve disorder that usually follows a slowly progressive course and where elevated intraocular pressure is the most important risk factor for developing a visual disability [5]. As intraoccular pressure increases, the pressure pushes harder against the nerve fibers of the optic nerve, which transmits images to the brain. This increased pressure reduces the blood supply to the optic nerve, depriving it of oxygen and nutrients. Over time, high eye pressure can cause irreversible optic nerve damage and vision loss [6].

Primary open-angle glaucoma is described distinctly as a multifactorial optic neuropathy that is chronic and progressive, with a characteristic acquired loss of optic nerve fibers. Such loss develops in the presence of open anterior chamber angles, characteristic visual field abnormalities, and intraocular pressure that is too high for the continued health of the eye. It manifests by cupping and atrophy of the optic disc in the absence of other known causes of glaucomatous disease [7],[8].Improvements in therapy of primary open-angle glaucoma consist of more effective and better-tolerated drugs to lower intraocular pressure, and more effective surgical procedures. New treatments to directly treat and protect the retinal ganglion cells that are damaged in glaucoma are also in development [9].

Secondary open angle glaucoma can be caused by a variety of substances that mechanically block the outflow of aqueous humour through the anterior chamber angle, resulting in an elevation of intraocular pressure. These substances include pigment, exfoliation material, and red blood cells. Secondary open angle glaucoma can also result from alterations in the structure and function of the trabecular meshwork, due to trauma, inflammation, and ischemia. In

secondary open angle glaucoma, elevated intraocular pressure causes progressive typical glaucomatous optic neuropathy and visual field loss. In several forms of secondary glaucoma path mechanisms leading to both secondary open angle and angle closure glaucoma are combined, in each case individual evaluation is necessary [10].

Angle closure glaucoma is less common than open angle glaucoma. It also differs in that symptoms begin in a sudden, violent attack. In angle closure glaucoma, the fluid at the front of the eye cannot reach the angle and leave the eye. The angle gets blocked by part of the iris. People with this glaucoma type have a sudden increase in eye pressure. Symptoms include severe pain and nausea, as well as redness of the eye and blurred vision [11].

Several secondary causes of glaucoma must be considered before diagnosing primary open angle glaucoma. These causes include: exfoliation syndrome, pigment dispersion syndrome (pigmentary glaucoma), Lens-induced glaucoma, ocular inflammatory diseases, intraocular tumors, raised episcleral venous pressure, topical or systemic corticosteroid use syndromes (e.g, Axenfeld-Rieger syndrome) [12]. There are typically no early warning signs or painful symptoms of open-angle glaucoma. It develops slowly and sometimes without noticeable sight loss for many years. Most people who have open-angle glaucoma feel fine and do not notice a change in their vision at first because the initial loss of vision is of side or peripheral vision, and the visual acuity or sharpness of vision is maintained until late in the disease [13],[14].The most important risk factors include: age, elevated eye pressure, African ancestry, thin cornea, and family history of glaucoma, nearsightedness, past injuries to the eyes, steroid use, and a history of severe anemia or shock [15].

The goal of treatment is to reduce eye pressure. Treatment depends on the type of glaucoma. In case of open-angle glaucoma, eye drops are mostly given, may be of more than one type. Most people can be treated successfully with eye drops. Most of the eye drops used today have fewer side effects than those used in the past. Pills may also be given to lower pressure in the eye. Other treatments may involve the laser therapy called an iridotomy and eye surgery if other treatments do not work. Acute angle-closure attack is a medical emergency. Blindness will occur in a few days if it is not treated. In case of angle-closure glaucoma, eye drops or medicines can be given to lower eye pressure, given by mouth and through a vein[16].

Current medical therapy for primary open-angle glaucoma is limited towards lowering intraocular pressure. The ideal drug for treatment of primary open-angle glaucoma should effectively lower intraocular pressure, have no side effects, and be inexpensive with once-a-day dosing; however, no medicine possesses all of the above. When choosing a medicine ophthalmologist prioritizes these qualities based on specific needs. Medicines are classified according to their chemical makeup and how they affect the eye. For primary open-angle glaucoma, the major drug classes include: alpha-agonists, beta-blockers, carbonic anhydrase inhibitors, miotics and prostaglandin analogs [17].

Alpha-agonists, beta-blockers, and carbonic anhydrase inhibitors reduce the amount of fluid (aqueous humor) in the eye, whereas prostaglandin analogs and miotics increase the outflow of aqueous humor from the eye. These medicated eye drops are prescribed to help lower increased intraocular pressure. Sometimes, more than one medicine is needed. Initially, ophthalmologist might have used the eye drops in only one eye to see how effective the drug is in lowering the pressure inside eye [18].Intraocular pressure can be lowered with medication, usually eye drops. Several different classes of medications are used to treat glaucoma, with several different medications in each class. Each of these medicines may have local and systemic side effects. Adherence to medication protocol can be confusing and expensive; if side effects occur, the patient must be willing either to tolerate these, or to communicate with the treating physician to improve the drug regimen. Initially, glaucoma drops may reasonably be started in either one or in both eyes[19].

Once a medicine is prescribed, regular follow-up visits are required. The first follow-up visit is usually 3-4 weeks after beginning the medicine. Pressures are checked to ensure the drug is helping to lower intraocular pressure. If the drug is working and is not causing any side effects, then it is continued and patient is reevaluated 2-4 months later. Generally, if the pressure inside the eye cannot be lowered with 1-2 medicines, surgery may be necessary [20].To decrease aqueous production, a nonspecific beta-blocker eye drop such as levobunolol was, until recently, the first drug class to be chosen. Levobunolol is the least expensive agent and often can be used once daily. If

the patient is already taking a systemic beta blocker, the physician should consider using another class of eye drops; because systemic beta-blocker therapy may reduce the ocular hypotensive effects of beta-blocker eye drops. Physicians should avoid using beta-blocker eye drops in patients with reactive airway disease, cardiac conduction defects, or heart failure. Systemic absorption of these eye drops can cause bradycardia, bronchospasm, and even fatalities from bronchospasm in patients with asthma and heart conditions, Betaxolol is a relatively selective beta-blocker eye drop. Betaxolol may have a lower risk of systemic side effects, especially pulmonary, than the nonspecific beta blockers [21].

Several classes of eye drops increase the aqueous outflow. Latanoprost (Xalatan), a topical prostaglandin analog, is now the most frequently prescribed glaucoma medication in the world. The U.S. Food and Drug Administration recently approved latanoprost as a once-daily eye drop for the initial treatment of elevated intraocular pressure associated with open-angle glaucoma or ocular hypertension because it proved beneficial in randomized studies [22]. The goals of pharmacotherapy are to reduce intraocular pressure and morbidity and to prevent complications. The goal of therapy with intraocular pressure-lowering medications is for a reduction of at least 30%. Nonselective beta-blockers (e.g., timolol maleate, levobunolol) are controversial because as visual-field progression is possibly due to secondary aggravated nocturnal arterial hypotension [23].

The objectives of this study are to observe patient compliance with prescribed drug regimen in open angle glaucoma, to counsel and educate the patients about possible complications in open angle glaucoma and to study the management of open angle glaucoma in different hospitals.

Materials and methods

Study design:

A descriptive study was conducted using a structured questionnaire during June-2015 to August 2015, in different hospitals of Lahore.

Inclusion andExclusion criteria:

The target population was the patients undergoing open angle glaucoma including men and women above 40 years of age. All patients suffering from other types of glaucoma were excluded from the study.

Data collection and analysis

Data was collected from 100 patients, using convenient sampling technique. A data collection form was developed to obtain patient history, patient complaints regarding management of disease. Data collected was analyzed &presented in the form of graphs.

Results and discussions

Results showed that in 10% of the patients glaucoma was diagnosed during routine check up while in 90% patients it was diagnosed as they felteye sight weakness(Fig: 1). 65% patients had family history of disease while 35% not (Fig: 2). 70% of the patients were taking treatment from last one month, 25% from 2 months and only 5% from more than 2 months (Fig: 3). 95% of the patients had unilateral while only 5% had bilateral open angle glaucoma (Fig: 4). Results further showed that35% of the patients had near vision weakness, 40% had far vision weakness while 25% had both types of weakness(Fig: 5). 90% of the patients had headache while 10% had not(Fig: 6). 75% of the patients were using glasses while 25% were not using(Fig: 7). 52 % patients have experienced vision loss during treatment, 30% no loss while 28% lost to some extent (Fig: 8). 90% of the patients were getting medication, 6% laser while only 4% surgery as treatment (Fig: 9).

Results further showed that 44% of the patients were prescribed Timoptol, 23% Xalatane, 20% Cosopit and 13% Betagan(Fig: 10). Among oral medications, 45% were taking Acemox, 30% Diamox while 25% Timorax-D (Fig: 11). None of the patients had allergy with drops(Fig: 12). As far as side effects with drops were concerned, 20% had Itching, 20% had Watering, 10% had redness, while 60% had no side effects(Fig: 13). Patients compliance showed that only 10% of the patients improved their health status (Fig: 14).

Open angle glaucoma typically occurs in patients over the age of 50, and the risk increases with age. The weakness of eye sight is more experienced as the age progresses. For example the Framingham eye study demonstrated age-stratified prevalence estimated to be 1.2% between 50 and 64 years, 2.3% from 65 to 74yrs and 3.5% in 75yrs and above [24].

Annual incidence rates in Caucasian populations have been estimated to be between 0.15 and 0.25% and strongly suggest that incidence increases with age [25].

Foster et al. (2002) suggested that fifty-six patients with either open-angle or low-tension glaucoma who were concurrently taking calcium channel blockers were compared to similar groups not taking such medications for a mean follow-up period of 3-4 years [10]. While Coffey et al. suggested that serial stereoscopic optic nerve photographs and visual fields of all patients were evaluated for evidence of glaucomatous progression [26].

In patients with low-tension glaucoma, there was a significant difference in the progression of visual field defects, with only two of 18 eyes (11%) of patients taking calcium channel blockers, compared to ten of 18 eyes (56%) of controls showing new visual field defects [27].

Similarly, low-tension glaucoma patients taking calcium channel blocker therapy demonstrated no evidence of progressive optic nerve damage, compared to eight of 18 control eyes (44%). In contrast, patients with open angle glaucoma taking calcium channel blockers showed no marked difference in the progression of glaucoma, compared to controls [10].

Netland and Chaturvedi suggested that calcium channel blockers may be useful in the management of low-tension glaucoma [28].

Conclusion

From the present study it is concluded that, at earlier stages of glaucoma there are no marked symptoms. Five classes of medications are used alone or in combination to fight this disease: prostaglandin analogs i.e; latanoprost , bimatoprost and travoprost , topical beta-adrenergic receptor antagonists such as timolol, levobunolol and betaxolol, alpha2-adrenergic agonists such as brimonidine , less-selective alpha agonists, (epinephrine) miotic agents (parasympathomimetics) such as pilocarpine, carbonic anhydrase inhibitors such as dorzolamide and acetazolamide and physostigmine. Most of the people have no problem in administering the drug once a day. Moreover, it was concluded that open angle glaucoma is an irreversible disease; it can be treated to prevent further vision loss by using different medications but can not be treated completely to get normal

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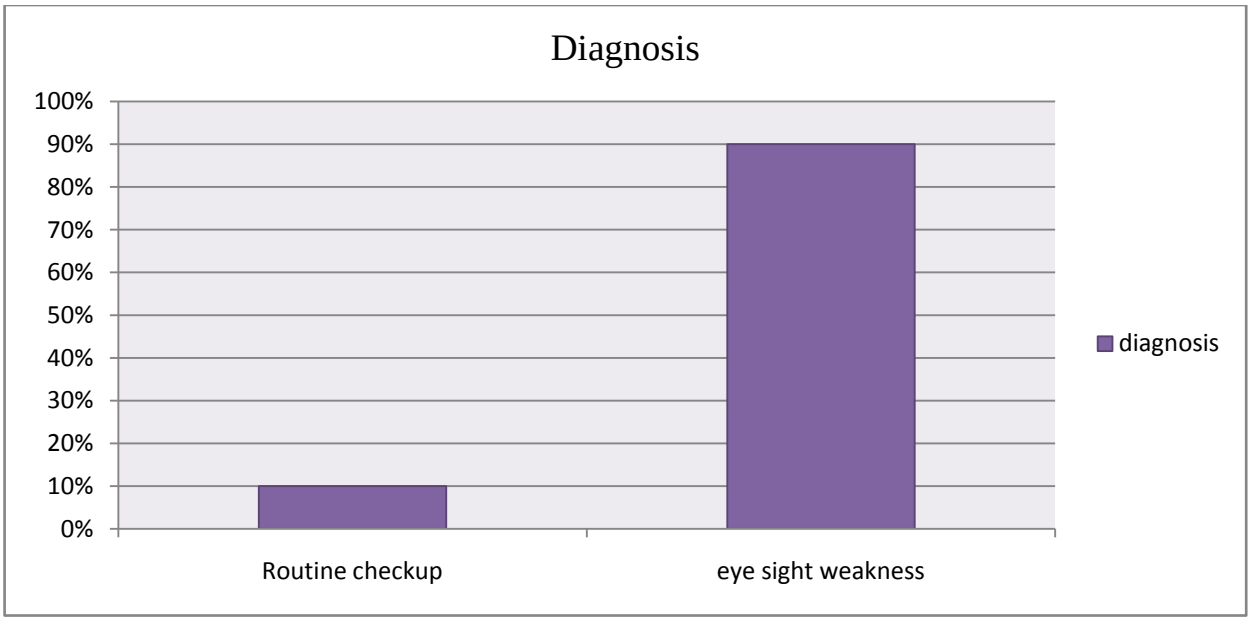

Figure:1 Most of patients have experienced eye sight weakness in open angle glaucoma**.**

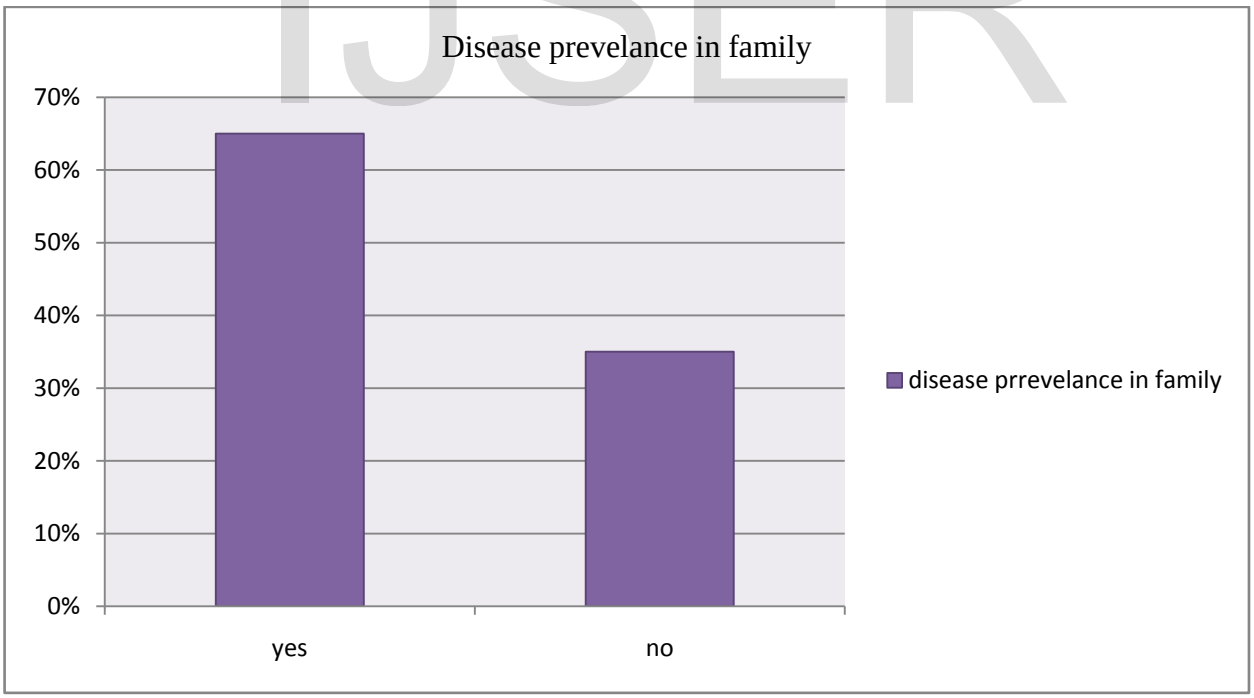

Figure: 2 Mostly patients have disease in their family.

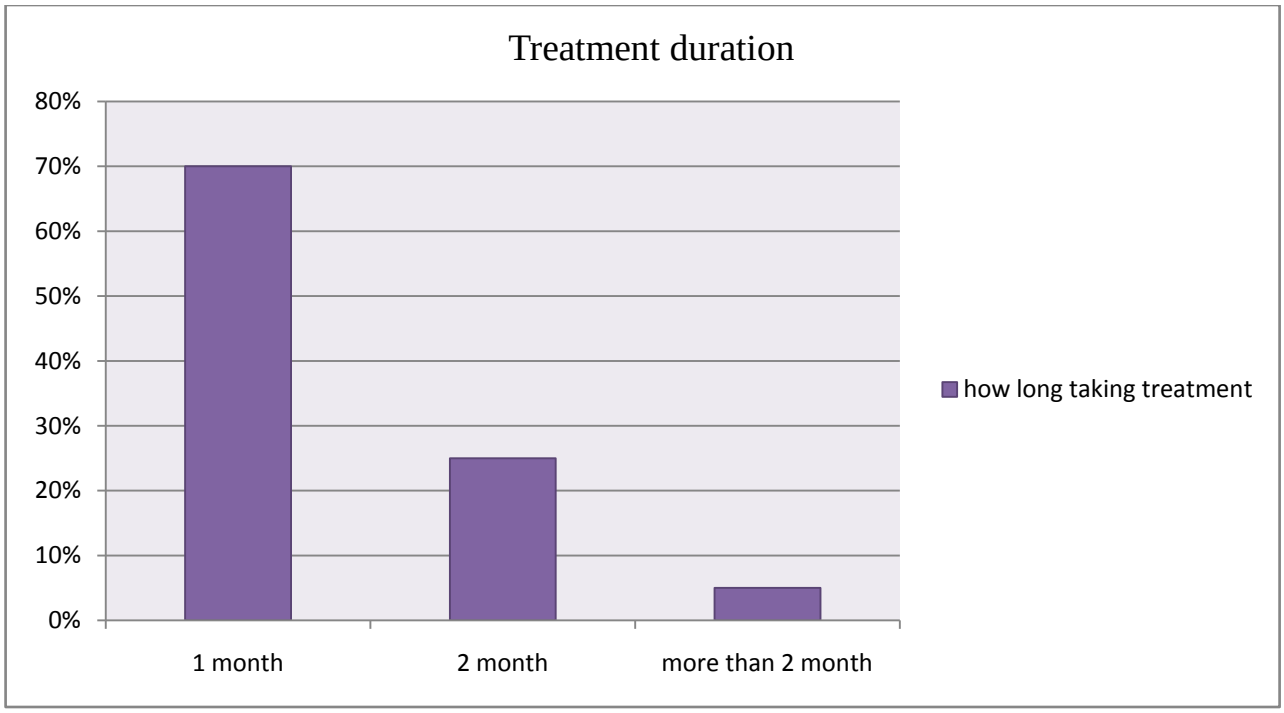

Figure: 3 Mostly patients were taking treatment from 1 month.

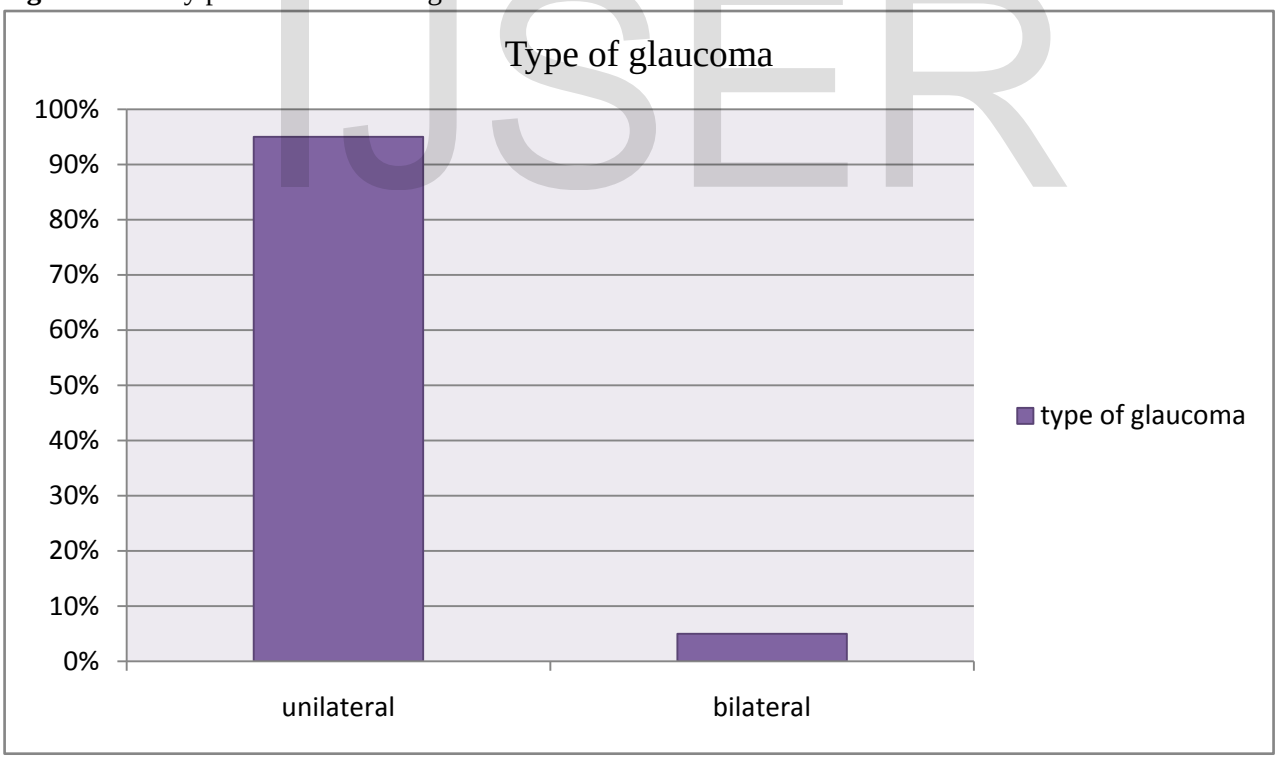

Figure: 495% patients were having unilateral open angle glaucoma.

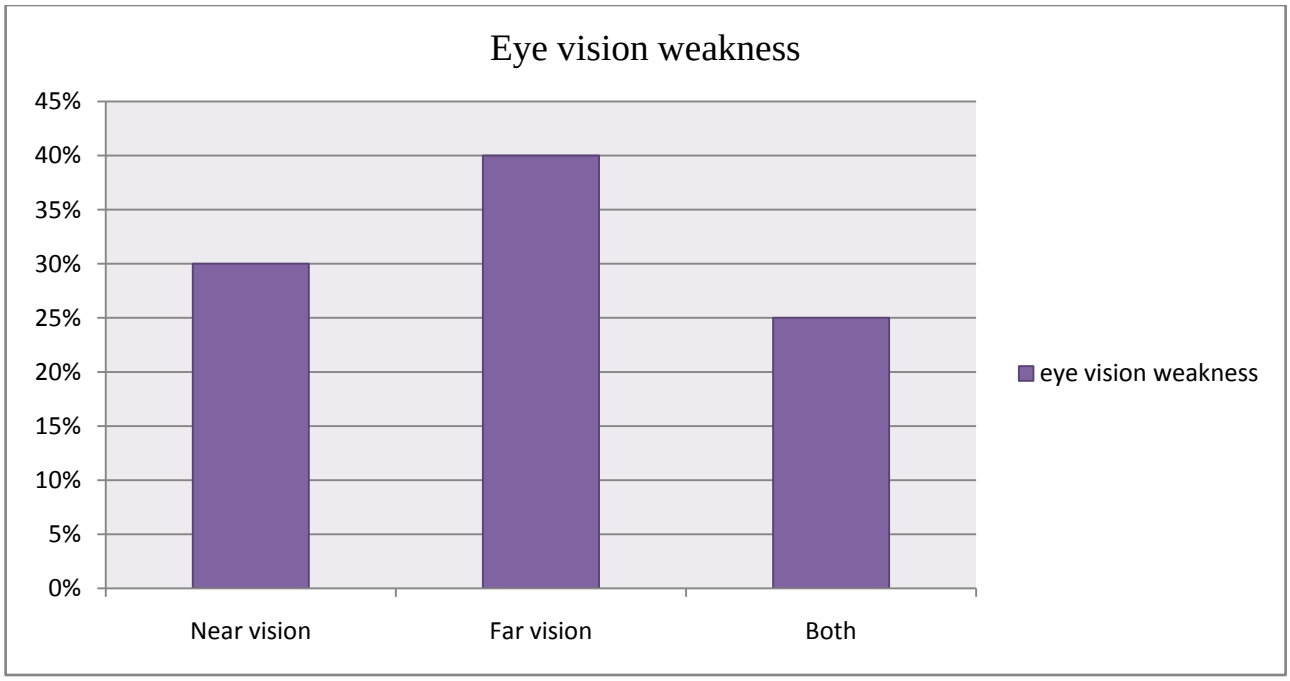

Figure:540% patients were having far vision weakness.

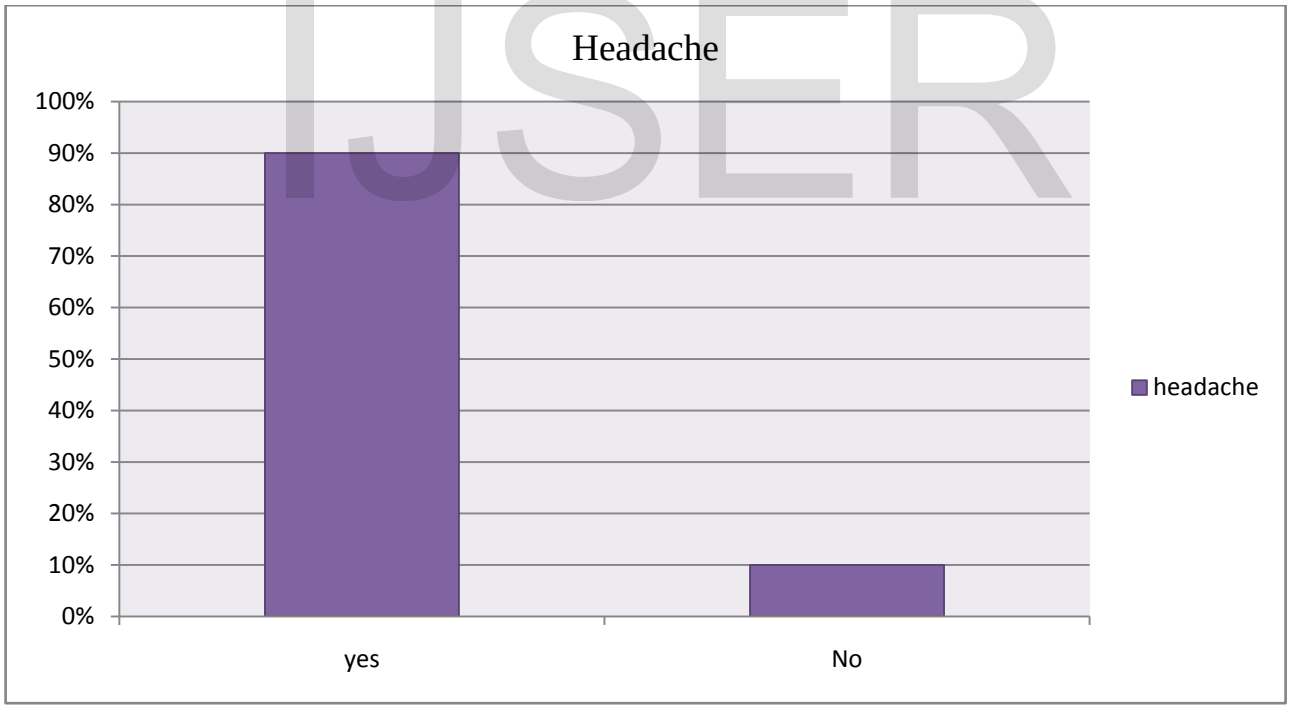

Figure: 690 % patients were having headache in open angle glaucoma.

Figure: 7 75% patients were using glasses.

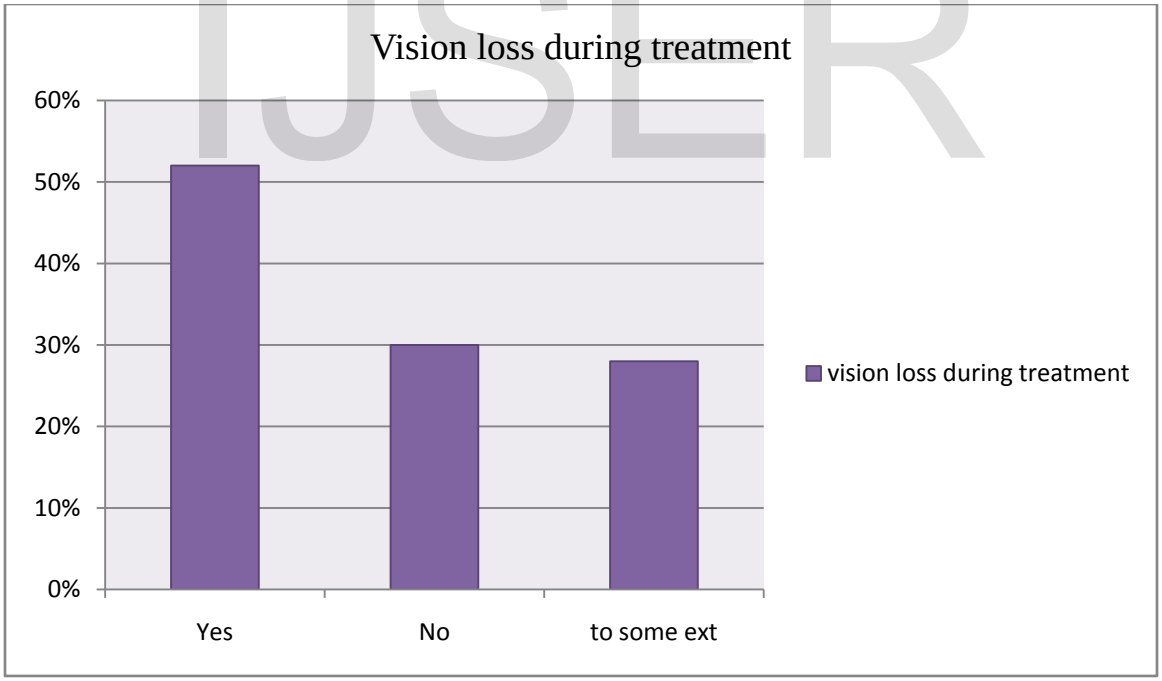

Figure: 8 52 % patients have experienced vision loss during treatment.

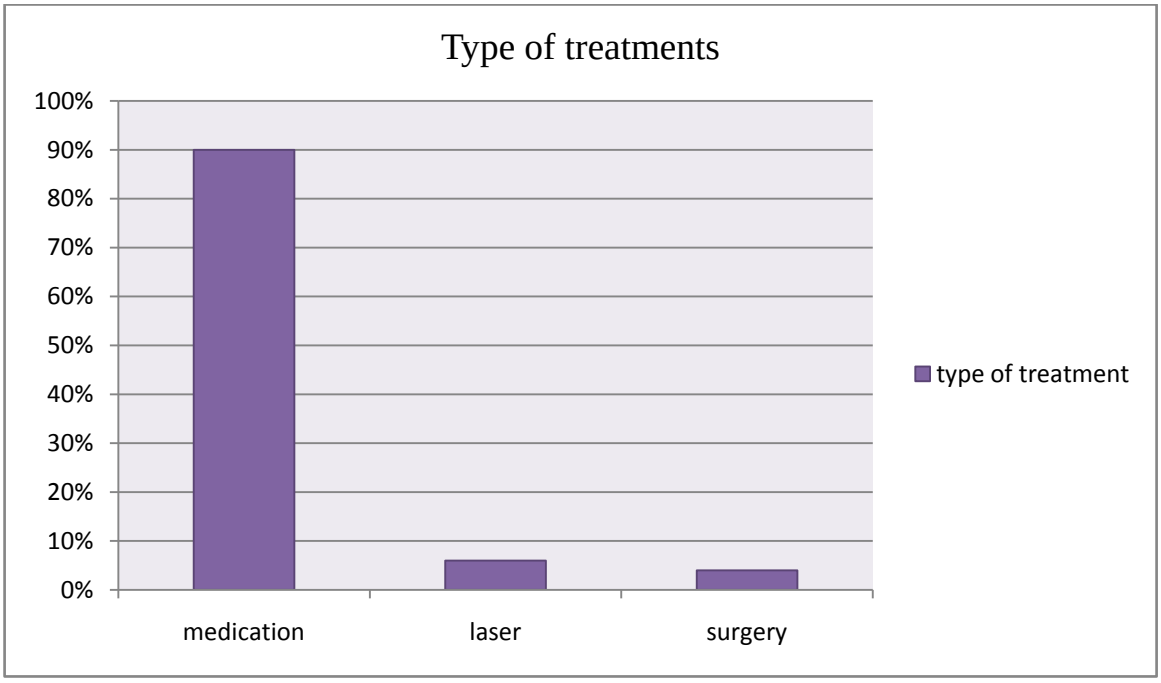

Figure: 9 90% patients were treated with medication.

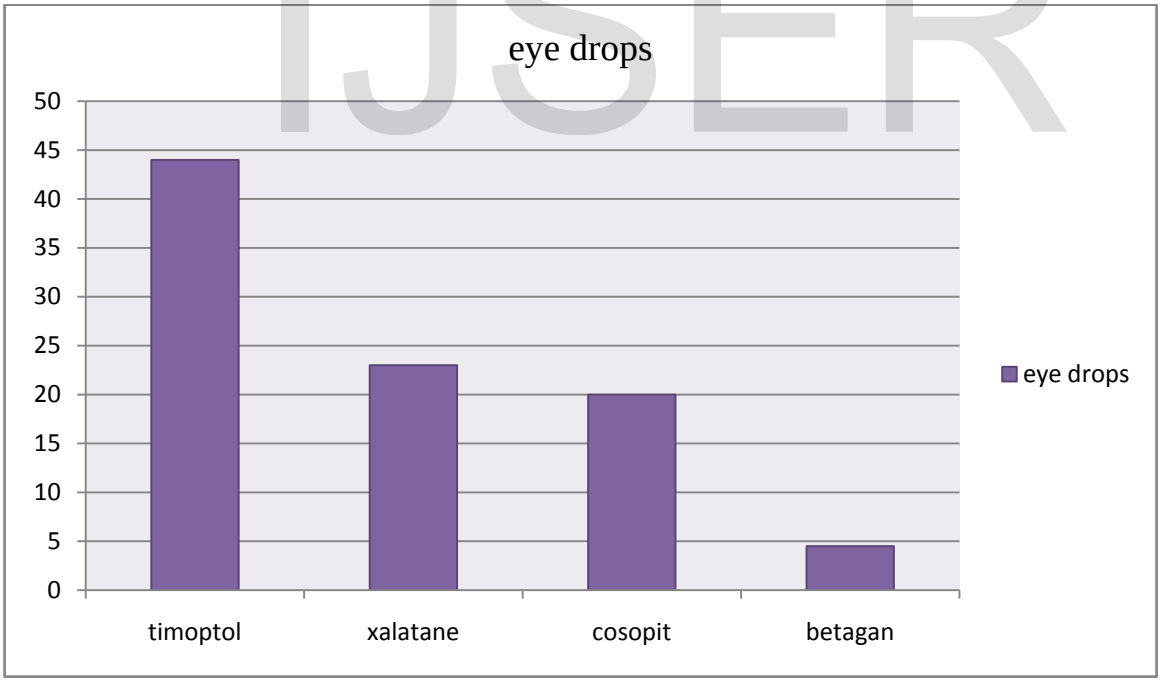

Figure: 10 Tiomolol eye drops were mostly used by the patients.

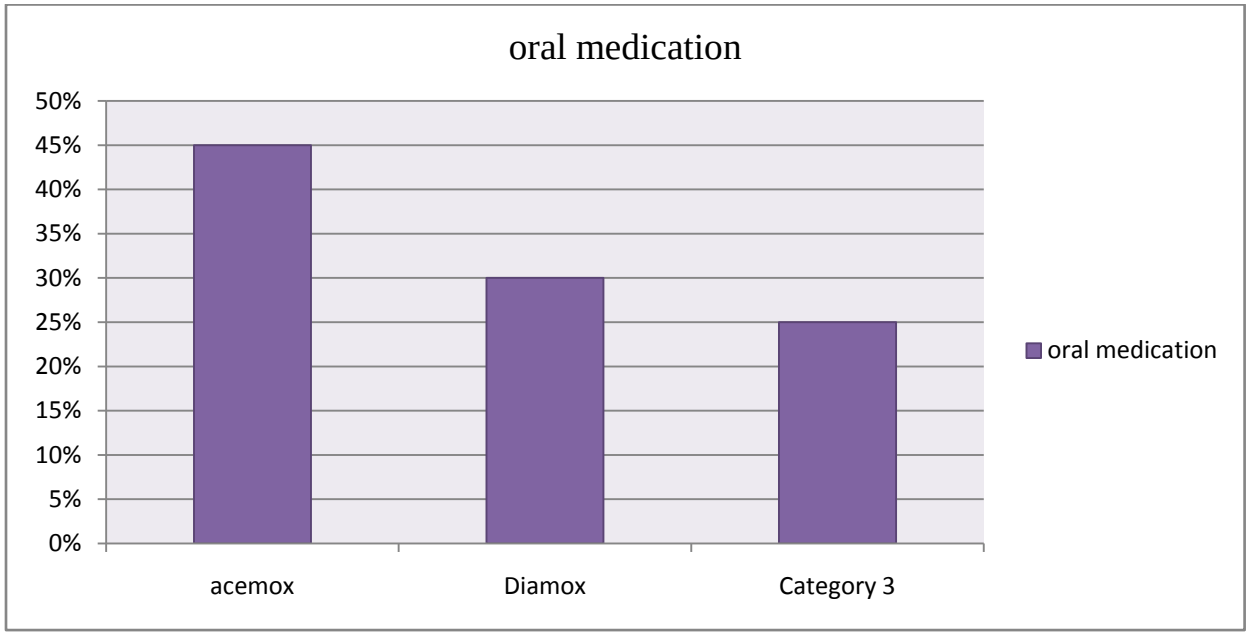

Figure: 11 Acemox medication was used by most of the patients.

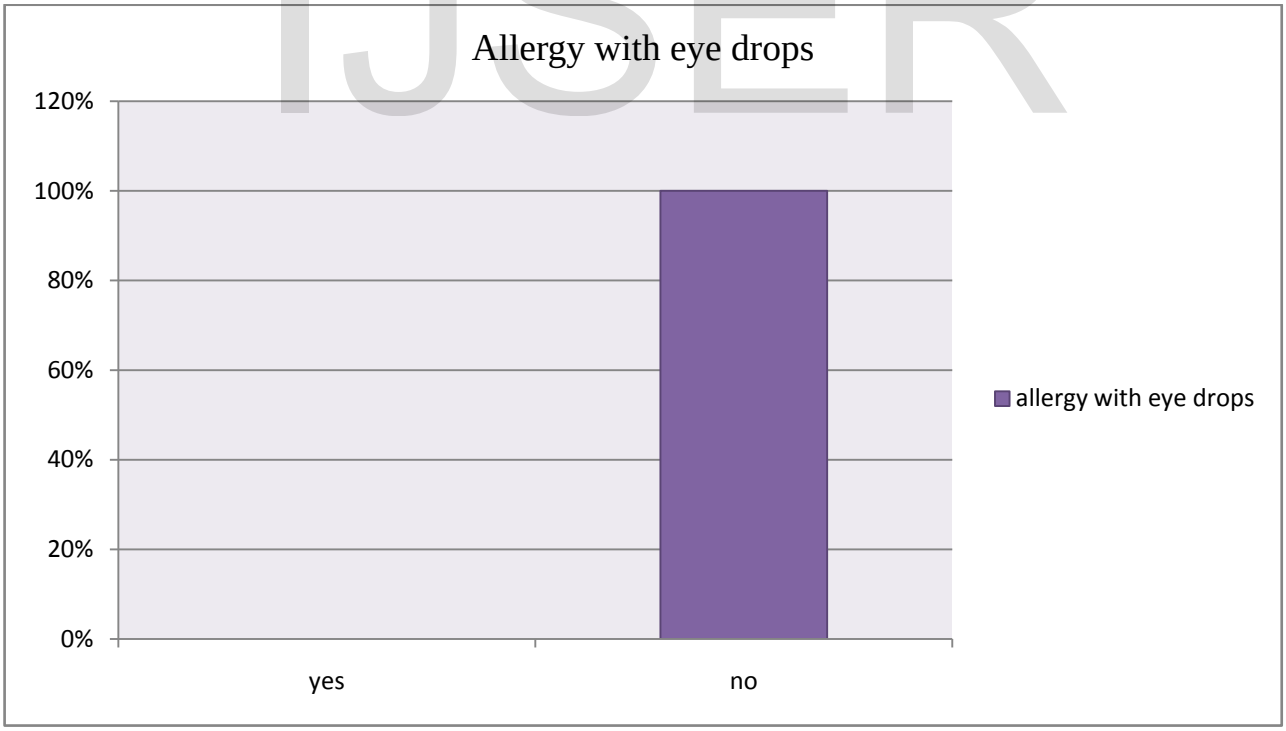

Figure: 12 None of the patients experienced any allergy with any eye drops.

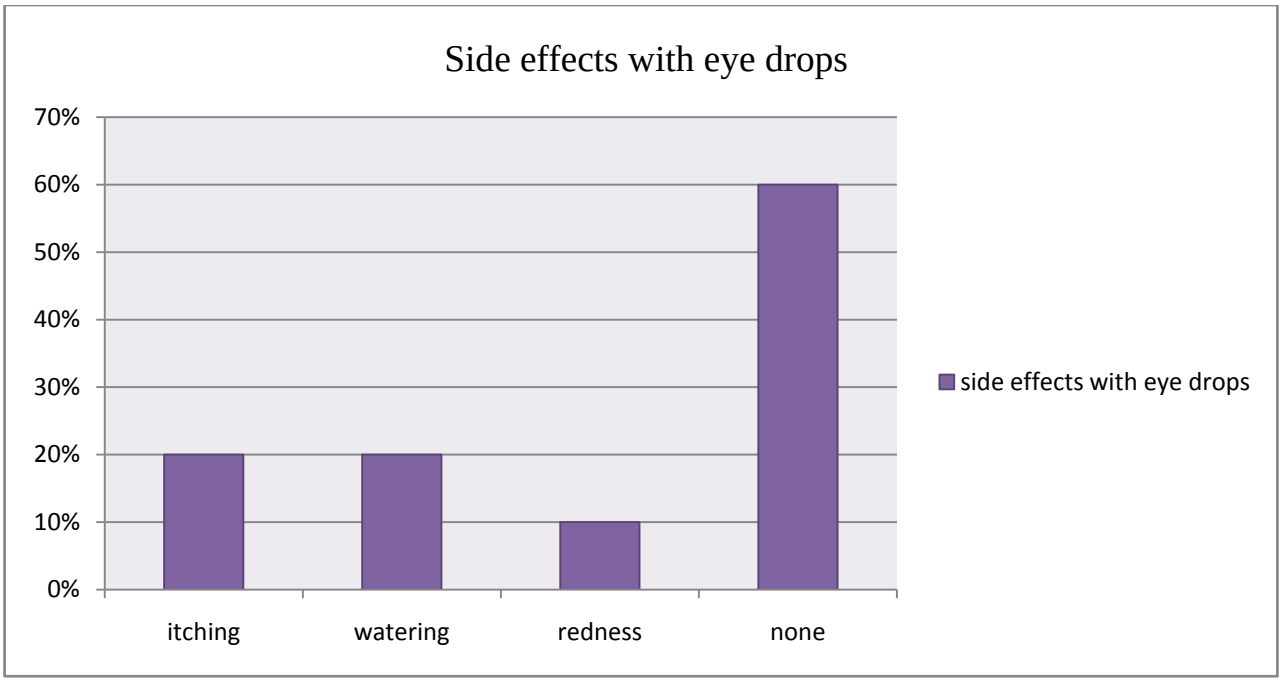

Figure: 13 Mostly patients were having no side effects.

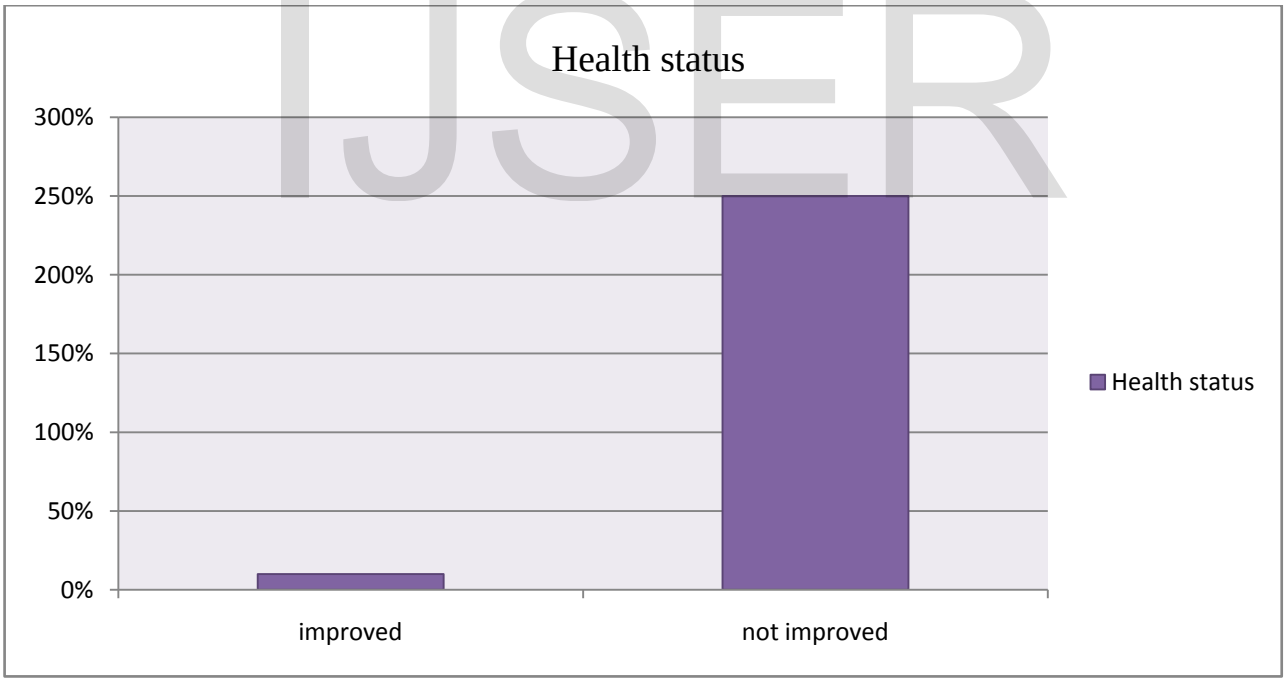

Figure: 1490% patients were having no improvement.