

Factors predisposing to rhegmatogenous retinal detachment among Ethiopians

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Abstract

Aim: To determine and describe the causes and risk factors predisposing Ethiopian patients to rhegmatogenous retinal detachment (RRD).

Methods: A retrospective study of all patients with RRD seen at the retina clinic of Menilik II Hospital, Addis Ababa, from April 1999 to October 2003 was done. Charts of patients with the diagnosis of RRD were collected and data were filled on structured questionnaires and analyzed using EPI INFO 6 software.

Results: Data were available for 276 patients (305 eyes) in whom the diagnosis of RRD was made. Age of patients ranged from 7-85 years; mean age was 41 and median was 40 years. Hundred-eighty-eight [68%] of the patients were males and 88 [32%] were females with male-to-female ratio of 2.1:1. Myopia was the predisposing factor for RRD in 78 [28.3%] patients of which 63 had myopia of $\geq 5D$. In 57 [20.7%] patients with RRD, there was a history of ocular trauma. Thirty-nine [14.2%] patients had had cataract surgery with lens implantation and 21 [7.6%] patients were surgically aphakic. Macula-off RRD was seen in 225 [73.8%] eyes. Bilateral RRD was seen in 29 [10.5%] patients.

Conclusion: The study showed that myopia, ocular trauma, pseudophakia and aphakia in decreasing frequency were the main risk factors associated with RRD among Ethiopians attending a tertiary eye care centre. [*Ethiop. J. Health Dev.* 2011;25(1):31-34]

Introduction

Retinal diseases are the major causes of visual impairment in the western countries but may be less important in the developing world where vision loss from preventable causes like cataract and corneal scarring predominate. However, a population-based survey in India indicated that retinal diseases were the primary causes of blindness in a significant percentage [12.7%] of the studied population (1). In the United States (2, 3) and Europe (4, 5), an annual incidence of retinal diseases or retinal detachment (RD) between 6 to 12 per 100,000 population per year have been reported. Population-based surveys on the incidence of RD in developing countries are scarce (6) and little is known about the incidence of retinal detachment in Africa (7).

As the number of cataract extractions performed these days is increasing, it is clear that pseudophakic RD will also increase correspondingly. As a result, in developing countries like Ethiopia, where there is lack of optimal operating facilities and few vitreoretinal surgeons, blindness from retinal diseases like RD, diabetic retinopathies and age-related macular degeneration will increase unless a strategy is designed to increase the numbers and improve the set-ups of the existing facilities and also increase the number of trained professionals in the field of retina.

Despite significant number of patients with RD being seen each year in the existing eye care facilities, there are no population-based surveys or hospital studies done to know the prevalence and identify the causes and risk factors of RD among Ethiopian patients.

The purpose of this study is to identify and describe the risk factors that predispose Ethiopians to rhegmatogenous retinal detachment (RRD) at a tertiary eye care center in Addis Ababa. The study also proposes ways of reducing the incidence of RRD among the risk groups.

Methods

Using a retrospective, descriptive study, all charts of patients with the diagnosis of RRD seen at the retina clinic of Menelik II Hospital from April 1999 to October 2003 were collected from the chartroom and relevant points were extracted from each chart.

Menelik II Hospital is a tertiary teaching hospital situated in the capital, Addis Ababa. The eye department gives comprehensive eye care services to all patients with ocular diseases as to the limits of the available facilities in the hospital. Patients with ocular diseases come to the eye department directly and by also being referred from other hospitals in the city. Patients are also referred and come to the centre from all corners of the country as Menelik II Hospital is relatively well equipped and has got trained professionals at subspecialty levels. Menelik II Hospital is one of the very few centers where retinal detachment surgery is done at the time of the study.

As documented on patient charts, the clinical diagnosis of RRD was made based on patients' history and clinical findings. Indirect ophthalmoscope examinations were done and B-scan ultrasound was used when there was media opacity. In the charts of myopic patients with RRD, myopic fundus changes and measurements of axial lengths of the eyes using A-scan ultrasound were

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documented. High myopia was defined in this study as a refractive error requiring concave corrective glasses of 5 D or more or axial length of the eye more than 26 mm.

Other types of RD, namely tractional and exudative RD, were excluded from this study. All necessary information for the study was recorded from the retrieved charts on a structured questionnaire format.

Data were entered into a computer and analyzed using *EPI INFO 6* software program. Rates, proportions and percentages were calculated.

Results

Out of 328 patients with the diagnosis of RRD registered on the registry at the retina clinic, the charts of 276 patients [84.1%] were retrieved from the card room. Of the 276 patients, 188 [68%] were male and 88 [32%] were female making the male to female ratio 2.1:1. Their age ranged from 7 years to 85 years with a mean of 41 and a median of 40 years. Of the 276 patients, 247 [89.5%] had RRD (133 [48.2%] in the right eye and 114 [41.3%] in the left eye) and 29 patients [10.5%] were having bilateral RRD; thus totally there were 305 eyes affected with RRD. The demographic profile and clinical characteristics of the patients are shown in Table 1. The ages of patients were classified into three groups (young/adulthood/elderly) as each group more or less share similar potential risk factors for RD.

Table 1: Demographic profile and clinical characteristics of patients with rhegmatogenous retinal detachment

Characteristics	Frequency (n=276)*	Percent [%]
Age (years)		
<20	35	12.7
20-50	152	55.1
>50	89	32.2
Sex		
Male	188	68.0
Female	88	32.0
Laterality of RRD		
Right eye	133	48.2
Left eye	114	41.3
Bilateral	29	10.5
Macular status		
Macula-off	225	73.8
Macula-on	18	6.0
Undetermined	62	20.2

*n for macular status is 305 indicating the number of eyes.

Myopia of all severity was identified in 78 [28.3%] eyes of which 63 had myopia of 5D or more. History of blunt ocular trauma to the eye with RRD was documented on the charts of 57 [20.7%] patients. Thirty-nine [14.2%] eyes with RRD were pseudophakic and 21 [7.6%] eyes were surgically aphakic. In 81 [29.3%] patients with RRD, no causes or predisposing factors were identified (Table 2). Even though a combination of causes operating together was a possibility, history of ocular trauma was not jointly documented on the charts of myopic or pseudophakic/aphakic patients with RRD.

Table 2: Factors predisposing to rhegmatogenous retinal detachment

Predisposing factors	Frequency (n=276)		Total [%]	P-value
	Male	Female		
Myopia				
5D	36	27	63 [22.8]	0.17
<5D	4	1	5 [1.8]	
Not mentioned	8	2	10 [3.6]	
Ocular trauma	42	15	57 [20.7]	0.39
Pseudophakia	29	10	39 [14.2]	0.47
Aphakia	15	6	21 [7.6]	0.92
None/ indeterminate	54	27	81 [29.3]	0.84

Hundred-twenty-five [41.0%] eyes had total RRD involving all four quadrants of the retina. Sixty-nine [22.6%] eyes had RD involving three quadrants. Macula-off RD was found in 225 [73.8%] eyes. Proliferative vitreoretinopathy (PVR) was observed in 124 [40.7%] eyes and among these, PVR of grade C or worse was identified in 57 [18.7%] eyes.

Table 3: Age-sex distribution and laterality of RRD (n=247247)*

Characteristics	Laterality of RRD		P-value
	OD**	OS***	
Age (years)			
<20	15 [46.9]	17 [53.1]	0.51
20-50	72 [52.9]	64 [47.1]	
>50	46 [58.2]	33 [41.8]	
Sex			
Male	100 [58.8]	70 [41.2]	0.03
Female	33 [42.9]	44 [57.1]	

*Patients with bilateral RRD (29 patients) were excluded.

**OD=Oculus Dexter (right eye).

***OS=Oculus Sinister (left eye).

Table 4: Macular status and sex of patients with RRD (n=243)*

Macular status	Sex		P-value
	Male	Female	
Macula-off	146 [64.9]	79 [35.1]	0.58
Macula-on	10 [55.6]	8 [44.4]	

* Eyes with unknown macular status (62 eyes) were excluded.

Discussion

In our study the mean age at presentation was 41 years with 55% of the patients being between 20 and 50 years of age, and the median age was 40 years. This is comparable to other studies done by Mohamed et al (8) in Singapore and Yorston et al (7) in East Africa where they found mean ages of 46.1 and 47 years respectively. **But** in another study done in Croatia by Ivanisevic et al (9), the mean age was 58.3 years, which is higher than that of the other studies. The higher mean age in the Croatian study could be justified by the fact that this study (unlike the others three) excluded all traumatic RRD cases which actually tend to occur in young adults.

It has been thought that there might be a sex difference among patients with RD with a preponderance of males even when cases with traumatic RD are excluded (4). Our study also showed that RRD was significantly more common in males [68%] than in females [32%]. This finding is also comparable to studies done in East Africa (7) and Singapore (8) where 62.2% and 70% of RD, respectively, manifested in men. One possible explanation for this difference at least in our setup could be that males (for various reasons) have the custom to show up at health (eye) care services more often than females do.

High myopia is a well-known risk factor for RD and significant myopia is associated with about 42% of all RRDs (10). In our study, 78 [28.3%] eyes with RRD were myopic of which number, 63 [80.8%] eyes had myopia of 5D or more, 5 [6.4%] eyes had myopia of <5D and in the remaining 10 [12.8%] myopic eyes with RRD the degree of myopia was not recorded on the charts. The Eye Disease Case Control Study (11) showed that myopic people have 4-10 times higher risk of developing RD. The higher incidence of RRD among myopic eyes is ascribed to a higher incidence of lattice degeneration and posterior vitreous detachment and a vulnerable thinner peripheral retina to develop tears compared to that seen in emmetropes (12). Compared to that of emmetropes, myopic eyes are also more vulnerable to trauma which may result in RRD (4). In a study done in Sweden (4), myopia of >2D was found in 25% and myopia of \geq 5D in 12.7% of the patients with RRD. Other studies also have shown the association of high myopia with RRD; in Zaire (13) 11.4%, India (6) 18.4%, China (14) 35% and in UK (15) 20.9% of RRD patients were found to have high myopia.

Blunt ocular trauma is a leading cause of RRD in children and adolescents (10) and it is an important cause of RD in Africa (6). Retinal breaks resulting from blunt traumas are usually due to compression of the globe along its antero-posterior diameter with compensatory expansion at the equatorial plane. In our study, ocular trauma was the cause of RRD in 57 [20.7%] patients. In other studies, trauma contributed to RD in 30% of eyes in South Africa, 23% in Zaire, and 8% in Kenya (15). Our finding is comparable to that of the study done in Zaire.

Cataract surgery is a known risk factor for RRD, especially if it is complicated with posterior capsular rupture and vitreous loss. The risk is even higher in cases of intracapsular cataract extraction (ICCE). In our study, RRD occurred in 39 [14.2%] pseudophakic and 21 [7.6%] aphakic patients. Therefore, totally 60 [21.7%] patients with RRD in this study had had a history of cataract extraction. A study done by Rowe et al (2) estimated the cumulative probability of RD 10 years after cataract extraction to be 5.5 times higher than those without surgery. Because ICCE is not routinely performed these days, the proportion of aphakic RRD in our study is lower than that of pseudophakic RRD despite the higher risk of RRD associated with aphakia. Another study done by Yorston (6) showed that in Kenya 24.1% and in Zaire 15.2% of eyes with RRD had had cataract surgery, and in a study made in Singapore, previous cataract surgery was observed in 12% of patients with RRD (8). A study done in East Africa also showed that 46 eyes [12.7%] with RRD were aphakic and 41 [11.4%] were pseudophakic (7). The proportion of patients with RRD following cataract extraction in our study [21.7%] is comparable to that of the Kenyan and East African studies.

Most of the patients with RRD seen in our study presented themselves to the study centre very late so that a significant number of eyes [40.7%] had already developed PVR and similar percentage of eyes were having four quadrant retinal involvements with signs of longstanding RD at presentation.

In this study there were no significant associations between any of the risk factors and the sex of the patients (p-values>0.05). In all age groups, there were also no significant differences in involvement of either the right or the left eye with RD (p-value=0.51). Of 170 male patients with RRD involving one eye, 100 [58.8%] of them had RD in the right eye and 70 [41.2%] in the left eye (Table 3). Similarly of the 77 female patients with RRD in one eye, 33 [42.8%] of them had RD in the right eye and 44 [57.2%] in the left eye. In this study unilateral RRD tended to be more common in males than in females (p-value=0.03). There was no significant difference in involvement of the macula with RD between male and female patients (p-value=0.58).

Limitations to the study included the followings:

- Not all cards of patients with the diagnosis of RRD were retrieved from the chartroom, 52 cards [15.9%] were missing.
- Because it was a retrospective review of medical records, only information recorded in the charts could be included. In some charts, key information, like the degree of refractive error, was inadequately documented.
- Macular status was not documented for a significant proportion [20%] of cases.
- In 29.3% of the cases, it was not possible to determine the cause or ascribe any predisposing factor for the RRD.

Conclusion and recommendations

This study showed that high myopia, blunt ocular trauma, pseudophakia and surgical aphakia in decreasing order were the main risk factors predisposing Ethiopians to RRD. Myopia, being the commonest predisposing factor for RRD in this study, needs special attention. High myopic patients have to be advised to have regular follow ups with dilated fundus examination at retina clinics in order to detect early and treat accordingly those predisposing degenerative retinal lesions and breaks common in these patients. They should also be advised to avoid risky physical activities like sports and similar maneuvers to minimize traumas to the eyes. Ocular injuries in general can also be minimized by giving proper public health and eye care educations to the community using mass media, at schools and health care facilities.

The study also showed that RD is quite a common encounter in the eye centre and further prevalence study in the general population or at multiple centres in the country, where there exit retina clinics is recommended. Significant proportions of patients in our study were coming from the countryside as Menelik II Hospital is the only governmentalized centre in the country where standard vitreoretinal surgery is performed. It is therefore recommended to establish vitreoretinal setups in other eye care centres as well and train additional vitreoretinal surgeons in order to expand the service.

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References

1. Dandona L, Dandona R, Srinivas M, Dandona L, Dandona R, Srinivas M, et al. Blindness in the Indian State of Andhra Pradesh. *Invest Ophthalmol Vis Sci* 2001; 42: 908-916.

2. Rowe JA, Erie JC, Baratz KH, Hodge DO, Gray DT, Butterfield L, Robertson DM. Retinal detachment in Olmsted County, Minnesota, 1976 through 1995. *Ophthalmology* 1999; 106: 154-9.
3. Haimann MH, Burton TC, Brown CK. Epidemiology of retinal detachment. *Arch Ophthalmol* 1982. 100: 289-92.
4. Tornquist R, Stenkula S, Tornquist P. Retinal detachment: A study of a population-based patient material in Sweden 1971-1981. *Acta Ophthalmologica* 1987; 65: 213-222.
5. Laatikainen L, Tolppanen EM, Harju H. Epidemiology of rhegmatogenous retinal detachment in a Finnish Population. *Acta Ophthalmol (Copenh)* 1985; 63: 59-64.
6. Yorston D, Jalali S. Retinal detachment in developing countries. *Eye* 2002; 16: 353-358.
7. Yorston DB, Wood ML, Gilbert C. Retinal detachments in East Africa. *Ophthalmology* 2002; 109: 2279-2283.
8. Rosman M, Tien YW, Sze GO, Chong LA. Retinal detachment in Chinese, Malaysian and Indian residents in Singapore: A comparative study on risk factors, clinical presentation and surgical outcomes. *International Ophthalmology* 2002; 24:101-106.
9. Ivanisevic M, Bojic L, Eterovic D. Epidemiological Study of Non traumatic Phakic Rhegmatogenous Retinal Detachment. *Journal for research in experimental and clinical ophthalmology* 2000;32:5.
10. Brian PC and Carl DR. Rhegmatogenous Retinal Detachment. In: Tasman W, Jaeger EA (Eds). *Duane's Clinical Ophthalmology*. Lippincott's, 1999; 3: Chap 27: 5.
11. The Eye Disease Case-Control Study Group. Risk factors for idiopathic rhegmatogenous retinal detachment. *Am J Epidemiol* 1993; 137: 749-57.
12. Vander JF. Choroidal neovascularization associated with myopic macular degeneration. In: Tasman WS (Eds). *Clinical Decisions in Medical Retinal Disease*. Mosby, St. Louis, 1994; 95-102.
13. Kaimbo K, Maertens K, Kayembe L, Kabuni M, Kikudi H, Missotten L. Retinal Detachment in Patients from Zaire: Etiological, clinical aspects, surgical treatment. *Bull Soc Belge Ophthalmol* 1986; 218: 83-93.
14. Laatikainen L, Harju H, Tolppanen EM. Post-operative outcome in rhegmatogenous retinal detachment. *Acta Ophthalmol (Copenh)* 1985; 63: 647-655.
15. Sullivan PM, Luff AJ, Aylward GW. Results of primary retinal reattachment surgery: a prospective audit. *Eye* 1997; 11: 869-871.