

# How Sociodemographics Affect Clinical Presentation in Patients with Rhegmatogenous Retinal Detachment (Epidemiological Study in Tertiary Hospital, East Java, Indonesia)

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## KEYWORDS

Socio-demographic, Rhegmatogenous retinal detachment (RRD), Educational level, Time interval

## ABSTRACT

There has been very limited information on sociodemographic data of rhegmatogenous retinal detachment (RRD) in Indonesia. The purpose of this study was to comprehensively explain the relationship between sociodemographic factors with clinical presentation of RRD. The study involved 119 patients conducted from medical records at Vitreo-Retinal Clinic in one of the tertiary hospitals in East Java, Indonesia, in 2023. The data consist of best corrected visual acuity (BCVA), anterior-posterior segment examination, complete socio-demographic data (age, sex, education level, time between first symptoms and consultation, residence distance) and analyzed with Chi-Square analysis. This study found patients with higher education levels tend to present earlier to an ophthalmologist ( $p=0.004$ ). This study also found that patients who presented early to an ophthalmologist more likely to have milder PVR grade ( $p=0.000$ ) and better BCVA at initial presentation ( $p=0.000$ ). No relation was found between residence distance with clinical presentation ( $p>0.05$ ). This study found education level is associated with patient's early presentation to an ophthalmologist. Furthermore, time intervals between first symptoms and consultation are significantly associated with milder PVR grade and better BCVA at initial presentation. The study suggests improvements in education level and health promotion about RRD in primary care settings in Indonesia.

## INTRODUCTION

The most prevalent type of retinal detachment (RD) is rhegmatogenous retinal detachment (RRD), which affects around 1 in 10,000 people annually. It arises from the separation of the neurosensory retina (NSR) from the underlying retinal pigment epithelium (RPE) due to a retinal "break" or full-thickness defect in the NSR that permits fluid from the vitreous cavity to enter the subretinal space.<sup>1</sup> If left untreated, RRD can cause severe and permanent vision impairment. In order to preserve or restore vision, immediate surgical intervention is typically required for RRD treatment. An annual RRD prevalence rate of 6–18 per 100,000 people has been recorded in previous research, with significant regional and time variations. The annual incidence rates reported in Asia were 8–10 per 100,000 people. An estimated 17,000 to 25,000 new cases of retinal detachment occur in Indonesia each year. But as of yet, there is no national annual report available on the quantity of RD surgeries.<sup>2–4</sup>

Previous studies have investigated sociodemographics as a descriptive variable in the incidence of RRD. However, the relationship between sociodemographics and the clinical characteristics of RRD remains under-researched. It is believed that sociodemographics, which includes age, gender, race, and income, may influence the clinical characteristics of patients with RRD.<sup>5-7</sup>

This study aimed to investigate sociodemographic parameters that influence the incidence of RRD. We hypothesized that patients with RRD who live distant from the referral hospital and have lower educational attainment will be more likely to delay seeking treatment, which will exacerbate their clinical features. The results of this study are anticipated to be used as data to improve access to eye care, better screening programs in outlying areas, and increased awareness among the public and health workers alike so that early detection and diagnosis can be accomplished—as time is a crucial component in the management of RRD.

### **STUDY DESIGN**

The study design employed in this research is retrospective descriptive-analytic. The study was conducted utilizing data extracted from medical records at the eye clinic of the Vitreo-Retina division of Saiful Anwar General Hospital, Malang, Indonesia in 2023. This research study has obtained research ethics approval from the Health Research Ethics Commission of Saiful Anwar General Hospital. The study population comprised all patients of the Vitreo-Retina division of Saiful Anwar General Hospital, Malang, Indonesia who were diagnosed with rhegmatogenous retinal detachment (RRD) and who visited the hospital between January 2023 and December 2023. The patients were examined for best corrected visual acuity at initial presentation, underwent anterior-posterior segment examination, and had complete socio-demographic data in accordance with the variables desired by the researcher. Patients were excluded from the study if they had a history of previous retinal reattachment surgery or a diagnosis of exudative retinal detachment, tractional retinal detachment or combined retinal detachment. A total of 119 patients met the inclusion criteria for the study.

The study variables were divided into socio-demographic data and clinical characteristics. Socio-demographic data included age, gender, level of education, time interval between first symptoms and consultation and residence distance to hospital. Time interval between first symptoms and consultation is the time interval from the onset of symptoms recognised until the first time the patient comes to see a Vitreo-Retinal Specialist at the eye clinic of Saiful Anwar General Hospital. Residence distance is the distance from the patient's residence to the referral hospital, which in this context is Saiful Anwar General Hospital. The residence distance of the patient is measured using Google Maps by entering the patient's residential address listed on the patient's status.

The data set comprised information on the clinical characteristics of the patients, including their visual acuity at the time of their initial presentation, the type of retinal break, the number of breaks, the location of the breaks, the quadrant of detachment, the involvement of the macula (macular-on or macular-off) and the PVR grade. A funduscopy examination was conducted using slit lamp biomicroscopy with a 78D/90D lens and an indirect binocular ophthalmoscope (Keeler) with a 20D lens.

Furthermore, all data were collected into microsoft excel for statistical analysis. The first analysis of this study was univariate analysis in the form of frequency distribution statistical analysis of socio-demographic data and clinical characteristics. The second analysis of this study was a bivariate analysis using Chi-Square which was used to determine the association or relationship between socio-demographic data to clinical characteristics in patients with RRD. The relationship between two variables is considered significant or meaningful if the P Value <0.05.

## RESULT

The study analysed 119 patients with rhegmatogenous retinal detachment. Table 1 presents the sociodemographic characteristics of the 119 participants in the study. The proportion of males and females was almost identical, with the male gender exhibiting a slightly higher prevalence (51.3%). The majority of patients (36.9%) were aged between 56 and 70 years. In terms of educational attainment, 35.3% of patients have completed high school. The data of this study indicates majority of patients (37%) arrived at the referral hospital within a time span of 1 to 4 weeks after the onset of symptoms, while only 12.6% patients arrived within less than one week. A majority of patients live within a radius of 50 km from the referral hospital.

The clinical characteristics of the patients are shown in Table 2. Out of the 119 patients, retinal detachment was predominantly found in the right eye, with 66 patients (55.5%) affected, followed by the left eye with 50 patients (42%), and bilateral retinal detachment in 3 patients (2.5%). The majority of patients (50.4%) had preoperative visual acuity hand movement and only 14 patients with snellen best corrected visual acuity.

On funduscopy examination, the results showed that 102 patient (85.7%) had retinal tears, 8 patients (6.7%) had macular holes, and 6 patients (5%) had unidentified breaks. The majority of retinal breaks identified on funduscopy examination were located in the supero-temporal region (44.3%), followed by 12 patients (10.1%) with multiple break locations and 8 patients (6.7%) whose break locations could not be determined on examination. The majority of respondents (68.1%) had only one retinal break, while only 8 patients had 3 or more breaks in the retina.

**Table 1. Sociodemographic Characteristics**

Sociodemographic characteristics	n	%
<b>Sex</b>		
Male	61	51.3
Female	58	48.7
<b>Age</b>		
<30 yo	13	10.9
30 – 45 yo	29	24.3
46 – 55 yo	32	26.8
56 – 70 yo	44	36.9
>70 yo	1	0.84
<b>Education level</b>		
Elementary School	15	12.6

JHS	21	17.6
SHS	42	35.3
Collage Education	41	34.5
<b>Symtoms Onset to Consultation (SOC)</b>		
<1 Week	15	12.6
1-4 Weeks	45	37.8
>1 Months	20	16.8
2-3 Months	22	18.5
>3 Months	17	14.3
<b>Travel Distance to Hospital (TDH)</b>		
<50 km	77	64.7
50-100 km	34	28.6
100-200 km	5	4.2
>200 km	3	2.5

The majority of respondents (99.2%) presented with a macular-off condition in terms of their involvement of the macula. Regarding the number of detached retina quadrants, most patient (42%) had three quadrants involved, while only 5% came with one quadrant involved. In terms of PVR grading, most patient (58%) had PVR grade B.

The socio-demographic data results underwent a Chi Square test to determine the relationship between educational level and clinical characteristics of RRD (Table 3). The results show a significant association between education level and time interval between first symptoms and consultation (P Value = 0.004). The data shows that the majority of patients who visited the referral hospital for less than one week or one to four weeks were college-educated, with 66.7% and 46.7% respectively.

In the second bivariate test, the relationship between Residence distance, time interval between first symptoms and consultation, preoperative BCVA, and Macular involvement was analyzed (Table 4). Based on the results of this analysis, no relationship was found between Residence distance and time interval between first symptoms and consultation (P value = 0.733), patients' preoperative BCVA (P value = 1.00) and macular involvement of the patients (P value = 0.057).

**Table 2. Clinical Characteristics**

Clinical Characteristics	n	%
<b>Pre-Operative Visual Acuity</b>		
LP	2	1.7
1/300	60	50.4
1/60-3/60	38	31.9
4/60-6/60	5	4.2
>20/200-20/30	13	10.9

>20/30	1	0.8
<b>Break Type</b>		
Atrophic Hole	1	0.8
Macular Hole	8	6.7
Perimacular Hole	1	0.8
Tear	102	85.7
Tear and Macular Hole	1	0.8
Unseen	6	5.0
<b>Break Location</b>		
Supero-temporal	53	44.3
Infero-temporal	16	13.4
Supero-nasal	8	6.7
Infero-nasal	2	1.9
Superior	7	5.8
Inferior	5	4.2
Mix Location	12	10.1
Macular / Perimacular	8	6.7
Unseen	8	6.7
<b>n Break</b>		
>3	2	1.7
1	81	68.1
2	24	20.2
3	6	5.0
Unseen	6	5.0
<b>Macular Involvement</b>		
Macular Off	118	99.2
Macular On	1	0.8
<b>Quadrant of detachment</b>		
1	6	5.0

2	46	38.7
3	50	42.0
4	17	14.3
<b>PVR Grade</b>		
A	25	21.0
B	69	58.0
C	25	21.0

Furthermore, this study analysed the relationship between time interval between first symptoms and consultation and several clinical characteristics of patients (Table. 5). Time interval between first symptoms and consultation was found to have a significant relationship with preoperative refractive status (P value = 0.000). It can be observed that patients who come earlier to the referral hospital from the onset of symptoms tend to have better visual acuity at arrival. Time interval between first symptoms and consultation was also significantly associated with PVR grading (P value = 0.000). Patients who presented early tended to have milder PVR grading with 96% of patients with Grade A PVR presenting in less than 4 weeks from the time of symptom's onset.

**Table 3. Association of Educational Level with Time Interval Between First Symptoms and Consultation, Pre-operative BCVA, Post Operative BCVA, and Macular Involvement**

Baseline Data	Educational Level				P-Value
	ES	JHS	SHS	Collage	
<b>Time Interval Between First Symtoms and Consultation</b>					
<1 Weeks	1 (6.7)	0 (0.0)	4 (26.7)	10 (66.7)	0.004
1-4 Weeks	3 (6.7)	6 (13.3)	15 (33.3)	21 (46.7)	
>1 Months	3 (15.0)	3 (15.0)	10 (50.0)	4 (20.0)	
2-3 Months	6 (27.3)	6 (27.3)	5 (22.7)	5 (22.7)	
>3 Months	2 (11.8)	6 (35.3)	8 (47.1)	1 (5.9)	
<b>Pre-Operative BCVA</b>					
LP	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0.486
1/300 (HM)	8 (13.3)	14 (23.3)	22 (36.7)	16 (26.7)	
1/60-3/60	5 (13.2)	6 (15.8)	12 (31.6)	15 (39.5)	
4/60-6/60	1 (20.0)	0 (0.0)	3 (60.0)	1 (20.0)	
20/200-20/30	1 (7.7)	0 (0.0)	4 (30.8)	8 (61.5)	

>20/30	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	
<b>Macular Involvement</b>					
Macular - Off	15 (12.7)	21 (17.7)	42 (33.8)	40 (33.9)	0.77
Macular – On	0 (0.0)	0 (0.0)	0 (0.0)	1 (100)	

ES : Elementary school  
JHS : Junior high school  
SHS : Senior high school

**Table 4. Association of Residence Distance with Time Interval Between First Symtoms and Consultation, Pre-operative BCVA and Macular Involvement**

Baseline Data	Residence Distance				P-Value
	<50 km	50-100 km	100-200 km	>200 km	
<b>Time Interval Between First Symtoms and Consultation</b>					
<1 Weeks	11 (73.3)	3 (20.0)	1(6.7)	0 (0.0)	0.733
1-4 Weeks	32 (71.1)	11 (24.4)	1(2.2)	1(2.2)	
>1 Month	11 (55.0)	7 (35.0)	1 (5.0)	1(5.0)	
2-3 Months	16 (72.7)	5 (22.7)	1 (4.5)	0 (0.0)	
>3 Months	7 (41.2)	8 (47.1)	1 (5.9)	1 (5.9)	
<b>Pre-Operative BCVA</b>					
LP	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	1.00
1/300 (HM)	39 (65.0)	17 (28.3)	2 (3.3)	2 (3.3)	
1/60-3/60	24 (63.2)	11 (28.9)	2 (5.3)	1 (2.6)	
4/60-6/60	3 (60.0)	2 (40.0)	0 (0.0)	0 (0.0)	
20/200-20/30	9 (69.2)	3 (23.1)	1 (7.7)	0 (0.0)	
>20/30	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
<b>Macular Involvement</b>					
Macular - Off	86 (72.8)	34 (28.8)	5 (4.2)	3 (2.5)	0.057
Macular - On	1 (100)	0 (0.0)	0 (0.0)	0 (0.0)	



**Table 5. Association of Time Interval Between First Symtoms and Consultation with Pre-operative BCVA, Macular Involvement and PVR Grade**

Baseline Data		Time Interval Between First Symtoms and Consultation				P-Value
		<1 Weeks	1-4 Weeks	>1 Months	2-3 Months	
Pre-Operative BCVA						
LP	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	1 (50.0%)	0.000
1/300 (HM)	4 (6.7%)	20 (33.3%)	13 (21.7%)	12 (20.0%)	11 (18.3%)	
1/60-3/60	1 (2.6%)	17 (44.7%)	6 (15.8%)	9 (23.7%)	5 (13.2%)	
4/60-6/60	1 (20.0%)	3 (60.0%)	1 (20.0%)	0 (0.0%)	0 (0.0%)	
20/200-20/30	8 (61.5%)	5 (38.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
>20/30	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Macular Involvement						
Macular-Off	14 (11.8%)	45 (38.1%)	20 (16.9%)	22 (18.6%)	17 (14.4%)	0.398
Macular - On	1 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
PVR Grade						
Grade A	11 (44.0%)	13 (52.0%)	1 (4.0%)	0 (0.0%)	0 (0.0%)	0.000
Grade B	4 (5.8%)	28 (40.6%)	13 (18.8%)	16 (23.2%)	8 (11.6%)	
Grade C	0 (0.0%)	4 (16.0%)	6 (24.0%)	6 (24.0%)	9 (36.0%)	

## DISCUSSION

### Socio-demographic

The results of this descriptive study indicate that, based on sociodemographic data, the majority of patients with RRD were male, aged between 56 and 70 years, and had a high school education. This study is consistent with other large-scale descriptive studies, such as the study conducted by Xu *et al.*, which involved 4061 patients. The study found that the majority of patients with RRD were male, presented with both macular on (57%) and macular off (62%) conditions, and had a mean age of 60 years.<sup>8</sup> Furthermore, this descriptive study is consistent with another retrospective population study conducted in Korea involving 53,179 patients with RRD, which found that the age group 60-64 years had the highest incidence of RD, with the majority occurring in



men (54.7%).<sup>9</sup> The highest incidence of RRD in the age group around 60 years is due to the increased incidence of posterior vitreous detachment (PVD), which is one of the main pathophysiological causes of RRD.<sup>10</sup> Furthermore, the finding that males are more often affected by rhegmatogenous retinal detachment (RRD) is thought to be due to the high incidence of eye trauma in males when compared to females. However, other studies suggest that both sexes have the same pathophysiology of RRD, thus concluding that gender has little influence on the incidence of RRD.<sup>9</sup>

Majority of patients have a high school and college education. This finding is consistent with findings in several other population studies, including a study conducted in Sweden involving 10,268 people, which found that the higher a person's education level, the higher the risk of retinal breaks and retinal detachment. The study found that a person with a post-graduate education level had a 1.77 times greater risk of developing retinal detachment. The risk decreased with a lower education level. This association is believed to be related to the increased incidence of myopia and the progressivity of myopia, both risk factors for retinal detachment. A multitude of studies have proven that a higher level of education is linked to a higher risk of myopia incidence and myopia progressivity.<sup>11</sup> The finding of this study suggests that the higher the education of patients with RRD, the faster the arrival of patients to seek help from health workers.

Most of patients (37%) arrived at the referral hospital within a time span of 1 to 4 weeks after the onset of symptoms, while only 12.6% (15 patients) arrived within less than one week. The results of this study are markedly different from another descriptive study conducted in the Netherlands, which found that the average patient with retinal detachment (RD) presented to the first healthcare service within 3-5 days of onset and only took 14 days to undergo a surgical procedure.<sup>12</sup> Another study conducted in the United Kingdom found that the average patient presented within 7 days of symptom onset and was referred by a general practitioner (GP) to an ophthalmologist. The average patient takes approximately three days to undergo a surgical procedure following an initial consultation with an ophthalmologist.<sup>13</sup> This study was in line with other studies in developing or third world countries, i.e. many RD patients presented late, ranging from about 2 weeks to over a month and more than 3 months after the onset of symptoms.<sup>14</sup> However, the findings of this study show better time interval between first symptoms and consultation data when compared with study conducted in another referral hospital in the same province as this study which revealed that the majority of patients presented to the referral hospital more than two months after the onset of symptoms, with only 15% arriving within seven days.<sup>15</sup> Patient delay in presenting to referral hospitals in developing countries may be due to education level as this study found that education level was significantly associated with time interval between first symptoms and consultation of patients with RRD (P Value = 0.004). It also can be concluded from this study that patients who presented earlier to the referral hospital from the onset of symptoms (<4 weeks) had a tendency to present with lighter PVR grading (96%). From several studies that have been conducted, patient delay is caused by a variety of things including lack of awareness of RRD, considering RRD symptoms are not serious and can heal on their own.<sup>16,17</sup>

Another interesting finding from this study was that the distance of the patient's residence was not associated with the duration of time to the referral hospital (P value = 0.733), preoperative visual acuity (P value = 1.00) and macular condition of the patient when they first came to the referral hospital (P value = 0.727). This finding is consistent with a retrospective study conducted in Ohio which found that the location of the patient's residence was not associated with macular condition (P value = 0.69) but found that the location of residence was associated with a longer time taken for the patient to be operated on.<sup>18</sup> Another retrospective study conducted in rural Dakota also found that the distance of residence did not affect the duration of time patients went to the vitreoretinal specialist, macular condition, and visual acuity before or after surgery.<sup>19</sup> However, the results of this study are slightly different from a study conducted in Surabaya, Indonesia which found that a residential location >120km from the referral hospital had an impact on time interval between first symptoms and consultation but no impact on preoperative visual acuity.<sup>15</sup> This shows that patients with RRD who seek treatment at referral hospitals are not affected by the location of residence, this is supported by the advancement of public transport facilities, road infrastructure and a good BPJS referral system in the East Java area, especially around the city of Malang.<sup>20</sup>

### **Clinical Characteristics**

This study provides data on the clinical characteristics (Table 3) of the incidence of rhegmatogenous retinal detachment (RRD). The majority of patients presented with visual acuity of 1/300 or hand motion (50.4%). This study aligns with numerous other studies conducted in India and Ethiopia, which found that 53.3% and 87.2% of patients with RRD presented with VA <3/60, respectively.<sup>21,22</sup> Another study in Indonesia also demonstrated similar characteristics, with 45% of patients presenting with VA <1/60.<sup>23</sup> In the fundusoscopic examination data of this study, the tear was the most common type of break found in the retina (85.7%), with the supero-temporal location being the most common tear location (44.3%) and the majority of patients having one tear (68.1%) and most of them involving three quadrants of detachment (42.0%) with the majority in macular-off condition (99.2%). These fundusoscopic findings are comparable to those of other studies, such as the UK-based study which found that 69.9% of RRD patients had a tear, with 68.7% located in the supero-temporal area. However, in that study, the majority of patients only involved two quadrants of detachment (35.5%) and had much less macular-off presentation (56.3%).<sup>24</sup>

### **CONCLUSION**

This study is one of the few comprehensive retrospective epidemiological studies in explaining the incidence of RRD where this study found that the majority of patients with RRD in Indonesia, especially in the city of Malang, arrived late to the referral hospital which would affect various clinical characteristics.

Sociodemographically, this study found that education level is associated with the patient's early presentation to the ophthalmologist. Furthermore, time interval between first symptoms and consultation was found to be significantly associated with pre-operative BCVA and PVR grade. In addition, this study also proved that residential

distance location was not associated with onset duration and macular involvement. From this study it can be concluded that better clinical characteristics in patients with RRD is determined by education level dan time interval between first symtoms and consultation of the patients.

In the future, this study is expected to be continued to determine the influence of socio-demographics on the surgical choice and postoperative visual outcome in patients with RRD.

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