

Pseudocapsular exfoliation in the Bantu of South Africa

II. Occurrence and prevalence

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Pseudocapsular exfoliation occurs in most races and countries but appears to be particularly common in Norway and in the Eastern European and Mediterranean countries. It is rare in American Negroes, only two cases having been reported (Gradle and Sugar, 1947), and in Negroes in the West Indies (Connell, 1970), and has not been reported in Negroes elsewhere outside South Africa (Bartholomew, 1970; Luntz, 1970).

The geographical distribution of exfoliation was reviewed by Aasved (1969), who concluded that many of the differences in occurrence and prevalence are due to the nature of the samples and methods used. He found prevalence rates, in three groups of subjects over 60 years old, of 6.3 per cent. in Norway, 4.0 per cent. in Germany, and 4.7 per cent. in England, using similar samples and identical methods of examination.

The apparent rarity of exfoliation in Negroes throughout the world, apart from the South African Bantu, promoted these efforts to obtain more information about the occurrence and prevalence of exfoliation in the various Bantu tribes, who have different racial and genetic backgrounds, live under widely different climatic conditions, and are at different stages in development from a primitive rural to an urban way of life.

Material and methods

(A) From the Eye Department of Baragwanath Hospital and The St John Eye Hospital in Johannesburg:

(1) 100 consecutive patients undergoing cataract extraction were examined for exfoliation with a slit lamp, the pupils being fully dilated.

(2) During a 3-month period 625 consecutive new ophthalmic outpatients, over 30 years of age, were examined with a slit lamp. The pupils were dilated only if otherwise indicated, or to confirm suspected exfoliation. Some early cases will have been missed.

(3) 192 patients were referred for assessment to the glaucoma clinic. All were examined on a slit lamp with dilated pupils. 63 of these were examined personally; in the remainder information was taken from case histories.

All these patients were South African Bantu of various tribes, mainly living in the suburban districts of Johannesburg.

(B) Field tours were undertaken for the South African Bureau for the Prevention of Blindness among various rural Bantu tribes, between 1968 and 1971. The diagnosis of exfoliation was made under unfavourable conditions using a torch, loupe, and ophthalmoscope and was thus confined to those with obvious well-established disease. 4,156 persons were examined in this way.

(C) A population study was carried out on the Pondo tribe. 2,584 persons over the age of 30 years were examined. The examination included biomicroscopy using a Haag Streit 900 R slit lamp, in suitably darkened surroundings. The pupils were dilated in all cases. The conditions were thus ideal for detecting exfoliation.

With the exception of some of the cases attending the glaucoma clinic everyone was examined personally.

Results

Table I shows the incidence of exfoliation in 100 consecutive cataract cases. 26 per cent. had exfoliation; their average age was 68 years.

Table II shows the incidence of exfoliation in 625 new ophthalmic outpatients over 30 years of age: 5.2 per cent. had exfoliation; their average age was 64 years.

Table I *Exfoliation in 100 Consecutive Cataract Cases, by Sex*

<i>Sex</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
Cataract	31	43	74
Exfoliation	13	13	26
Total	44	56	100

Table II *Exfoliation in 625 new ophthalmic outpatients*

<i>Sex</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
Normal	370	222	592
Exfoliation	26	7	33
Total	396	229	625

Table III lists 192 cases referred to the glaucoma clinic for assessment: 19 per cent. of the 116 cases with confirmed glaucoma had exfoliation; their average age was 63 years.

Table III *Exfoliation in 192 cases referred to the glaucoma clinic*

<i>Type of Glaucoma</i>	<i>Number</i>	<i>Per cent.</i>
Primary open-angle	65	56
Primary angle-closure	11	9
Glaucoma capsulare	22	19
Secondary	18	16
Unconfirmed	76	

The patients from these three hospital groups came from the following tribes: Zulu, Swazi, Xhosa, Pondo, Southern Sotho, Pedi, Tswana, Shangaan, Venda, and Swahili. Table IV (opposite) shows the results of 4,156 examinations during nine field tours for the South African Bureau for the Prevention of Blindness. Exfoliation was found in 0.55 per cent. of these patients of all ages. 2.4 per cent. had glaucoma, 17 per cent. of these being associated with exfoliation.

Table V A and B (opposite) shows the results of 2,584 examinations during the population study. They are reviewed for pregranular and granular exfoliation (Bartholomew, 1971). The prevalence of granular exfoliation in the whole sample of subjects over 30 years old was 5.1 per cent. The prevalence rises with each 10-year age group from 1.3 per cent. at 30-39 years to 10.9 per cent. at over 70 years. The prevalence for those over 60 years was 9.7 per cent. If the pregranular cases are included, the prevalence becomes higher in the younger age groups, 6.4 per cent. at 30-39 years, and 8.0 per cent. for the whole sample.

Table IV Incidence of pseudocapsular exfoliation found on field tours.

Area	Swaziland	N.E. Transvaal	S. Transvaal	Transkei	Transkei	E. Transvaal	W. Transvaal	Pondoland	N.E. Transvaal	Total
Tribe	Swazis	Shangaan Sotho	Southern Sotho	Xhosas (Bomwana)	Xhosas	Sotho	Pedi	Pondo	Shangaan	
No. examined	361	1,000	1,173	158	281	82	32	490	576	4,156
No. with glaucomas	1	12	5	19	15	0	0	42	5	99
No. with exfoliation	0	1	2	2	2	0	2	8	5	23
Per cent. with exfoliation	0	0.1	0.17	1.3	0.7	0	6.2	1.6	0.9	0.55
Comments	Young population	All ages	Mainly school children	Selected eye cases	Selected eye cases	Selected eye cases	Cataract cases	Selected eye cases	All ages	

Table V A Prevalence of pregranular and granular exfoliation in the Pondo, by sex and age

Age group (yrs)	Male								Female							
	No. of cases	Pregranular		Granular		Total		No. of cases	Pregranular		Granular		Total			
		No.	Per cent.	No.	Per cent.	No.	Per cent.		No.	Per cent.	No.	Per cent.	No.	Per cent.		
30-39	67	2	3.0	1	1.5	3	4.5	90	6	6.7	1	1.1	7	7.8		
40-49	453	27	6.0	10	2.2	37	8.2	461	17	3.7	10	2.2	27	5.9		
50-59	338	15	4.4	9	2.7	24	7.2	321	4	1.2	19	6.0	23	7.1		
60-69	234	2	0.85	29	12.4	31	13.3	315	2	0.6	20	6.4	22	7.0		
70+	155	0	0.0	19	12.3	19	12.3	150	1	0.7	14	9.3	15	10.0		
Total	1,257	46	3.7	68	5.4	114	9.1	1,337	30	2.2	64	4.8	94	7		

Table V B Total prevalence of exfoliation in the Pondo, by age

Age group (yrs)	Total							
	No. of cases	Pregranular		Granular		Total		
		No.	Per cent.	No.	Per cent.	No.	Per cent.	
30-39	157	8	5.1	2	1.3	10	6.4	
40-49	914	44	4.8	20	2.2	64	7.0	
50-59	659	19	2.9	28	4.3	47	7.2	
60-69	549	4	0.7	49	9.0	53	9.7	
70+	305	1	0.3	33	10.9	34	11.2	
Total	2,584	76	2.9	132	5.1	208	8.0	

Discussion

OCCURRENCE

Examination by rather crude means of rural Bantu on field tours has shown that exfoliation occurs in the Xhosas, Pondo, Pedi, Southern Sotho, and Shangaan tribes, although no case was found in a group of young Swazis. This wide occurrence has been confirmed by the sophisticated examination of urbanized Bantu in three hospital groups in Johannesburg. Cases of exfoliation were seen among the above tribes and in addition among the Zulus, Tswanas, Swazis, Vendas, and Swahili. Exfoliation is therefore seen in all the major Bantu tribes of South Africa, and among Swahili coming from Kenya.

PREVALENCE

A high incidence was found among cataract patients (26 per cent.) and glaucoma patients (19 per cent.). These groups are selected in various ways and the figures bear little relation to the true prevalence of the condition in the general population. Similarly, the low incidence found on the field tours (0.55 per cent.) and in hospital outpatients (5.2 per cent.) reflects the inadequacy of the methods of examination. Population studies on exfoliation should provide more accurate figures, but have so far been reported by only four authors (Table VI). A comparison between these figures and those found in the remaining population of Pondos shows two striking differences.

Table VI *Prevalence of exfoliation in population studies.*

<i>Authors</i>	<i>Date</i>	<i>Country</i>	<i>Sample</i>	<i>Age group (yrs)</i>	<i>Per cent. exfoliation</i>
Forsius and Eriksson	1961	Aland isles	222	Over 40	8.5
Hollows and Graham	1966	Wales	4,925	40-75	0.2
			1,023 with dilated pupils		
Aasved	1969	Norway	766	Over 60	6.3
		Germany	491	Over 60	4.0
		England	801	Over 60	4.7
		Norway	8,537	50-59	0.4
				80-89	7.9
Bartholomew	1971	S. Africa	2,584	Over 40	8.1
				50-59	7.2
				Over 60	10.3

(1) *Age*

The age at onset is 10 to 20 years earlier in the Pondo. This may be due to the well-known difficulty of determining age in a largely illiterate community, but enough cases were seen in young people whose ages were accurately known to be sure that early onset does occur. Alternatively, this difference may be due to the method of examination, as pregranular exfoliation will be detected by only the most careful scrutiny, and its early onset may have been missed in other populations. It seems likely, however, that this difference is a real one.

(2) *Prevalence*

The prevalence is up to sixteen times higher in Pondos of all ages than in the inhabitants of Norway, England, Germany, or Wales.

These differences may indicate that the Pondos have a constitutional tendency to develop exfoliation or that some external factor, such as climate or nutrition, may cause or promote it. At present this is speculative, but a climatic factor seems to be unlikely as exfoliation occurs in Bantu tribes living in a wide variety of climatic conditions, ranging from the temperate coastal zone through the high veldt and low veldt to the subtropical zone.

(3) *Relationship to glaucoma capsulare*

The significance of these findings lies in the relationship of exfoliation to its main complication of glaucoma capsulare, which is a common cause of blindness among the Bantu; exfoliation was found in 19 per cent. of glaucoma clinic patients, 17 per cent. of glaucoma patients on field tours, and 34 per cent. of all glaucomas detected among the Pondo.

The relationship of pseudocapsular exfoliation to intraocular pressure and the onset of glaucoma will be discussed in a future paper.

Conclusions

- (1) Exfoliation occurs in all the main Bantu tribes of South Africa.
- (2) Prevalence rates of 6.4 per cent. in the 30 to 39-year age group rising to 11.2 per cent. in those over 70 years of age were found, the prevalence for the whole sample being 8.2 per cent.
- (3) Exfoliation was found to occur 10 to 20 years earlier than has been reported elsewhere
- (4) Early onset and high prevalence of exfoliation correlate with a high incidence of glaucoma capsulare, between 17 and 34 per cent. of glaucoma cases.

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