



AN ESTIMATION OF PAST SMALLPOX INCIDENCE IN SOUTH-WESTERN SOMALIA

B. Kriz<sup>a</sup>

Pockmark surveys were found to be useful in smallpox eradication programmes in several countries, however, where variola minor was prevalent their value was considered to be limited. Variola minor infection usually left superficial scars with pink centres followed eventually by hyperpigmentation lasting some months. This type of scarring may be confused with similar hyperpigmentation caused by severe chickenpox infections, particularly in old persons. Despite this potentially confusing issue, a pockmark survey proved useful in reconstructing the history of smallpox in Somalia.

Material and Methods

During the first months of 1978, 48 surveillance agents of the Somalia smallpox eradication programme visited all villages of Middle and Lower Juba Regions. Using a special form they noted the sex and age group of every person contacted. They then asked every person whether or not they had had smallpox in the past and on receiving a positive response noted the age, sex, year of attack, place of attack and the current vaccination status of the person concerned. Finally, the face of the subject was examined and the number of pockmarks or hyperpigmented spots recorded. All surveillance agents were individually trained to recognize pockmarks and hyperpigmentation during a pilot study conducted in each of the eight districts of Middle and Lower Shabelli. During the field work the surveillance agents were supervised by eight district team leaders, two regional epidemiologists and the author.

Results

In total, 178 199 persons were contacted in the two regions. Of these, 878 stated that they had suffered from smallpox at some time in the past. Their age distribution and the age-group specific prevalence per 1000 investigated population is presented in table 1. The most affected group was the persons now 60 years or older, followed by the age group between 50 and 59 years. The highest prevalence rate found was among the 60+ age group in Sakow District, 155.7 per 1000 population. The least affected groups were those from 0 to 29 years, where the prevalence varied from 0 to 0.3 per 1000.

The age distribution of the previous smallpox cases and the percentage with pockmarks or hyperpigmentation is shown in table 2. The cases most consistently found to have residual scarring were those in the age groups above 50 years, many of whom had 10 or more scars on the face.

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<sup>a</sup> Formerly WHO Epidemiologist, Smallpox Eradication Programme, Somalia, currently Senior Lecturer in Epidemiology, Department of Epidemiology, Charles University, Prague, Czechoslovakia.

TABLE 1  
AGE SPECIFIC PREVALENCE OF PREVIOUS SMALLPOX IN INVESTIGATED POPULATION

Age	Middle Juba			Lower Juba			Total		
	Persons seen	Previous smallpox cases	Prevalence per 1000	Persons seen	Previous smallpox cases	Prevalence per 1000	Persons seen	Previous smallpox cases	Prevalence per 1000
0-29	63 636	4	0.08	59 156	4	0.07	122 792	8	0.07
30-39	10 621	56	5.3	11 272	19	1.7	21 893	75	3.4
40-49	8 882	94	10.6	9 437	35	3.7	18 319	129	7.0
50-59	4 301	205	47.7	4 195	41	9.8	8 496	246	29.0
60+	3 379	299	88.5	3 320	121	36.5	6 699	420	62.7
Total	90 819	658	7.2	87 380	220	2.5	178 199	878	4.9

TABLE 2

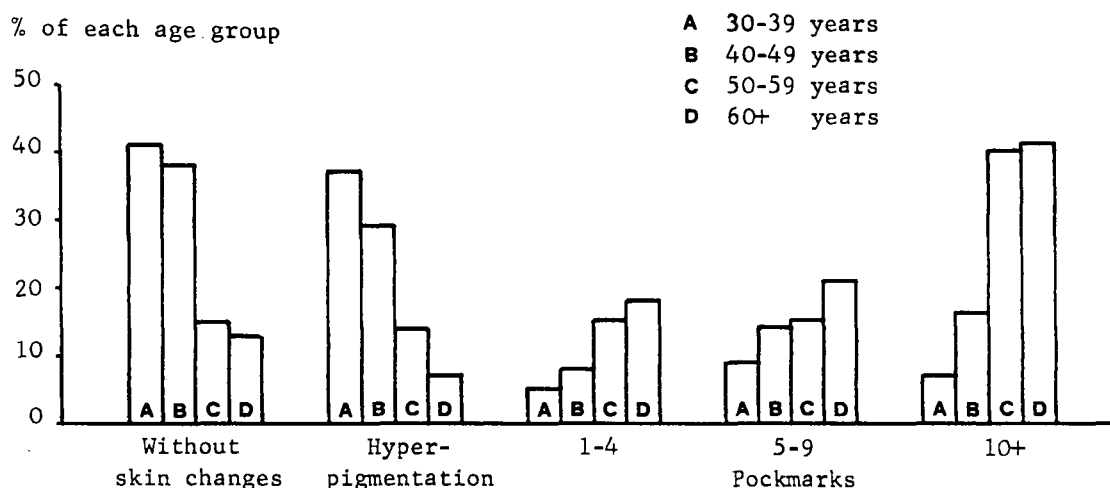
RESULTS OF EXAMINATION OF 878 PREVIOUS SMALLPOX CASES, BY AGE GROUP

Age group	Total		Without skin changes		Hyper-pigmentation		Facial pockmarks					
							0-4		5-9		10+	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-29	8	100	3	37.5	4	50.0	-	-	-	-	1	12.5
30-39	75	100	31	41.3	28	37.3	4	5.3	7	9.3	5	6.7
40-49	129	100	99	38.0	31	29.0	10	7.7	18	13.9	21	16.3
50-59	246	100	38	15.4	34	13.8	38	15.4	38	15.4	98	39.9
60+	420	100	56	13.3	29	6.9	77	18.3	88	20.9	170	40.5
Total	878	100	177	20.1	126	14.4	129	14.7	151	17.2	295	33.6

A significant percentage of those who admitted having had smallpox were, however, without scars or showed only hyperpigmentation, 20.1% and 14.4% respectively. The distribution of cases without scars, with different numbers of scars and with hyperpigmentation only, by present age group, is shown in figure 1. Most of the cases aged 30 to 39 were either without any pockmarks at all or showed hyperpigmentation only, compared with those aged 60 years and more amongst whom a large percentage were scarred.

FIGURE 1

DISTRIBUTION OF FACIAL SKIN CHANGES BY PRESENT AGE GROUP



Distribution of the cases according to the year and the region where attacked is shown in table 3. Fifty-one per cent of the cases were affected in the regions where the study was conducted. Many were affected in other regions of Somalia and 9% had suffered outside the country. The epidemiological situation obviously varied considerably in different parts of Somalia in the past. The southern part was heavily affected in the first half of the present century with most of the cases, 59%, in the decade 1930-1939. Of those people contacted in the study who had suffered smallpox in the north of the country, the largest number were affected between 1950 and 1959.

TABLE 3  
YEAR AND PLACE OF ATTACK OF PREVIOUS SMALLPOX CASES

Area	Year of attack									Total
	1900	1901-09	1910-19	1920-29	1930-39	1940-49	1950-59	1960-69	1970+	
Middle Juba	3	7	32	60	211	27	2	1	4	347
Lower Juba		4	6	12	62	10	3	1	2	100
Other southern regions	2	6	21	24	66	11	4			134
Northern regions				4	24	70	94	16	2	210
Ethiopia		2	5	4	16	19	8	3	1	58
Kenya		2		1	2	7	11			23
Total	5	21	64	105	384	141	122	21	9	872*

\*Place of attack of six cases unknown.

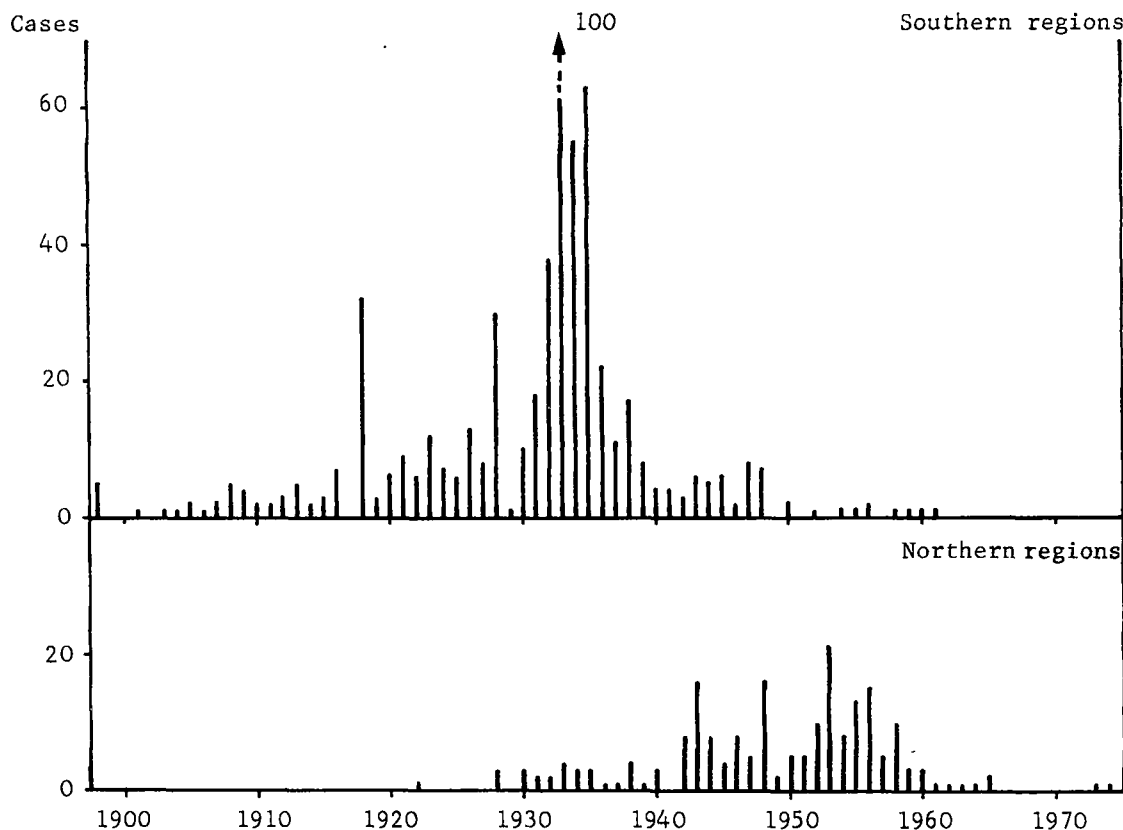
Analysis of the distribution of the smallpox cases in individual years revealed peaks of incidence for the south of Somalia in the years 1918, 1928, 1933-1935, 1947-1948 and for the northern part in 1943, 1948 and 1953-1956 (figure 2).

The vaccination status of the smallpox cases is shown in table 4. Forty-two per cent were without any vaccination scars and 36% were vaccinated in 1977 or more recently.

TABLE 4  
VACCINATION STATUS OF 878 PREVIOUS SMALLPOX CASES

Region	Not vaccinated		Vaccinated before 1977		Vaccinated 1977-1979		Total	
	No.	%	No.	%	No.	%	No.	%
Middle Juba	281	43	125	19	25	38	658	100
Lower Juba	92	42	68	31	60	27	220	100
Total	373	42	193	22	312	36	878	100

FIGURE 2  
DISTRIBUTION OF 791 PREVIOUS SMALLPOX CASES  
WITHIN SOMALIA, 1900-1975



### Discussion

Persons contacted during the study represent approximately 50% of the population of the region. Smallpox is well known among the people of the area concerned and in the past they were usually able to distinguish smallpox, "furuq", from chickenpox, "bus bus", although there is some evidence to suggest that in recent years they have confused variola minor infection with chickenpox. Only three out of 16 outbreaks which took place in 1977 in the regions concerned were revealed during this study. This is thought to be due to the reluctance of the population to admit to recent outbreaks for fear that their lives may be disrupted by further investigations. This study may, therefore, have missed an unknown proportion of previous smallpox cases, but overestimation of past incidence seems unlikely; whenever a person declared that he had had smallpox it is likely that he had in fact suffered from the disease.

Persons were asked whether they remembered deaths among the other cases of previous outbreaks. From those who did remember the reply was usually either that they could recall many deaths or no deaths at all. On the basis of that information it could be assumed that the outbreaks concerned were either variola major or variola minor. Using these criteria we can trace variola major infection back at least to the last years of the 19th century. The largest smallpox outbreak apparently caused by variola major occurred in the southern part of Somalia during 1933, and according to all available local sources had a case fatality rate of between 20-50%. In fact that year is known as "Sanadka Furuqa" - the year of smallpox.

Outbreaks with very low case fatality rates were not traced before 1933, but were present in the forties. It seems that for some time both variola major and variola minor infections existed side by side and gradually variola minor prevailed during the fifties. The last outbreak where a significant number of deaths occurred, according to information obtained during the study, was in 1959 in Mudug Region, although the overwhelming majority of smallpox outbreaks in the northern parts of Somalia during the massive epidemic of 1953 were caused by variola minor.

In a previous study in Nugal Region of northern Somalia, 929 persons from 28 localities were contacted in October 1978 and asked whether they had ever suffered from smallpox. Of 75 persons giving a positive answer, 65 (87%) reported having suffered the disease between the years 1952-1954. Questioned about the severity of the illness they generally considered it as mild and only one person recalled a single death from smallpox in her locality during that time. The epidemic of 1953 apparently affected every locality throughout the region. None of the 65 identified cases who had suffered from smallpox at that time had typical pockmarks on the face, although many showed hyperpigmentation.

Results of the survey show a significant difference in the percentage of pockmarked persons in the age group below 49 years compared with those of 50 and over. The change in the proportions by age group of those scarred is clearly apparent, supporting the conclusion that outbreaks in the early thirties were caused by variola major.

Vaccination coverage of previous smallpox cases does not differ considerably from vaccination status of the general population of both regions. Twenty per cent of them were vaccinated in the past, mainly at the time of the outbreaks in the thirties, most probably during the incubation period of their smallpox infection. At that time, according to their statements, several Italian vaccination teams operated in the area.

The past epidemiological importance of smallpox in Somalia can be seen from the fact that the highest recorded age specific prevalence is in the age group of 60 and above, 156 per 1000 population. This indicates that at least 15% of all people now reaching 60 years of age have been exposed to smallpox at some time in their lives.

#### Summary

Smallpox infection in Somalia was traced back to the year 1898. A total of 878 persons were found to have been affected in the past. Of these, 65% had facial pockmarks. A change in the proportion of people with facial pockmarks according to their age was found, suggesting the replacement of variola major by variola minor during the last 30-40 years. No cases were found with a history of smallpox after October 1977.

#### References

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