



RESIDUAL FACIAL SKIN CHANGES IN VARICELLA PATIENTS

Z. Jezek<sup>1</sup>, W. Hardjotanojo<sup>2</sup> & A. G. Rangaraj<sup>3</sup>

Summary

To assess the prevalence of persistent facial scars after recovery from chickenpox, 250 subjects whose diagnosis had been confirmed by electron microscopy identification of herpes varicella virus were carefully examined a year after their illness. Two point four per cent had five or more facial scars indistinguishable from those seen among smallpox victims, with a higher percentage among males (2.7%) than females (1.9%). The highest proportion of those with five or more residual facial scars (8.3%) was found among young adults 20-29 years old.

Chickenpox should be considered in making a retrospective diagnosis in cases of facial scarring resembling that of smallpox.

Introduction

Facial pockmark surveys have proved to be a useful method for assessing the extent of the past occurrence of smallpox, for evaluating the effectiveness of surveillance and reporting and for confirming the absence of smallpox during recent years.

International commissions for the certification of smallpox eradication have given a great deal of emphasis to facial pockmark surveys as an epidemiological tool in confirming the absence of smallpox occurring after the last reported case. Any pockmarked person claiming that the facial scars were caused by a disease that had occurred since the last known smallpox or in an area not previously recognized as affected by smallpox caused some concern. It was considered as suggestive of smallpox and a full investigation was conducted.

In many instances chickenpox was indicated as the disease responsible for the facial scarring of these persons, however, the scars after chickenpox usually are not permanent and there is a general belief that six months after the disease no scars will be visible. Studies in patients with a known history of recovery from chickenpox which had been laboratory-confirmed, have not previously been carried out.

The smallpox eradication programme conducted in Somalia from 1977-1979 and supported by extensive laboratory investigation provided an opportunity for such a study.

---

<sup>1</sup> WHO Medical Officer, Smallpox Eradication Programme, Somalia.

<sup>2</sup> WHO Medical Officer, Smallpox Eradication Programme, Somalia.

<sup>3</sup> WHO Consultant, Smallpox Eradication Programme, Somalia.



Materials and Methods

Reported chickenpox cases: The disease most likely to be mistaken for smallpox, especially variola minor, is chickenpox. For this reason major emphasis was placed on detecting, investigating and reporting chickenpox cases during and following the 1977 smallpox epidemic in Somalia.

A total of 4240 chickenpox cases, representing an annual incidence of 121 cases per 100 000 population, were reported in 1978. From this total number, 1016 specimens were collected and sent to the Center for Disease Control, Atlanta, USA, for laboratory examination. Herpes varicella virus was found by electron microscopy in 463 specimens.

Sample: A list of the 463 laboratory-confirmed chickenpox cases which had occurred in 1978 was prepared. An attempt was made to find and examine each of these cases during 1979, approximately one year after their chickenpox attack. Of the 463 cases, 250 could be traced and were included in the study. Several other persons were found but excluded because of a history of previous smallpox and some of the older patients in the original list had since died. Table 1 shows the age distribution of the 463 laboratory-confirmed cases and the age and sex distribution of the 250 study subjects.

Table 1  
Age and Sex Distribution of Studied Chickenpox Cases

Age group	Cases confirmed by EM (%)	Cases included in study		
		Male	Female	Total (%)
0-4	50 (10.8)	17	18	35 (14.0)
5-9	83 (17.9)	34	24	58 (23.2)
10-14	67 (14.5)	27	15	42 (16.8)
15-19	59 (12.7)	20	16	36 (14.4)
20-29	93 (20.1)	16	8	24 (9.6)
30-39	46 (9.9)	11	12	23 (9.2)
40-49	29 (6.3)	7	5	12 (4.8)
50+	36 (7.8)	13	7	20 (8.0)
Total	463 (100)	145	105	250 (100)

In contrast to Europe and North America, where the occurrence of chickenpox in persons over 14 years of age is infrequent, many cases occurred in young adults and older persons in Somalia. In an analysis of 2414 cases reported in Somalia in 1978, 55% were less than 15 years of age, 27% were 15-29 years of age and 18% were over 30 years. A similar distribution is seen in table 1 for the study subjects.

Method: The study was conducted by experienced epidemiologists who clinically examined the cases identified for inclusion in the study as well as checking the relevant epidemiological information. The subjects' faces and other exposed parts of their bodies were examined for residual skin changes as a result of their previous infection with chickenpox. Depressed scars (concentric and two or more millimetres in diameter) and discoloured spots (non-depressed, hyper- or hypo-pigmented, concentric and three or more millimetres in diameter) were noted. Other skin markings were disregarded and cases in which the aetiology of the skin changes was in doubt were considered as having no skin changes. Results were recorded on a simple standardized form.

Results

The results of the examinations, subdivided by sex, are shown in table 2.

Table 2  
Facial Skin Changes Due to Chickenpox

Sex	Total subjects examined	Subjects with facial skin changes			
		None	Discoloured spots only	1-4 scars	5+ scars
Males:					
Number	145	51	66	24	4
Percent	100.0	35.2	45.5	16.5	2.7
Females:					
Number	105	33	54	16	2
Percent	100.0	31.4	51.3	15.2	1.9
Total:					
Number	250	84	120	40	6
Percent	100.0	33.6	48.0	16.0	2.4

In all 84 (33.6%) persons had no visible skin changes approximately one-year after their chickenpox infection. On the faces of 46 individuals (18.4%) scars could be seen which were indistinguishable from those commonly seen after smallpox infection, however, only six persons (2.4%) had five or more such scars. The remaining 120 persons (48%) showed discoloured spots alone.

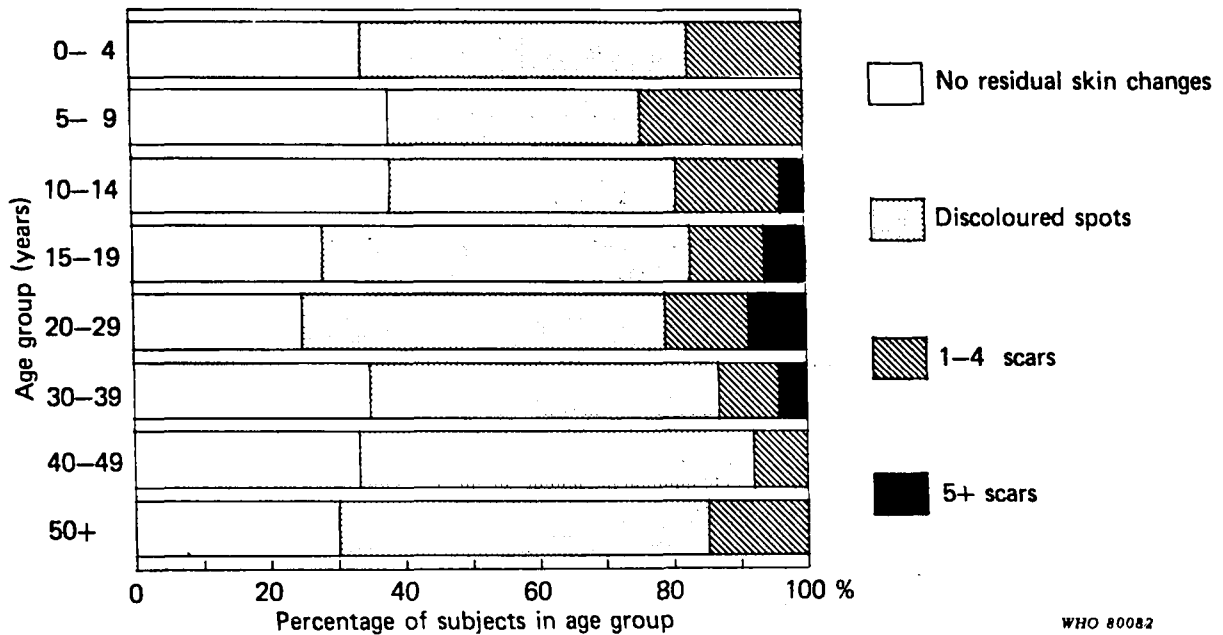
Differences between the sexes were generally slight, however, 2.7% of males compared with 1.9% of females showed five or more typical scars. The distribution of skin changes by age group of the subjects is shown in table 3.

Table 3  
Facial Skin Changes Due to Chickenpox, by Age Group

Age group	Total subjects examined	Subjects with facial skin changes			
		None	Discoloured spots only	1-4 scars	5+ scars
0-4	35	12	17	6	0
5-9	58	22	22	14	0
10-14	42	16	18	7	1
15-19	36	10	20	4	2
20-29	24	6	13	3	2
30-39	23	8	12	2	1
40-49	12	4	7	1	0
50+	20	6	11	3	0
Total	250	84	120	40	6
%	100	33.6	48.0	16.0	2.4

The proportions of subjects in each age group with some visible facial skin changes ranged from 62% in the 5-9 and 10-14 years age groups to 72% in the 15-19 years age group. This indicates that skin changes may develop and persist for at least one year in all age groups. The percentage distribution of the various types of skin changes by age group is shown in figure 1.

FIG. 1 PERCENTAGE DISTRIBUTION OF TYPES OF FACIAL SKIN CHANGES, BY AGE GROUP



WHO 80082

The distribution of persons found with typical facial scars, by the number of scars recorded, is shown in table 4. The majority of these persons (58.7%) showed only one or two scars, only 8.7% of persons had more than five scars and none had more than nine.

Table 4  
Distribution of Subjects by Number of Facial Scars Recorded

Number of facial scars	Number of subjects	Percent of total
1	16	34.8
2	11	23.9
3	9	19.6
4	4	8.7
5	2	4.3
6	2	4.3
7	1	2.2
8	0	-
9	1	2.2
10+	0	-
Total	46	100.0

The average number of facial scars per person increased with age, ranging from 1.2 in the 0-4 years age group to 3 in the 20+ age group.

Enumeration of discoloured spots showed that 50% of the subjects had less than five spots, 22% had from five to nine and 27% had a larger number.

### Discussion

There is a generally expressed opinion that facial scars due to chickenpox do not normally persist for more than six months. This study found that only 18.4% of 250 laboratory-confirmed chickenpox cases had retained facial scars after approximately one year. Only 2.4% had five or more of these typical scars which are indistinguishable from those left by smallpox. This figure is in expected contrast to the 7% of variola minor cases and 75% of variola major cases found to exhibit this degree of scarring, one to two years after their smallpox infection.

The difference in observed rates of residual scarring is presumably due to the nature of the lesions caused by the three agents mentioned. Skin lesions caused by herpes varicella virus are the most superficial and evolve most rapidly. The epidermal damage is quickly repaired without leaving a scar in the majority of cases. It seems that it is predominantly the lesions which become secondarily infected, thereby affecting the deeper skin layers, that subsequently form typical and persistent scars.

Furthermore, it seems that the occurrence of facial scars is connected with the severity of the attack; 87% of persons with residual scarring, compared with 18% of those without scarring, described their previous illness as severe. This is compatible with the finding of the highest prevalence of five or more facial scars in the 20-29 age group where severe chickenpox is common.

The study indicates that the criterion used by WHO in conducting smallpox pockmark surveys has objective justification. This has been that five or more concentric depressed facial scars of greater than 1 mm diameter at the base, in the presence of a history of pox disease, is presumptive evidence of past smallpox infection. This criterion would exclude the vast majority (97.6% in this survey) of chickenpox cases one year after infection.

Nevertheless, when persons are found with facial scarring from a disease said to have occurred since the last known smallpox in a particular area a diagnosis of previous chickenpox should always be considered. The differential diagnosis of smallpox and chickenpox can usually be made on the basis of a thorough clinical history.

### Acknowledgement

The authors wish to acknowledge the assistance of Drs B. Kriz, K. Markvart and V. Zikmund who assisted in examinations, and to thank the subjects themselves for their full cooperation during the fieldwork.

References

- Brilliant, L. B. & Khodakevich, L. N. The certification of smallpox eradication in countries without recent reported endemic transmission. World Health Organization document WHO/SE/78.106, 1978.
- Jezeq, J., Basu, R. N. & Arya, Z.S. Problem of persistence of facial pockmarks among smallpox patients. Indian J. Publ. Hlth, 22, 95-101, 1978.
- Jezeq, Z., Deria, A., Al Aghbari, M. & Hatfield, R. Smallpox eradication in Somalia. World Health Organization document WHO/SE/79.145, 1979.
- Jezeq, Z. & Hardjotanojo, W. Residual skin changes in patients who have recovered from variola minor. World Health Organization document WHO/SE/78.131, 1978.
- Rao, A. R. Clinical stages of smallpox, chickenpox, herpes. Inter-country Seminar on Surveillance in Smallpox Eradication, New Delhi, 30 October-2 November 1972, SE/WP/72.B.
- Rao, A. R. Distribution of principal clinical types and relative frequency of persistent scarring. Expert Committee on Smallpox Eradication, Geneva, 22-30 November 1971, SE/WP/71.12.
- Methodology for preparation of appropriate data for the 31 countries remaining to be certified free of smallpox. World Health Organization document SME/78.6, 1978.

= = =