

Incidence of acute rheumatic fever

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The incidence of acute rheumatic fever is decreasing rapidly in Malmö, Sweden. The findings of other investigators, which agree well with ours, indicate that this holds true for other parts of Scandinavia too. The frequency of rheumatic heart disease also seems to be rapidly decreasing. It is conceivable that the decrease in the incidence of rheumatic heart disease is even more pronounced than that of acute rheumatic fever.

A decline in the incidence of acute rheumatic fever during recent decades has been shown by several authors, e.g. Massell, Amezcua, and Pelargonio (1964), Mayer *et al.* (1963), Hitchins (1956), and Acheson (1965). However, reliable figures on the size of this decline are difficult to find and the uncertainty of estimations based on health department statistics is obvious (Rosenfield, 1958). Figures on mortality, though of the utmost interest, do not reflect the morbidity pattern, especially if the clinical picture is changing. There are reasons to believe that such a change is occurring (Mayer *et al.*, 1963; Besterman, 1970).

One of us (P. H.) presented in 1961 (Hall, 1961) a study on the prognosis and natural history of acute rheumatic fever and rheumatic heart disease. The study covered the years 1930-1954. Since all cases of acute rheumatic fever, even those in which the diagnosis was followed by a question mark, were included, it was necessary to divide the cases into three groups according to the firmness of the diagnosis. All patients satisfying Jones' modified criteria were assigned to the *firm group*, those with one major and only one or no minor manifestation to the *probable group*, and those with no major manifestation, but a 'clinical picture' that gave reasons for suspecting the condition, to the *suspected group*.

The frequency of patients with a firm diagnosis tended to decrease from one 5-year period to the next as long ago as the thirties, and a significant increase during the second

world war was followed by a substantial decrease afterwards. The incidence of firm acute rheumatic fever per 10,000 inhabitants was 2.5 in 1930-1934, 1.6 in 1935-1939, 1.8 in 1940-1944, 1.3 in 1945-1949, and 0.7 in 1950-1954. The incidence of probable acute rheumatic fever showed a similar pattern (1.2, 1.2, 1.3, 1.2, and 0.7 per 10,000 inhabitants) with a substantial decrease. The suspected group increased from one 5-year period to the next, and in the last 5-year period there was one probable and one suspected case for every firm case of acute rheumatic fever.

The total group with a firm diagnosis of acute rheumatic fever showed a frequency of rheumatic heart disease of no less than 25 per cent. In the group with a probable diagnosis of acute rheumatic fever the rheumatic heart disease frequency was 10 per cent. The group with suspected acute rheumatic fever included many different diagnoses at follow-up and the frequency of rheumatic heart disease was low.

We have found it of interest to continue this earlier study with an additional 10-year period, viz. 1955-1964, to elucidate further the decreasing incidence of acute rheumatic fever. Also we decided to follow up this 1955-1964 material to study the frequency of rheumatic heart disease.

Subjects

The medical record files for the years 1955-1964 from the Departments of Internal Medicine, Infectious Diseases, and Paediatrics were scrutinized for cases of primary attacks of acute rheumatic fever (Table). Sixty cases were found, fulfilling the criteria used in the earlier study. The evaluation of the firmness of diagnosis was made by the same person (P.H.) using exactly the same criteria as in the older study (Hall, 1961).

In 1966-1967 a follow-up was made of these 60

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TABLE Total 1955-1964 material

	Firm diagnosis		Probable diagnosis		Suspected diagnosis		Total		
	Male	Female	Male	Female	Male	Female	Male	Female	Total
1955-1959	5	8	8	9	6	8	19	25	44
1960-1964	1	3	4	3	1	4	6	10	16
Total	6	11	12	12	7	12	25	35	60

patients: 2 had died, 8 could not be found or refused to participate in the follow-up, but all of them were known to be alive and none of them had been readmitted to the hospital; 4 were living in a remote part of the country and were interviewed by letter; 46 had a complete examination, including medical history, physical examination, and a 12-lead electrocardiogram and in 42 of these cases a chest x-ray was done.

The mean interval between acute rheumatic fever and follow-up was 8.7 years, with a range of 3.4 to 12 years.

Results

Of the 60 cases of acute rheumatic fever found, 17 (28%) belonged in the firm diagnosis group, 24 (40%) in the probable diagnosis group, and 19 (32%) in the suspected diagnosis group.

Forty-four of the cases had occurred in the first 5-year period, 1955-1959, and only 16 during the last, 1960-1964. Fig. 1 shows the number of cases by 5-year periods in the years covered by the earlier as well as the present investigation.

Fig. 2 gives the number of cases per 10,000 inhabitants and year within the seven 5-year periods covered by the two investigations. The decline over the years is striking.

Fig. 3 shows the age distribution in the two groups of patients. A slight tendency towards younger age at first attack of acute rheumatic fever appears during the latest 10-year period. In the 1930-1954 series there was 1.24 female to each male case, compared to 1.40 female to each male case in the 1955-1964 period.

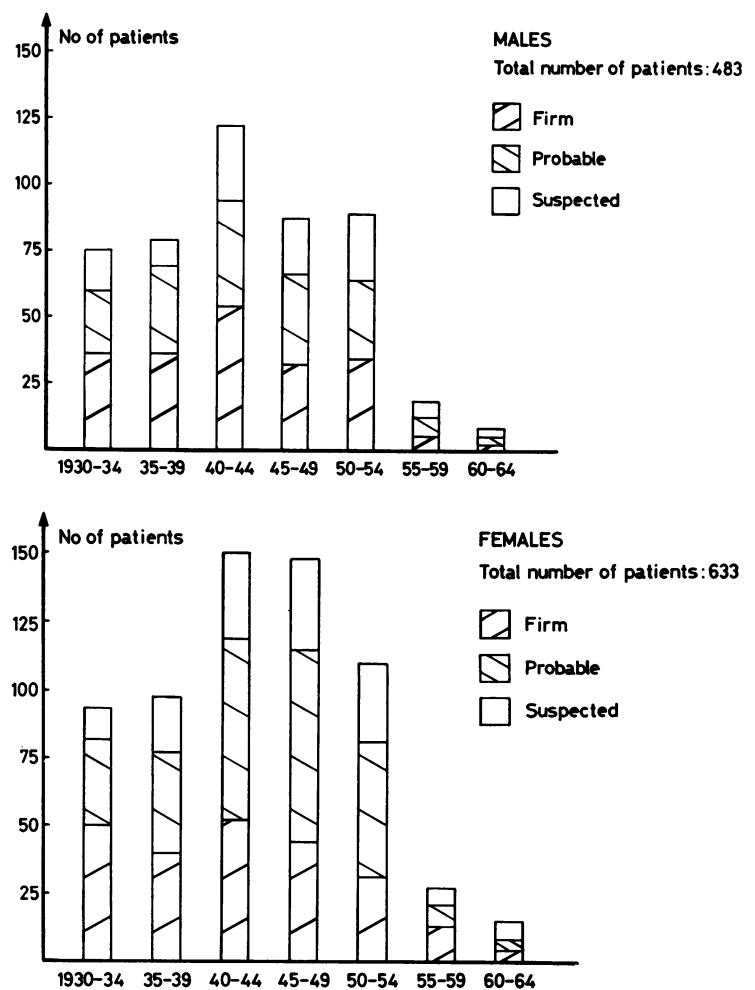
At the follow-up in 1966-1967, 8 patients could not be found or refused to participate and 2 had died, both of them coming to necropsy where no rheumatic heart disease was found. Among the 4 cases interviewed by post, no indications appeared of cardiac disease of any kind.

The remaining 46 cases re-examined comprised 1 certain and 2 suspected cases of rheumatic heart disease: these 3 cases belonged to the group firm diagnosis of acute rheumatic fever (total 17 cases). In addition, 1 patient belonging to the probable acute rheumatic fever group (total 24 cases) showed a pathological electrocardiogram tracing with right

axis deviation and broad notched P waves. However, she refused further examination. No certain or suspected case of rheumatic heart disease was found in the group of suspected acute rheumatic fever (total 19 cases).

The frequency of rheumatic heart disease in the total material of acute rheumatic fever is approximately 8 per cent, but twice this in the group of firm acute rheumatic fever, half

FIG. 1 Number of male and female acute rheumatic fever cases, 1930-1964.



as much in the group of probable, and none in the group of suspected.

Discussion

The reported decline in the incidence of acute rheumatic fever in Sweden has been shown by others. Ekelund *et al.* (1967), in a study on the incidence of acute rheumatic fever in children 1952-1961, showed a declining incidence during the period under study. In an attempt to calculate the total incidence of the disease on the basis of their own findings in children, together with published figures, they estimated the yearly incidence for 1952-1956 to be 0.45 per 10,000 and for 1957-1961 to be 0.12. These estimates correspond surprisingly well with our findings of 0.40 and 0.13 during 1955-1959 and 1960-1964, respectively.

Furthermore, Tybjaerg-Hansen (1966) has found that the annual incidence of acute rheumatic fever is about 0.15 per 10,000 inhabitants in Copenhagen, Denmark, only a few miles from Malmö.

The uncertainty of incidence figures based on hospital data is often discussed and stressed (Markowitz and Kuttner, 1965). However, circumstances in Malmö, with a single hospital serving a well-defined population completely covered by health insurance, renders this town unusually suitable for estimations of incidence figures. We believe that the figures found by us do reflect a true and profound decrease. Furthermore, we feel that the close agreement between our incidence figures and those found by Ekelund *et al.* (1967) in four different Swedish towns corroborate our findings.

The frequency of rheumatic heart disease at follow-up is reported to be influenced by the interval between acute rheumatic fever and follow-up (Bland and Jones, 1952). However, from studies made on the earlier material from 1930-1954 (Hall, 1961), it was apparent that no difference in the frequency of rheumatic heart disease was obtained when comparisons were made between follow-ups of 12.4 and 23.7 years after acute rheumatic fever. Patients with acute rheumatic fever (acute polyarthritis) admitted in 1945-1949 and re-examined in 1953 and 1959, respectively (range of follow-up 4-8 years and 10-14 years), showed no difference in the frequency of rheumatic heart disease.

Thus we feel that the low frequency of rheumatic heart disease found in the latest 10-year group cannot be due to a shorter interval between acute rheumatic fever and follow-up (8.7 years, range 3.4-12.3 years).

Number of ARF cases per 10000 inhabitants and year 1930-1964

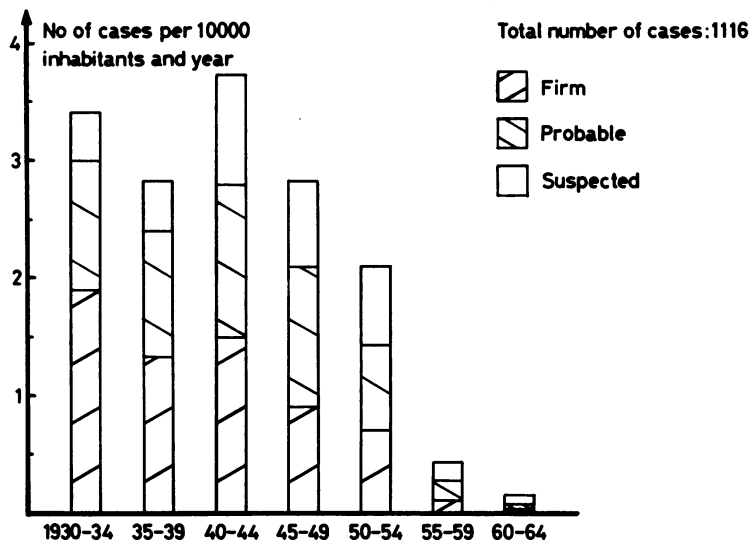
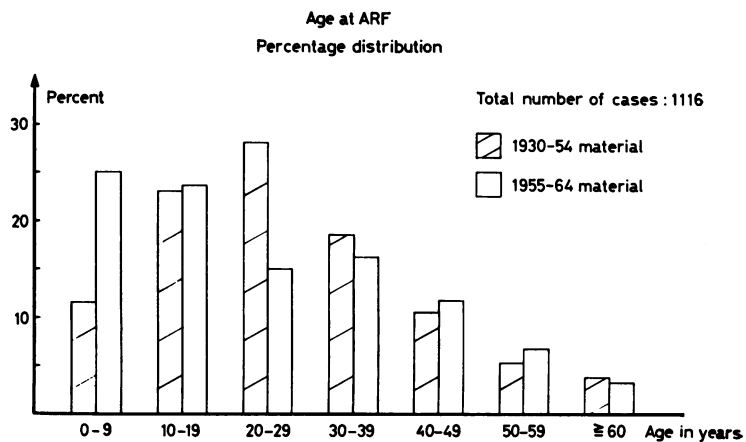


FIG. 2 Number of male and female acute rheumatic fever cases per 10,000 inhabitants and year, 1930-1964.

The frequency of rheumatic heart disease in this study is low, approximately 16 per cent in firm, 4 per cent in probable, and nil in suspected acute rheumatic fever, compared with our earlier figures - 25 per cent for firm, and 10 per cent for probable. It is conceivable that this difference in the frequency of rheumatic heart disease is due to less severe heart damage during the period of acute rheumatic fever.

FIG. 3 Age at onset of acute rheumatic fever. Percentage distribution, both sexes.



References

- Acheson, R. M. (1965). The epidemiology of acute rheumatic fever, 1950-1964. *Journal of Chronic Diseases*, **18**, 723.
- Besterman, E. (1970). The changing face of acute rheumatic fever. *British Heart Journal*, **32**, 579.
- Bland, E. F., and Jones, T. D. (1952). The natural history of rheumatic fever; a 20 year perspective. *Annals of Internal Medicine*, **37**, 1006.
- Ekelund, H., Enocksson, E., Michaëlsson, M., and Voss, H. (1967). The incidence of acute rheumatic fever in Swedish children 1952-1961: a survey from four hospitals. *Acta Medica Scandinavica*, **181**, 89.
- Hall, P. (1961). On the prognosis and natural history of acute rheumatic fever and rheumatic heart disease. *Acta Medica Scandinavica*, Suppl. 362.
- Hitchins, R. A. W. (1956). Decline of acute rheumatism. *Annals of the Rheumatic Diseases*, **15**, 160.
- Markowitz, M., and Kuttner, A. G. (1965). *Rheumatic Fever: Diagnosis, Management and Prevention*. W. B. Saunders, Philadelphia.
- Massell, B. F., Amezcua, F., and Pelargonio, S. (1964). Evolving picture of rheumatic fever. Data from 40 years at the House of the Good Samaritan. *Journal of the American Medical Association*, **188**, 287.
- Mayer, F. E., Doyle, E. F., Herrera, L., and Brownell, K. D. (1963). Declining severity of first attack of rheumatic fever. *American Journal of Diseases of Children*, **105**, 146.
- Rosenfield, A. G. (1958). Children with rheumatic fever in Minnesota. *American Journal of Public Health*, **48**, 1596.
- Tybjærg-Hansen, A. (1966). Present status of the prevention of rheumatic heart disease in Denmark. Paper read at the Vth World Congress of Cardiology, New Delhi.