

WHO programme for the prevention of rheumatic fever/rheumatic heart disease in 16 developing countries: report from Phase I (1986–90)

WHO Cardiovascular Diseases Unit and principal investigators¹

The programme was initiated in 1984 by WHO in close collaboration with the International Society and Federation of Cardiology (ISFC). Sixteen countries in five WHO Regions participated: Mali, Zambia and Zimbabwe (in Africa); Bolivia, El Salvador and Jamaica (in the Americas); Egypt, Iraq, Pakistan and Sudan (in the Eastern Mediterranean); India, Sri Lanka and Thailand (in South-East Asia); and China, the Philippines and Tonga (in the Western Pacific). The programme was planned for implementation in three phases: pilot study and control programme in a selected area, control programmes in all the selected communities, and their extension to the whole country.

In Phase I, a total of 1 433 710 schoolchildren were screened and 3135 cases of rheumatic fever/rheumatic heart disease (RF/RHD) were found, giving a prevalence of 2.2 per 1000 (higher in the African and Eastern Mediterranean regions); 33 651 recently identified or already known cases were registered; completion of secondary prophylaxis was irregular but averaged 63.2% coverage; percentages of adverse reactions (0.3%) and recurrence of acute RF (0.4%) were very small; 24 398 health personnel and teachers were trained. Health education activities were organized for patients, their relatives, and the general public in hundreds of health education sessions. Thousands of pamphlets, brochures and posters were distributed, and health education programmes were broadcast on radio and television. The quality of care for RF/RHD patients improved under the programme, which has been expanded to other areas.

Introduction

Rheumatic fever / rheumatic heart disease (RF/RHD) is the most common cardiovascular disease in children and young adults and remains a major public health problem in developing countries (1). The cost is very high because of repeated hospitalizations (often resulting in premature death), the enormous resources needed for medical and surgical treatment of large numbers of patients, and the suffering

caused to patients and relatives (2).^a The resurgence of acute RF in the USA in the mid-1980s, with its specific epidemiological characteristics, plus other isolated epidemics of RF (1, 2),^a and the absence of an effective antirheumatic streptococcal vaccine or genetic marker to identify people at high risk of developing RF, point to the fact that intensified research is needed in these areas. Meanwhile, the available and feasible preventive methods must be applied (1, 2).^a

WHO has been concerned with RF/RHD prevention and control since 1954, when the WHO Expert Committee on Rheumatic Diseases suggested

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^a Nordet, P. *Rheumatic fever. Clinical and epidemiological aspects, Havana, Cuba, 1972–1987*. Thesis. Havana, Cuban Ministry of Health, 1988.

the possibility of using antibiotics and sulfonamides to prevent RF/RHD on a worldwide scale (3). Subsequently, other WHO Expert Committees have directed their efforts towards public health practices with regard to the study, prevention and control of group A streptococcal infections and RF/RHD (1, 3-8).^{b, c}

In the 1970s, WHO initiated an international cooperative study on RF/RHD prevention in seven developing countries in Africa, the Americas and Asia, and the Pan American Health Organization (PAHO) developed another study in seven Latin American countries. Both of these demonstrated that community programmes for the secondary prevention of RF/RHD were not only feasible but also cost-effective in developing countries (9), and this has been stressed in several WHO reports on RF/RHD (1, 6-10).^{b, c, d}

In 1984, in response to a World Health Assembly resolution (WHA36.32), WHO, in close collaboration with the International Society and Federation of Cardiology (ISFC), initiated the global programme for the prevention of RF/RHD in 16 developing countries.^d This programme, which was designed to encourage the application of proven control measures to decrease morbidity and mortality due to RF/RHD and to support national strategies for Health for All by the Year 2000, is partly funded by the Arab Gulf Programme for United Nations Development Organizations (AGFUND).

Methods

Based on the experiences from the earlier WHO cooperative research study (9), the present programme was conceived and planned as a *service-oriented activity* to be implemented through primary health care (PHC) and the national health care delivery system.^d The Ministry of Health therefore has executive responsibility for the national programme, appointing the national programme manager and a multi-disciplinary advisory committee, and providing local inputs to maintain the programme at a viable level.

^b Report of an Advisory Committee Meeting on Streptococcal Diseases Complex, Geneva, 15-18 November 1983. Unpublished WHO document BVI/STREP/85.1, 1985.

^c Meeting on the assessment and further development of the WHO programmes on streptococcal diseases and meningococcal infection (Geneva, 10-13 October 1988). Unpublished WHO document WHO/MIM/STREP/CSM/89.2, 1989.

^d WHO Global Programme for the Prevention of Rheumatic Fever/Rheumatic Heart Disease in sixteen developing countries (AGFUND supported). Meeting of national programme managers, Geneva, 4-6 November 1986. Unpublished WHO document WHO/CVD/87.1, 1987.

Each collaborating country has prepared a national plan of operation following guidelines provided by WHO, with objectives and targets and a commitment to extend programme activities in realistic steps towards nationwide coverage. Each approved plan of operation was signed by the Minister of Health and the respective WHO Regional Director to indicate their endorsement of the plan as a basis for collaboration with WHO.

The programme's implementation was in three phases:

- short-term (Phase I): planning and development, pre-programme pilot study, and programme of control in the selected area;
- medium-term (Phase II): community control (consolidation and extension to the whole selected community);
- long-term (Phase III): nationwide extension (consolidation and extension to the whole country).

Collaborating countries. Sixteen countries from five WHO Regions were identified in 1984 and have been participating in the global programme.

- Africa (population, 193 615): Mali, Zambia, Zimbabwe
- The Americas (140 700): Bolivia^e, El Salvador, Jamaica
- Eastern Mediterranean (874 813): Egypt, Iraq, Pakistan, Sudan
- South-East Asia (1 950 000): India, Sri Lanka^e, Thailand
- Western Pacific (632 000): China (Guangdong Province)^f, Philippines, Tonga.

Programme approaches. These cover case-finding, registration, and secondary prophylaxis.

Three approaches are used for case-finding: (1) screening surveys of schoolchildren; (2) hospital retrospective case surveys; and (3) continuing detection and referral of any RF/RHD confirmed or suspected case from hospital discharge, private clinic, outpatient services or any other sources.

A central register was created to record the names and main data of all confirmed RF/RHD patients. In some areas, there is more than one local registration centre. There is a referral centre to confirm the diagnosis of the suspected RF/RHD patients.

Follow-up consultation and secondary prophylaxis are conducted in the local registration centres

^e Pre-programme pilot study only.

^f Target population, 5-15 years old.

Table 1: Prevalence of RF/RHD, by Region

WHO Region	No. of surveys	No. of schoolchildren screened	No. of RF/RHD cases detected	Prevalence per 1000 (range)
Africa	11	173 408	818	4.7 (3.4–12.6)
Americas	5	23 328	35	1.5 (0.1–7.9)
Eastern Mediterranean	19	409 933	1807	4.4 (0.9–10.2)
South-East Asia	6	195 142	26	0.12 (0.1–1.3)
Western Pacific	17	631 899	449	0.7 (0.6–1.4)
All Regions	58	1 433 710	3135	2.2 (0.7–4.7)

or in the polyclinics, depending on the characteristics of the PHC available in the selected community. The criteria recommended by WHO (1) were used.

Personnel training and health education. Health education was carried out by all collaborating countries as an integral part of the programme. This meant training both school teachers and health personnel (including doctors) to carry out education of healthy children, patients and their families, and the general public. The health education message was disseminated by the use of pamphlets, brochures and posters and regular television/radio sessions or newspaper articles. These activities were conducted by doctors, nurses and other trained personnel, under the responsibility of the programme manager and the programme advisory committee.

Evaluation procedure. Continuous evaluation was maintained throughout the programme, and a six-monthly progress report was submitted by each centre to WHO on a standard form.⁹ This evaluation was based on the numbers of children screened, newly identified cases of RF/RHD, new cases registered from any other sources, patients registered for secondary prophylaxis, patients who completed the prophylaxis course, patients with recurrence of acute RF, adverse reactions to benzathine benzylpenicillin, and any other concerns. All the collaborating countries observed similar general principles and methods of operation, with some adaptations to local conditions.

Results

The results are based on the pre-programme pilot study report from the sixteen collaborating countries

and the six-monthly progress reports submitted to WHO from 14 centres between May 1986 and March 1990. Occasionally reports were not received from some centres or were delayed.

Case-finding, registration and secondary prophylaxis

A total of 1 433 710 schoolchildren were screened through 58 surveys carried out in the selected area of the collaborating countries, 3135 cases of RF/RHD were found, giving an average prevalence rate of 2.2 per 1000 (range, between 0.1 and 12.6), which was higher in the African and Eastern Mediterranean regions (4.7 and 4.4/1000) (Table 1). The countries with the highest prevalence rates were Zambia (12.6), Sudan (10.2), Bolivia (7.9) and Egypt (5.1).

During the study period, 33 651 recently identified patients or already known cases were registered: 8889 from hospital retrospective surveys and other sources (including 3135 through screening), and 24 762 known cases (Table 2). The percentage of recently identified cases was higher in the Eastern Mediterranean (81.0%).

Secondary prophylaxis was administered to more than 30 000 registered patients, at first to 4394 in the pre-programme pilot study and then, depending on the survey reports, to newly registered cases; patients who had completed their course of prophylaxis or had died or moved elsewhere were excluded. An average of 12 000 patient-years was registered for prophylaxis.^h The rate of coverage per 100 patients registered for secondary prophylaxis per month, although irregular, averaged 63.2% (range, 23.8–96.9%); coverage was higher in the Western Pacific and lower in the Americas and Eastern Mediterranean (Table 3). The countries with the lowest rates were El Salvador (23.8%), Mali (31.8%) and Egypt (39.4%). The expected coverage rate of

⁹ See footnote d on page 214.

^h Patient-years: number of patients registered for secondary prophylaxis during a period of 12 months.

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Table 2: Case detection and registration, by Region

WHO Region	Cases discovered			Total on register
	Screening	Other sources	Known cases	
Africa	818	91	6390	7299
Americas	35	881	8729	9645
Eastern Mediterranean	1807	3790	1323	6920
South-East Asia	26	685	6167	6878
Western Pacific	449	307	2153	2909
All Regions	3135	5754	24 762	33 651

≥70% was reached by 9 of the 14 countries. Benzathine benzylpenicillin by injection was administered to 95.7% of the patients; adverse reactions were reported by 36 patients (0.3 per 100 patient-years, or 8 per 10 000 injections administered during the programme), including 11 cases of severe anaphylaxis (0.09% patient-years, or 2 per 10 000 injections), of whom 4 died (0.03% patient-years, or 0.8 per 10 000 injections). Pain was often reported in the area of injection. Recurrence of RF occurred in 53 patients (0.4 per 100 patient-years), of whom only two were receiving regular penicillin prophylaxis (3.8% of the recurrence and 0.02 per 100 patient-years). Those not included in the coverage data had dropped out or were irregular in completing the year's course of prophylaxis, which occurred more frequently with oral prophylaxis (Table 3).

Personnel training and health education

Training of doctors, nurses, other health personnel, and teachers to carry out health education or other

Table 3: Coverage of secondary prophylaxis, by Region^a

WHO Region ^b	Average coverage rate (%)	Range (%)
Africa	74.1	31.8 – 88.1
Americas	47.2	23.8 – 75.6
Eastern Mediterranean	51.5	39.4 – 83.9
South-East Asia	58.8	56.6 – 82.9
Western Pacific	90.2	80.2 – 96.9
All Regions	63.2	23.8 – 96.9

^a 95.7% used benzathine benzylpenicillin, 2.1% oral penicillin, 0.1% sulfadiazine, and 2.1% erythromycin; 0.3% patient-years had adverse reactions to penicillin and 0.4% patient-years had a recurrence.

^b Three six-monthly country progress reports of inadequate quality were excluded.

Table 4: Training of personnel, by type and Region

WHO Region	Personnel			Total
	Doctors	Other health workers	School teachers	
Africa	91	169	438	698
Americas	123	1147	810	2080
Eastern Mediterranean	934	1672	3498	6104
South-East Asia	227	934	7648	8809
Western Pacific	763	1858	4086	6707
Total	2138	5780	16 480	24 398

technical aspects of the programme was conducted for a total of 24 398 persons. This was developed in several workshops, seminars, symposia and health education courses. Health education activities for patients, relatives, healthy children and the general public were supported by 1032 health education group sessions; and thousands of pamphlets, brochures and posters were distributed in schools and health centres. Also, a total of 124 radio or television programmes were broadcast. They were conducted in the 14 participating countries, and adapted to the local conditions and specific cultural and linguistic characteristics (Tables 4 and 5).

Discussion

The observed prevalence rate of RF/RHD was lower than expected, which may be because it showed only in some selected schools. The high number of recently identified patients and already known cases indicates that RF/RHD remains an important problem for children, adolescents and young adults in almost all the participating countries, and that all the case-finding approaches used in the programme were useful.

Table 5: Activities for health education, by Region

WHO Region	Pamphlets and brochures	Posters	Radio or television programmes	Group sessions
Africa	1 600	–	17	13
Americas	24 304	28	22	93
Eastern Mediterranean	58 500	9 790	39	486
South-East Asia	45 284	24 581	36	200
Western Pacific	111 580	1 003	12	240
Total	767 768	35 402	126	1032

The level of secondary prophylaxis coverage is difficult to assess over long periods, because of the influence of many constraints such as shortage of benzathine benzylpenicillin, inadequate staff, weak reporting on activities, and low patient compliance during some phases of the programme; hence, great variations were observed between countries and in the six-monthly reports from the same country. The results in nine countries, with a higher-than-expected 70.0% average of prophylaxis coverage and with low rates of RF recurrence, resemble those from other studies on community control of RF/RHD (9, 11–13). The proportion of adverse reactions to the penicillin (mainly severe anaphylaxis and death) was small and agrees with other reports (ranging from 1 to 4 per 10 000 courses of penicillin treatment) (1, 14–16).

Personnel training and health education activities also varied between countries and during progress of the programme, mainly because of a lack of resources. However, any improvement in these activities increased the number of cases identified and registered, as well as secondary prophylaxis coverage.

Phase I of the programme, which was completed satisfactorily in almost all the participating countries with integration into the PHC system, led to greater awareness of RF/RHD among patients, and increased the coverage for secondary prophylaxis and medical care. The recurrence rate decreased and the government and health authorities also showed more interest in this disease.

The experience gained from Phase I of the programme should encourage the participating countries to continue with Phase II. In addition, the programme should be extended to other countries where RF/RHD is a problem, as recommended recently.¹

¹ A Joint WHO/ISFC Global Strategy to prevent Rheumatic Fever/Rheumatic Heart Disease. Report of a Consultation, Geneva, 26–27 February 1990. Unpublished WHO document WHO/CVD/90.3, 1990.

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Résumé

Programme OMS de prévention du rhumatisme articulaire aigu et des cardiopathies rhumatismales dans 16 pays en développement: rapport de la Phase I (1986–1990)

Le programme a été lancé en 1984 par l'OMS en collaboration étroite avec la Société et Fédération internationale de Cardiologie (SFIC). Seize pays appartenant à cinq Régions OMS y participent: Mali, Zambie et Zimbabwe (Afrique); Bolivie, El Salvador et Jamaïque (Amériques); Egypte, Iraq, Pakistan et Soudan (Méditerranée orientale); Inde, Sri Lanka et Thaïlande (Asie du Sud-Est); Chine, Philippines et Tonga (Pacifique occidental). Le programme devait être mis en œuvre en trois phases: étude pilote et programme de lutte dans une région choisie, programmes de lutte dans toutes les communautés choisies, extension à l'ensemble du pays.

Au cours de la Phase I, un total de 1 411 910 écoliers ont été dépistés et 3135 cas de rhumatisme articulaire aigu ou de cardiopathie rhumatismale ont été trouvés, ce qui correspond à une prévalence de 2,2 cas pour 1000 (avec des chiffres plus élevés dans la Région africaine et la Région de la Méditerranée orientale); 33 651 cas récemment diagnostiqués ou déjà connus ont été enregistrés; la prophylaxie secondaire a été irrégulièrement suivie, mais a atteint une couverture de 63,2%; les pourcentages de réactions indésirables (0,3%) et de rechutes de rhumatisme articulaire aigu (0,4%) ont été très faibles; 24 398 membres des personnels de santé et enseignants ont été formés. Des activités d'éducation pour la santé ont été organisées à l'intention des malades, des familles et du grand public, au cours de centaines de séances éducatives. Des milliers de brochures et d'affiches ont été distribués, et des programmes d'éducation pour la santé ont été diffusés à la radio et à la télévision. La qualité des soins aux malades atteints de rhumatisme articulaire aigu et de cardiopathies rhumatismales s'est améliorée au cours du programme, qui a été étendu à d'autres régions.

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Annex

Programme sites and principal investigators

African Region

Mali: Hôpital du point “G”, Ecole Nationale de Médecine et de Pharmacie, Bamako (M.K. Toure).

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