A proposal for the eradication of rheumatic fever in our lifetime

Bongani M Mayosi

The Pan African Society of Cardiology (PASCAR) convened the 1st All Africa Workshop on Rheumatic Fever (RF) and Rheumatic Heart Disease (RHD) on 15 - 16 October 2005 at the Champagne Sports Resort, Drakensberg, South Africa. The purpose of the Workshop was to formulate an action plan for the prevention of RF and RHD in Africa. The gathering was a response to the new guideline on the control of RF and RHD by the World Health Organization (WHO) in 2004.[1] The meeting (and this supplement) was made possible by the generous sponsorship of the national Department of Health of South Africa, the Medical Research Council of South Africa, the WHO Regional Office for Africa (WHO-AFRO) and the World Heart Federation, and endorsed by the Heart Foundation of South Africa, the Paediatric Cardiac Society of South Africa, and the South African Heart Association. The other organisations represented at the meeting included the Africa Heart Network, the Nigerian Heart Foundation, and academics from the universities of Alexandria, Cape Town, Ghana, Ibadan, KwaZulu-Natal, Libreville, Limpopo, Nairobi, Pretoria, and Eduardo Mondlane University.

The meeting lived up to its name as the most representative African gathering ever held on the question of RF and RHD, with representatives from all the five regions of Africa, and from all major language regions of the continent (i.e. English, French, and Portuguese-speaking Africa) (Fig. 1). The 42 delegates were from Angola (1), Cameroon (1), Congo (1), Egypt

The delegates who participated in the 1st All Africa Workshop on Rheumatic Fever and Rheumatic Heart Disease are:
Back row (left to right): Chapman Palweni, South Africa; Salah Zaher, Egypt; Jonathan Carapetis, Australia; Patrick Commerford, South Africa; Pierre Kombila-Koumba, Gabon; Kingsley Akinyore, Nigeria; Michael Dean, South Africa; Samuel Omokhodion, Nigeria; Albertino Damasceno, Mozambique; Wole Adebo, Nigeria; Baby Thomas, South Africa; Elijah Ogola, Kenya; Jonathan Matenga, Zimbabwe; Antonio Filipe, Angola; Robert de Souza, South Africa; John Lawrenson, South Africa; Pravin Manga, South Africa; Charles Bannerman, Zimbabwe; Chris Hugo-Hamman, South Africa; Albert Amoah, Ghana; Jimmy Volmink, South Africa.
Seated (left to right): Anne Croasdale, South Africa; Christelle Kotzenberg, South Africa; Kate Robertson, USA; Ana Mocumbi, Mozambique; Kathie Walker, South Africa; Antoinette Cilliers, South Africa; Tshimbi Mathivha, South Africa; Shan Biesman-Simons, South Africa; Sally Ann Jurgens-Clur, The Netherlands; Tiny Mokone, South Africa; Jenny Dean, South Africa.
Kneeling (left to right): Phindile Mntla, South Africa; Adrian Pearce, South Africa; Bongani Mayosi, South Africa; Avril Salo, South Africa; Ronnie Jardine, South Africa; Charles Wiysonge, Cameroon.

(1), Ghana (1), Mozambique (2), Nigeria (3), South Africa (27), and Zimbabwe (2). There were also speakers from Australia (1), the Netherlands (1), and the USA (1).

The scene for the main business of the meeting was set by a welcoming message from Professor Anthony MBewu, President of the Medical Research Council of South Africa, which was followed by a situational analysis of the epidemiology and treatment of the disease in South Africa (by Jurgens-Clur) and Nigeria (by Omokhodion), respectively. The intensive deliberations that ensued resulted in the adoption of the Drakensberg Declaration on the Control of Rheumatic Fever and Rheumatic Heart Disease in Africa, a clarion call for action to prevent RF/RHD in all African countries. The proposed action plan, which is called the A.S.A.P. Programme, calls for efforts to increase **A**wareness of RF/RHD among the general public and practitioners; the establishment of **S**urveillance programmes to measure the burden of disease in the population; **A**dvocacy to increase allocation of resources for the treatment of affected children and young adults; and the implementation of primary and secondary **P**revention schemes in all countries of Africa.

The Pan African Society of Cardiology calls on all fraternal organisations and other members of the international community to join in this ambitious effort to rid Africa of the scourge of RF and RHD in our lifetime.

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Reference

1. World Health Organization. Rheumatic fever and rheumatic heart disease. Report of a WHO Expert Consultation, Geneva, 29 October - 1 November 2001. **http://www.who.int/cardiovascular_diseases/resources/trs923/en/** (last accessed 15 November 2005).

Welcome address: Rheumatic heart disease is a neglected disease of poverty requiring a multisectoral approach for control and eradication

Anthony D MBewu

Ladies and Gentlemen, as President of the Medical Research Council of South Africa (MRC), who are co-sponsors of this meeting, it gives me great pleasure to welcome you to this, the 1st All Africa Workshop on Rheumatic Fever (RF) and Rheumatic Heart Disease (RHD). We congratulate the Pan African Society of Cardiology for having conceived and brought this bold project to fruition, and we also commend the Organising Committee led by Professor Bongani Mayosi for all their hard work over the past months in planning and organising this important event.

We are particularly honoured to have Dr Jonathan Carapetis, Chairman of the World Heart Federation Council on Rheumatic Fever and one of the world's foremost authorities on acute RF, whose excellent chapter in the *Oxford Textbook of Medicine* I enjoyed reading immensely.

An African problem solved by Africans

So often important initiatives on health or health research in Africa are conceived in Europe or America, planned in Geneva or Washington by a group of scientists predominantly from the north, and then implemented in Africa by similar groups of researchers heading south. Of course, we are only too grateful for the collaborations and inputs, both financial and technical, of people from all over the world in tackling Africa's health problems, but how refreshing it is to see an initiative that was conceived and developed in Africa, and that will be implemented by Africans with the assistance of friends and partners from all over the world.

Our President, Thabo Mbeki, is often quoted as saying that only when Africa and Africans acknowledge and take responsibility for their own health, political and socio-economic problems, will they be able to rise up and solve them, in partnership with people worldwide. This is the rationale behind the socio-economic blueprint of the African Union – the New Partnership for Africa's Development (NEPAD). In many ways this project to stop RF and RHD in Africa, A.S.A.P., is a NEPAD project, at least in spirit, and I would recommend that you seek funding from the NEPAD Health Secretariat for your work in the future.

President, Medical Research Council of South Africa, Parowvallei, W Cape
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Faculty

I therefore congratulate the organisers on having amassed such a distinguished faculty of cardiologists, physicians and scientists to consider this weighty problem. I am certain that this composition of experts will ensure that the project moves forward on a broad continental front, and that its recommendations are taken up and implemented by the relevant national ministries throughout Africa's 53 countries. Planning such dissemination strategies while still doing the work is a tactic that we are using to good effect in the Disease Control Priorities Project, of which I will say a few words later. Indeed such an approach will help clear one of the biggest hurdles that has faced acute RF prevention and control in developing countries, viz. adoption by the national ministry of health and enthusiastic implementation of prevention and control programmes.

A neglected disease of poverty with multisectoral action needed

There is no doubt that RF remains a disease with great morbidity and mortality in most low- and middle-income countries, despite having been nearly eradicated in high-income countries. It is therefore both a neglected disease and a disease of poverty. Indeed, it is a classic example of a disease that, despite the presence of effective primary and secondary prevention, treatment and rehabilitation methods, continues to wreak a heavy toll on many societies.

This is partly because many of the important determinants of this disease lie outside the health sector. They include social determinants such as housing, education and poverty, in addition to the classic health care determinants of access to primary health care clinics, scarcity of health care staff, health literacy of health care workers, patients and families, logistics of drug supply, and availability of sophisticated cardiology and cardiac surgery services.

Your message therefore will need to go not only to the Ministries of Health and the Deans of the Medical Schools, but also to the Ministries of Housing, Education and Treasury, as well as to the media, patient support groups, and allied health professionals.

Inter Academy Medical Panel

I sit on the Steering Committee of a global partnership called the Inter Academy Medical Panel (IAMP) **(http://www.iamp-**

online.org/). The IAMP represents 50 of the leading medical academies of the world and is due to hold its biennial congress in Beijing in April 2006. The IAMP held a strategic planning workshop in Sicily in June 2005, and I took the liberty of informing them of this important initiative which they could, with your permission, champion at a global level. They were very enthusiastic and eagerly await the outcomes of this workshop. As the members of the IAMP are the most distinguished clinicians and medical scientists in their respective countries, they have access to national agencies and foundations at a high level, and they are fairly certain that they could garner support for the A.S.A.P. initiative for RF/RHD control in Africa.

In the minutes of their Sicily meeting they write 'the actions proposed include convening a group of experts from academies, carrying out research in etiology and into better diagnostic methods, and most of all lobbying and advocacy for total elimination by adherence to national guidelines that already exist'. It was felt that national academies in affected countries could mainly help to raise awareness in their governments of the need to bring prevention, prophylaxis and control systems to the public eye. Academies could work in tandem with the World Health Organization and medical organisations dealing with cardiology and infectious diseases in the implementation of national guidelines that exist already.

Furthermore, the IAMP Steering Committee members form the Advisory Committee to the Editors of the Disease Control Priorities Project (DCPP), funded by the Gates Foundation and the World Bank, and hosted by the Fogarty International Centre of the National Institutes of Health (**http://www.fic.nih.gov/dcpp/**). The second edition of the DCPP book will be launched at the Beijing meeting and clearly we must ensure that RF features prominently as a disease control priority for developing countries.

The IAMP was instrumental in lobbying for the US$50 million that the Gates Foundation committed to the African Academies of Science Project which seeks to develop the capacity and effectiveness of African Academies of Science. One of its key objectives is to ensure that these Academies provide effective policy advice and technical input to national governments on issues of health. This would obviously be central to your work in implementing your programmes at national level, and I would urge you to contact the African Academies project in this regard.

Conclusion

These then are just a few practical suggestions as to how you can ensure that the results of this weekend workshop are both disseminated and implemented to eliminate RF from Africa in our lifetime, and RHD not too long after that. It is feasible, having been done in the West over the past 50 years.

I wish you all success with your deliberations and look forward to seeing the outputs of this meeting. We at the Medical Research Council will endeavour to continue our support for this initiative as a priority in cardiovascular research in South Africa and Africa.

Frequency and severity of rheumatic heart disease in the catchment area of Gauteng hospitals, 1993 - 1995

Sally-Ann Clur

Objective. Identification of frequency and severity of rheumatic fever/rheumatic heart disease (RF/RHD) in the catchment area of Gauteng hospitals.

Design. A retrospective descriptive analysis using hospital-based computer databases.

Setting. Helen Joseph, Chris Hani Baragwanath and Johannesburg General hospitals, Gauteng, South Africa.

Subjects. Three hundred and twelve of 493 (63%) paediatric RF/RHD patients with documented addresses seen from 1993 to 1995.

Methods. A proportional analysis, with the total congenital heart disease (CHD) patients seen in an area as the denominator, was employed to identify areas with prevalent and/or severe RF/RHD. Severe disease was defined as that requiring surgery or balloon valvuloplasty.

Results. 32.7% of RF/RHD patients came from outside Gauteng, and 70.2% of those seen at Chris Hani Baragwanath Hospital were not from Soweto. KwaZulu-Natal, Northern Province, Mpumalanga and Evaton had a significantly higher-than-expected ratio of RHD/CHD patients and were identified as priority areas at high risk for RHD. Gauteng and some Johannesburg suburbs had a significantly lower-than-expected ratio and therefore had a relatively low risk for RHD. 32.9% of RHD patients had severe disease. The severity rate for Gauteng residents was 34.8% and for non-Gauteng residents 51%. Significantly more severe cases than expected came from KwaZulu-Natal, Northern Province, Mpumalanga and Gauteng south. Significantly fewer severe RHD patients than expected came from Gauteng, especially Gauteng centre.

Conclusions. A high frequency of RF/RHD and severe disease was recorded in patients living in KwaZulu-Natal, Northern Province and Mpumalanga.

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South Africa is in the unique situation of having tertiary care facilities juxtaposed against conditions that foster rheumatic fever (RF) and rheumatic heart disease (RHD).[1,2] RF/RHD remain particularly prevalent among black people, who were deprived of human and socio-economic rights under apartheid.[3-6] In South Africa, RF/RHD is a disease of young rural children who often experience frequent relapses, often resulting in prolonged hospitalisation and surgery, with long-lasting adverse effects on lifestyle and employability.[2,4,7-12]

Paediatric patients often present in cardiac failure and require surgical intervention.[5,13] As conservative surgery is not advisable in the acute phase, mechanical valve replacement is necessary requiring lifelong anticoagulant therapy.[7,13] Balloon valvuloplasty, valve repair or replacement require expert teams in tertiary care centres.[8,14] Few developing countries can provide these facilities or guarantee the long-term anticoagulant therapy, surveillance and ongoing prophylaxis required after surgery.[15] Costs of antifailure therapy, long-term anticoagulation and thrombo-embolic complications are therefore substantial in rural patients.[7,8,15-17]

In 1972 the prevalence rate of RHD in Soweto was found to be 6,9/1 000 in the 2 - 18-year age group.[9] In 1973, RF/RHD was listed among the top 10 causes of death in the 15 - 24-year age group in South Africa.[6] The disease accounts for about 15% of the paediatric cardiac patients admitted to South African hospitals.[11] The need for a comprehensive preventive campaign directed at RF prophylaxis and socio-economic upliftment was recognised over 30 years ago.[9] In 1983 it was suggested that a national register of RF/RHD patients be instituted along with patient identity/record cards to help the situation.[4,10] An effective national campaign for the prevention of RF/RHD is long overdue.

This study was conducted to identify areas with a high frequency and severity of RF/RHD within the referral range of the three paediatric teaching hospitals of the University of the Witwatersrand. Such information would identify geographical areas and communities for priority preventive action.

Methods

A retrospective analysis of the geographical origins of paediatric patients with RF/RHD seen from January 1993 to December 1995 was performed, using the paediatric computer databases of the Helen Joseph (HJ), Chris Hani Baragwanath (CHB) and Johannesburg General (JG) hospitals. An effort was made to enquire from the patients themselves where they became ill. The lack of reliable South African population census figures at the time of the study made the determination of incidence and prevalence rates difficult. The author elected to use congenital heart disease (CHD) as a marker related to population size to

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overcome the need for accurate population data. This was based on the premise that the prevalence of CHD is constant, with an incidence of about 10/1 000 live births (3 - 5/1 000 in earlier, and 4 - 12/1 000 in later studies).[18] However the incidence of CHD in underdeveloped countries is not known as population studies are lacking for these areas. An incidence of 6.08/1 000 live births has been reported in Guadeloupe,[19] and 7.5/1 000 live births in Johannesburg in 1981.[20]

The total number of RF/RHD patients seen from a given area was compared with the expected number, related to the number of CHD patients seen from that area, to identify areas with relatively more or relatively fewer RF/RHD sufferers than expected. The expected ratio of RHD to CHD used was 0.214.[11] The observed ratio was tested for a significant difference from the expected number.

Severe disease was defined as that requiring surgery or balloon valvuloplasty. The observed number of severe and non-severe RHD patients seen in an area was compared with the expected number, using the number of CHD cases seen as a marker. The overall observed ratios of severe RHD and non-severe RHD to CHD cases seen were used as the expected ratios. Areas where relatively more, or relatively less, severe RHD was seen than expected were therefore identified. The observed number of severe RHD patients seen from each area was tested for a significant difference from the expected number.

The chi-square test was used, and $p < 0.05$ was taken as significant. South Africa was initially divided into sections according to the nine provinces. Gauteng was further divided into Soweto, central, western, southern, eastern and northern sections. Ethical clearance was obtained from the University of the Witwatersrand Ethics Committee.

Results

A total of 493 patients with RF/RHD were seen in the study period. Of these, 312 (63.3%) had documented addresses. There were 2 876 cases of CHD seen in the same period. Of these, 1 747 (60.7%) had known addresses. The main countries referring cardiac patients to the three teaching hospitals were Lesotho, Mozambique, Swaziland and Zimbabwe. Tables I and II give the numbers of patients seen with each diagnosis together with the expected number of RF/RHD patients for the number of CHD patients seen.

Severe disease was found in 162 of the total 493 patients seen (32.9%). Thirty-seven (22.8%) of these patients were of unknown geographical origin. The severity rates for Gauteng and for patients originating from outside Gauteng were 34.8% and 51%, respectively. The numbers of patients seen from each area with CHD and severe and non-severe RF/RHD are shown in Table III.

Frequency and severity by province of origin

A significantly higher-than-expected number of RF/RHD patients came from the Northern Province, KwaZulu-Natal and Mpumalanga. An expected number came from the North-West Province and less than expected from Gauteng. The Eastern Cape and Free State figures were too small to draw definite conclusions (Table I).

Significantly more severe cases came from the Northern Province, KwaZulu-Natal and Mpumalanga and possibly the Eastern Cape (small numbers). An expected number originated from the North-West Province and possibly the Free State (small numbers). Significantly less severe cases of RF/RHD originated from Gauteng.

Frequency and severity within Gauteng subregions

Of the CHD patients seen, 82.8% were from Gauteng while only 67.3% of the RF/RHD patients seen were from Gauteng. Of the RF/RHD patients seen at CH hospital, 70.2% were from outside Soweto. A significantly less-than-expected number of RF/RHD patients originated from Gauteng central, north and east (Table I). This also applied to Johannesburg, the northern suburbs, the eastern suburbs north of the M2 and Alberton, and the north-eastern part of Gauteng north (Table II). Significantly more RF/RHD cases than expected came from Evaton but the numbers were small. The combined analysis of Evaton and surrounding areas showed that significantly more RF/RHD cases than expected came from that area. A higher-than-expected number came from Kwa-Thema and from Kwa-Thema, Duduza and Tsakane combined (small numbers).

Significantly less severe RF/RHD patients than expected came from Gauteng central. Within Gauteng central, significantly fewer severe cases than expected originated from Johannesburg west, centre and south, and Eldorado Park, Riverlea and Noodgesig. Significantly more severe RF/RHD patients than expected originated from Gauteng south. Vanderbijl Park and Evaton referred a higher-than-expected number of severe patients (small numbers). When Vanderbijl Park was analysed with Vereeniging and Sebokeng, a significantly higher-than-expected number of severe cases came from that area. The combined evaluation of Evaton and Sebokeng and Evaton, Vanderbijl Park and Vereeniging, also showed that significantly more severe RF/RHD cases than expected originated from these areas. Soweto, Gauteng west, north and east all showed an as-expected degree of severe RF/RHD. Within Gauteng east more severe RF/RHD cases than expected were seen from Kwa-Thema and Tsakane, while the numbers for Thokoza and Katlehong were as expected (small numbers).

Table I. Frequency of RHD and CHD patients seen from January 1993 to December 1995 in three Gauteng teaching hospitals compared with the expected frequency (expected ratio RHD/CHD = 0.214[11])

Area of origin	Observed RHD	CHD	Expected RHD	Chi-square	p-value	Note
Out of South Africa	5	34	7.188	0.666	NS	
KwaZulu-Natal	16	34	7.188	10.805	< 0.0025	> RHD
Northern Province	30	32	6.765	79.806	< 0.0005	> RHD
Mpumalanga	17	41	8.667	8.011	< 0.005	> RHD
North-West Province	20	122	25.791	1.300	NS	
Free State	4	22	4.651	0.091	NS	*
Eastern Cape	10	15	3.171	14.707	< 0.0005	> RHD*
Gauteng	210	1 447	305.896	30.063	< 0.0005	< RHD
All patients	493	2 876	607.986	21.747	< 0.0005	< RHD
Areas in Gauteng						
Gauteng central	47	452	95.553	24.671	< 0.0005	< RHD
Gauteng north	13	117	24.734	5.567	< 0.02	< RHD
Gauteng east	38	285	60.249	8.216	< 0.005	< RHD
Gauteng west	19	120	25.368	1.599	NS	
Gauteng south	37	153	32.344	0.670	NS	
Soweto	56	320	67.648	2.006	NS	

CHD = congenital heart disease; RHD = rheumatic heart disease/rheumatic fever; NS = not statistically significant; < RHD = RHD incidence less than expected; > RHD = RHD incidence greater than expected; * = numbers too small for analysis alone.

Table II. Frequency of RHD and CHD seen in Johannesburg and surrounding areas January 1993 to December 1995 compared with the expected frequency (expected ratio RHD/CHD = 0.214[11])

Area of origin	Observed RHD	CHD	Expected RHD	Chi-square	p-value	Note
North-eastern Gauteng north	6	76	16.066	6.307	< 0.02	< RHD
Johannesburg centre and north	8	166	35.092	20.916	< 0.0005	< RHD
South Johannesburg	1	34	7.188	5.327	< 0.025	< RHD
West Johannesburg	7	94	19.872	8.337	< 0.005	< RHD
Evaton	10	19	4.017	8.913	< 0.005	> RHD*
Evaton and Heidelburg	13	24	5.074	12.383	< 0.0005	> RHD
Evaton and Walkerville	12	23	4.862	10.478	< 0.002	> RHD
Evaton and Orange Farm	14	29	6.131	10.101	< 0.002	> RHD
Edenvale, Bedfordview and Germiston	0	39	8.245	8.245	< 0.005	< RHD
Boksburg, Brakpan and Springs	0	56	11.838	11.838	< 0.001	< RHD
Eastern suburbs (north of M2) and Alberton	4	126	26.636	19.237	< 0.0005	< RHD
Thokoza	6	28	5.919	0.001	NS	
Katlehong	14	73	15.432	0.133	NS	
Tsakane	5	14	2.960	1.407	NS	*
Kwa-Thema	3	4	0.846	5.489	< 0.02	> RHD*
Duduza	2	4	0.846	1.576	NS	*
Vosloorus	2	12	2.537	0.114	NS	*
Tsakane and Duduza	7	18	3.805	2.682	NS	*
Kwa-Thema and Duduza	5	8	1.691	0.056	NS	*
Kwa-Thema, Duduza and Tsakane	10	22	4.651	6.152	< 0.02	> RHD*
Kwa-Thema, Duduza, Tsakane and Thokosa	16	50	10.570	2.790	NS	
Kwa-Thema, Duduza, Tsakane and Vosloorus	12	34	7.188	3.222	NS	

CHD = congenital heart disease; RHD = rheumatic heart disease/rheumatic fever; NS = not statistically significant; < RHD = RHD incidence less than expected; > RHD = RHD incidence greater than expected; * = numbers too small for analysis alone.

Discussion

This study shows that residents of Northern Province, KwaZulu-Natal and Mpumalanga had a higher frequency of RF/RHD referrals to Gauteng hospitals than would have been expected from CHD rates. Regarding severe RF/RHD, more severe RF/RHD patients than expected originated from Northern Province, KwaZulu-Natal, Mpumalanga, Gauteng south and possibly Kwa-Thema and Tsakane in Gauteng east, and these areas have therefore been identified as high-risk areas for severe disease. The identified RF/RHD priority areas above have the largest rural populations in South Africa.[21,22] In 1995, more than 9 million children were living in poverty in South Africa.[22] Sixty-nine per cent were from KwaZulu-

Table III. Frequency of severe RHD in patients seen from January 1993 to December 1995 compared with the expected frequency related to the observed frequency of CHD

Area of origin	Obs. CHD	Obs. severe RHD	Obs. non-severe RHD	Exp. severe RHD	Exp. non-severe RHD	Chi-square	*p*-value	Note
KwaZulu-Natal	34	7	9	1.915	3.913	20.114	< 0.005	> SRHD
Northern Province	32	15	15	1.803	3.683	131.41	< 0.0005	> SRHD
Mpumalanga	41	10	7	2.310	4.719	26.713	< 0.0005	> SRHD
North-West Province	122	7	12	6.872	14.041	0.482	NS	
Free State	22	2	2	1.239	2.532	0.579	NS	*
Eastern Cape	15	6	4	0.845	1.726	34.447	< 0.0005	> SRHD*
Gauteng	1 447	73	137	81.507	166.54	6.126	< 0.05	< SRHD
Gauteng centre	452	8	41	25.460	52.021	14.31	< 0.001	< SRHD
Gauteng north	117	4	9	6.590	13.466	2.499	NS	*
Gauteng east	285	17	21	16.054	32.801	4.301	NS	
Gauteng west	120	10	9	6.759	13.811	3.229	NS	
Gauteng south	153	20	17	8.618	17.609	15.053	< 0.001	> SRHD
Soweto	320	14	40	18.025	36.829	1.172	NS	
Gauteng north and centre	569	12	50	32.051	65.486	16.21	< 0.0005	< SRHD
Johannesburg (JHB) centre	166	0	8	9.351	19.105	15.805	< 0.0005	< SRHD*
JHB west, south and centre	294	0	16	16.561	33.837	25.963	< 0.0005	< SRHD
Eldorado Park (EP)	46	0	12	2.591	5.294	11.085	< 0.005	< SRHD*
EP, Riverlea and Noordgesig	64	0	15	3.605	7.366	11.518	< 0.005	< SRHD
Vanderbijl Park (VP)	14	4	1	0.789	1.611	13.31	< 0.0025	> SRHD*
VP and Vereeniging (V)	44	7	2	2.478	5.064	10.103	< 0.01	> SRHD*
Sebokeng	42	5	4	2.366	4.833	3.077	NS	*
Evaton	19	6	4	1.070	2.187	24.211	< 0.0005	> SRHD*
Evaton and Sebokeng	61	11	8	3.436	7.021	16.788	< 0.0005	> SRHD
Sebokeng, VP and V	86	12	6	4.844	9.898	12.105	< 0.0025	> SRHD
Evaton, VP and V	63	13	6	3.549	7.251	25.388	< 0.0005	> SRHD
Tsakane	14	3	2	0.789	1.611	6.295	< 0.05	> SRHD*
Thokosa	28	2	4	1.577	3.223	0.301	NS	*
Katlehong	73	7	7	4.112	8.402	2.262	NS	*
Kwa-Thema (KT)	4	3	0	0.225	0.460	34.630	< 0.0005	> SRHD*
Tsakane and KT	18	6	2	1.014	2.072	24.523	< 0.0005	> SRHD*
Thokosa and Katlehong	101	9	11	5.689	11.624	1.960	NS	
KT, Tsakane and Katlehong	91	10	9	5.125	10.473	4.842	NS	

CHD = congenital heart disease; Obs. = observed; RHD = rheumatic heart disease/rheumatic fever; Exp. = expected; NS = not statistically significant; < SRHD = less severe rheumatic heart disease/rheumatic fever than expected; > SRHD = more severe rheumatic heart disease/rheumatic fever than expected; * = numbers too small for analysis alone; JHB = Johannesburg; EP = Eldorado Park; VP = Vanderbijl Park; V = Vereeniging; KT = Kwa-Thema.

Natal, the Eastern Cape and Northern Province. In 1994 the unemployment rate was 32.6% with the highest figure (47%) found in Northern Province.[22,23]

This study is retrospective and referral centre-based. As far as is known, this type of examination has not been done before in South Africa. For the methodology to be sound the probability of a patient with RF/RHD being referred must be the same as for a patient with CHD. However the probability of referral varies with patient age (a baby with critical CHD (±1.73/1 000 live births) may die before getting any medical care).[24] Surgery for CHD is complex requiring tertiary hospitals with special expertise, which may affect referral patterns. Of the RHD patients seen, 32.9% required surgical intervention or balloon valvuloplasty. Previously reported severity rates in hospital admissions in South Africa were 6.5%, 4.3% and 21%, therefore more severe disease was seen.[6,8,25] As the study was not population-based no conclusions about actual prevalence in the strictest sense of the word can be drawn from it.

Information on referral patterns has also been gained. This has important economic implications. A large proportion of the workload of the study hospitals is derived from patients from outside Gauteng's borders; 17.2% of the CHD cases and 32.7% of the RF/RHD patients seen were not from Gauteng. The outpatients seen in Gauteng make up more than 50% of all the outpatients seen in South Africa.[21] Of the RF/RHD patients seen from outside Gauteng, 51% were severe. The non-Gauteng severe RF/RHD patients seen were predominantly from the Northern Province, Mpumalanga, North-West Province and KwaZulu-Natal and made up 41.6% of the severe patients seen with known addresses.

RHD remains a formidable health challenge in South Africa.[9] This study documented the referral patterns to the paediatric teaching hospitals of the University of the Witwatersrand and highlighted the workload these hospitals carry from residents of other provinces and countries. Priority areas with a high risk of RF/RHD have been identified, i.e. KwaZulu-Natal, Mpumalanga and Northern Province.

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Management of patients with rheumatic fever and rheumatic heart disease in Nigeria – need for a national system of primary, secondary and tertiary prevention

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Rheumatic fever/rheumatic heart disease (RF/RHD), which are non-suppurative complications of group A β-haemolytic streptococcal pharyngitis due to delayed immune response,[1,2] affect children and young adults living in developing countries where poverty is widespread.[3] Up to 1% of schoolchildren in Africa, Asia, the Eastern Mediterranean region and Latin America show signs of RHD.[3] It is estimated that 12 million people are affected by RF/RHD and two-thirds of these are children between the ages of 5 and 15 years.[3] There are about 300 000 deaths each year, with 2 million people requiring repeated hospitalisation and 1 million likely to require surgery globally.[3] The burden of RF/RHD in the industrialised world began to decrease in the late 19th century, with a marked decrease after the 1950s. This decline coincided with an increase in the standard of living and improved access to medical care.[4]

While the disability-adjusted life years (DALYs) lost as a result of RHD have been estimated at 27.8 and 56.1 per 100 000 population in the Americas and Europe respectively in the year 2000, the picture was more grim in Africa and South-East Asia where in the same year the DALYs lost were 119.8 and 173.4 per 100 000 population, respectively.[1]

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Is RF/RHD a non-group A streptococcal disease in Nigeria?

The epidemiological association between group A β-haemolytic streptococcal throat infections and the subsequent development of acute RF has been well established.[5,6] In 1971, the β-haemolytic streptococcal throat carriage rate was found to be 13.3% among public school children in Lagos, South Western Nigeria.[7] A more recent cross-sectional survey in 2001 among public and private schoolchildren in Benin City (mid-western Nigeria) found the streptococcal throat carriage rate to be 9.78%, but no Lancefield group A isolates were found. Lancefield groups C, G, F and B were identified, with frequencies of 38%, 36%, 20%, 6% and 7% respectively.[8]

Group A streptococcus is the only group credited with the capacity to cause non-suppurative sequelae. The dominance of Lancefield groups other than A in tropical and subtropical countries has raised questions about the possibility that non-group A beta-haemolytic streptococci may cause RF and

acute glomerulonephritis.[1,5,6] Some workers have alluded to the possible roles of groups C and G in humans with non-suppurative sequelae since they are the predominant groups in the tropical and subtropical countries, where the prevalence of RF/RHD is high.[1-4] However direct evidence for such a role has yet to be provided.

Health care facilities in Nigeria

Nigeria (Fig. 1) has an estimated population of 129 million people,[9] and is served by a pyramidal health care structure comprising 6 first-generation teaching hospitals in Ibadan, Lagos, Enugu, Zaria, Benin City and Ile-Ife, 16 federal and state-owned teaching hospitals, and an array of federal medical centres, newer state and private university teaching hospitals that number about 52, all of which are designed to function at tertiary health care level. At the secondary level of care are the general hospitals, one in every major city, managed by the state governments, while at primary health care level are the primary health care centres (PHCs), one in every community level, which are managed by the local government council authorities.

A referral system up the ladder goes from primary to tertiary level via the secondary levels depending on the case being referred. The major problem plaguing the system to date remains the reluctance of qualified staff to take up employment in the rural areas because of lack of basic social amenities including good schools to serve their needs. Consequently there is a disproportionate concentration of qualified staff in the urban areas. The effort by the government in tackling this problem has been to impose the mandatory 1-year post-qualification national youth service scheme (NYSC) which ensures the posting of doctors to the rural areas. Less than 1% of such doctors take up permanent employment in those facilities on completion of their compulsory service year.

Fig. 1. Map of Nigeria showing major cities.

Table I. Patients treated for structural heart of the programme disease under the auspices of SACHN in the first 6 years

Patients who had open heart surgery (*N*)	144
Patients who had valvular surgery (*N*)	28
Patients for whom records were available (*N*)	25
Children	19
Adults	6

SACHN = Save A Child's Heart Nigeria.

Table II. Patients who had valvular heart surgery in the study period

Category of structural heart defects	Number of patients (%)	Age range (yrs)
Congenital	8 (32)	1.5 - 20
Acquired (RHD)	17 (68)	9 - 36

Table III. Types of valvular heart surgery in the first 6 years of the SACHN programme (N (%))

Valve repair	12 (48)
Valve replacement	7 (28)
Valve repair and valve replacement	5 (20)
Ross procedure	1 (4)

SACHN = Save A Child's Heart Nigeria.

At the tertiary level, only two of the centres, viz. University of Nigeria Teaching Hospital Enugu (funded by the federal government), and Lagos State University Teaching Hospital Ikeja (funded by the state government), have established facilities for open-heart surgery involving extracorporeal circulation. The programme at Enugu has been hampered by inadequate funding so that open-heart surgical operations are intermittent undertakings. The Lagos programme on the other hand is hampered by an inadequacy of personnel and therefore relies on periodic visits by a surgical team from the USA. In Ibadan, where expertise for open-heart operations exists, facilities are available only for palliative non-pump procedures.

Non-governmental initiatives for the treatment of heart disease in Nigeria

Over the last 7 years the author has rallied others through the agency of a non-governmental organisation, Save A Child's

Heart Nigeria (SACHN),[10] and embarked on collaboration with centres willing to subsidise the cost of treatment in Israel, Ghana and India; in that time SACHN has provided for the treatment of 174 patients with structural heart disease across the country.

A similar foundation, the Kanu Heart Foundation, founded by a popular footballer who has himself been treated for valvular heart disorder, has provided for the treatment of a similar number of patients, also abroad. As part of the capacity-building programme of SACHN, training of personnel in Israel[10,11] and infrastructural development in Ibadan have been paramount since inception, and in the near future a new facility known as Bethesda Heart Center will be opened in collaboration with Medical Care Incorporated USA which will provide for open-heart surgical operations and closed (interventional) procedures. To the best of the author's knowledge, the only other access to surgical treatment of cardiac diseases available to Nigerians is through multinational agencies and government organs that ferry their staff abroad for such treatment. Some wealthy Nigerians also in need of such treatment can afford to procure it abroad. In reality therefore, despite an enormous need, surgical treatment of rheumatic valvular heart conditions in Nigeria still leaves much to be desired.

Save A Child's Heart Nigeria (SACHN) – follow-up experience

Tables I - III present the profiles of patients treated surgically in Israel and Ghana under the auspices of SACHN in the first 6 years of the programme illustrating the number of patients who had valvular surgery and the proportion that was due to RHD. There was 1 death; a 13-year-old boy died 13 days after surgery of complications related to a prosthetic heart valve. All the other patients are still alive and the major problem with their follow-up remains that of poor compliance with warfarin despite the free supply provided by SACHN to avoid use of adulterated forms. In such cases it is difficult to maintain INR values in the desired range. As patients no longer have overt symptoms, (some as many as 50%) also do not keep their follow-up appointments. One patient, a 20-year-old woman, survived haemarthrosis and mild intracranial haemorrhage resulting from overdosage of warfarin when she was sold 5 mg tablets as 1 mg tablets at a local chemist. Six months later she presented with a 3-month pregnancy which she terminated without informing the doctor she was taking warfarin. She was again referred because of excessive bleeding, and again she survived following multiple blood transfusions.

The cost of the operations was met by the combined subsidy provided by the foreign institutions where the patients were operated on, contributions from the families, and funding raised by SACHN through appeals to corporate agencies and philanthropists, since there was no health insurance scheme at the time of undertaking the treatment.

A national system of care is needed for RF/RHD in Nigeria

There is a lack of a primary, secondary and tertiary (i.e. medical and surgical treatment) programme in Nigeria, and many other countries in sub-Saharan Africa. While it goes without saying that efforts should be geared towards improving living standards and eradicating poverty as the essential first step in the control of RF/RHD, funding is required to put in place the necessary infrastructure (the author recommends at least 6 open-heart surgical treatment centres spread across Nigeria) in order to curb the menace of RF/RHD.

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Protocols for antibiotic use in primary and secondary prevention of rheumatic fever

Bongani M Mayosi

Several guidelines and studies that address the issue of 'best practice' in the primary and secondary prevention of rheumatic fever (RF) have been published recently.[1-4] Here I present a summary of the latest recommendations for the prevention of RF that have been distilled from these sources.

Primary prevention of RF

The prevention of the first attack of RF requires antibiotic treatment of suspected or proven streptococcal throat infection or tonsillitis in children between the ages of 3 and 15 years.[4] In communities where RF is endemic, all cases of sore throat in children 3 - 15 years of age should be regarded as a streptococcal infection and be treated as such *unless* any one of the following clinical characteristics, which indicate that the sore throat should not be diagnosed as a 'strep' throat, is present: ulceration, hoarseness, watery nasal secretion, and/or conjunctivitis.[1] Children not diagnosed with streptococcal pharyngitis should be treated symptomatically. If laboratory services are available, diagnosis of 'strep' sore throat should be confirmed microbiologically, but this confirmation should not delay the initiation of treatment. The recommended treatment of 'strep' throat is set out in Table I.

Table I. Treatment of 'strep' throat (3 -15 years) (primary prevention)

Antibiotic	Mode of administration	Dose
Benzathine penicillin	Intramuscular (keep child under observation for 30 minutes)	Single dose > 30 kg: 1.2 MU < 30 kg: 600 000 - 900 000 U
OR		
Phenoxymethyl penicillin	Oral	> 30 kg: 500 mg b.d. or 250 mg q.i.d. < 30 kg: 125 mg q.i.d.
OR		
if history of penicillin allergy (rare)		
Erythromycin	Oral	> 30 kg: 500 mg b.d. or 250 mg q.i.d. < 30 kg: 125 mg q.i.d.

Secondary prevention of RF

Secondary prevention requires notification of the initial attack of RF (and the first diagnosis of rheumatic heart disease (RHD) if no history of RF) in some countries (e.g. South Africa), and drug treatment every 2 - 4 weeks (Table II). Intramuscular penicillin should be encouraged in all patients; it is more effective than oral penicillin and results in better compliance.[1,3] The new World Health Organization recommendations for the duration of secondary prevention are presented in Table III.[2]

Table II. Secondary prevention of recurrent rheumatic fever

Antibiotic	Mode of administration	Dose
Benzathine penicillin	Intramuscular (keep child under observation for 30 minutes)	Given every 2 - 4 weeks > 30 kg: 1.2 MU < 30 kg: 600 000 - 900 000 U
OR		
Phenoxymethyl penicillin	Oral	> 30 kg: 250 mg b.d. < 30 kg: 125 mg b.d.
OR		
if history of penicillin allergy		
Erythromycin	Oral	> 30 kg: 250 mg b.d. < 30 kg: 125 mg b.d.

Table III. World Health Organization recommendations for duration of secondary prevention for rheumatic fever

Category of patient	Duration of secondary prevention
Patient without proven carditis	For 5 years after last attack, or until 18 years of age (whichever is longer)
Patient with mild carditis (mild mitral regurgitation or healed carditis)	For 10 years after the last attack, or at least until 25 years of age (whichever is longer)
More severe valvular disease	Lifelong
After valve surgery	Lifelong

Conclusion

The persisting problem of RF and RHD may be due in part to the failure of health care professionals to adopt existing guidelines on the prevention of RF.[5] Penicillin, which is the cornerstone of any RF prevention programme, is cheap and widely available. The challenge is to bridge the gap between evidence and practice in countries where RF and RHD remain a major public health problem.

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Towards a uniform plan for the control of rheumatic fever and rheumatic heart disease in Africa – the Awareness Surveillance Advocacy Prevention (A.S.A.P.) Programme

Kate A Robertson, Jimmy A Volmink, Bongani M Mayosi, Writing Committee, 1st All Africa Workshop on Rheumatic Fever and Rheumatic Heart Disease Champagne Sports Resort, Drakensberg, South Africa, 15 - 16 October 2005

Over the last 150 years the developed world has experienced a dramatic decline in the incidence and prevalence of rheumatic fever and rheumatic heart disease (RF/RHD) through improved living conditions and the widespread use of penicillin for the treatment of streptococcal pharyngitis. Despite the proven effectiveness and availability of penicillin for both primary and secondary prevention of RF, developing countries continue to face unacceptably high rates of the disease.[1]

RF/RHD is the most common cardiovascular disease in children and young adults in the world, because 80% of the world's population live in developing countries where the disease is still rampant. Recent research estimates that RF/RHD affects about 15.6 million people worldwide, with 282 000 new cases and 233 000 deaths each year. There are 2.4 million affected children between 5 and 14 years of age in developing countries, 1 million of whom live in sub-Saharan Africa, making the continent the major RF/RHD hotspot.[2]

A recent systematic review of prevalence studies found exceptionally high rates of RHD in sub-Saharan Africa, with the highest level in Kinshasa, DRC at 14/1 000 school-aged children.[3,4] The only prevalence data available on RHD for South Africa are derived from two studies dating back to 1972 and 1984 which estimated the prevalence using clinical examination (no echocardiography) in Soweto (Johannesburg) and Inanda (Durban) at 7.1/1 000 schoolchildren and 1.0/1 000 schoolchildren, respectively.[5,6]

As a middle-income country South Africa would be expected to have more capacity than other countries in the region for developing and implementing a national RF/RHD intervention programme; however, South Africa has fallen short in its control efforts. A local assessment of the country's national guidelines[7] on the secondary prevention of RF found that as of 2004, little progress had been made towards implementing the guidelines which have been in existence since 1997.[7] Concerted efforts to control RF/RHD must be bolstered as soon as possible in the developing world so that progress can be made towards eradicating what is an entirely preventable disease.

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Programme description

The **A**wareness, **S**urveillance, **A**dvocacy, **P**revention (A.S.A.P.) proposal is a comprehensive programme for the control of RF and RHD that was adopted at the 1st All Africa Workshop on Rheumatic Fever and Rheumatic Heart Disease at the Champagne Sports Resort, Drakensberg, South Africa on 15 - 16 October 2005. The meeting was convened by the Pan African Society of Cardiology (PASCAR), sponsored by the national Department of Health of South Africa, the Medical Research Council of South Africa, the World Health Organization - Africa Office (WHO-AFRO), and the World Heart Federation, and endorsed by the South African Heart Association and the Paediatric Cardiology Society of South Africa. The workshop was attended by a total of 42 delegates, from Angola (1), Cameroon (1), Congo (1), Egypt (1), Ghana (1), Mozambique (2), Nigeria (3), South Africa (27), and Zimbabwe (2). There were also speakers from Australia (1), the Netherlands (1), and the USA (1).

The components of the A.S.A.P. model adopted at the workshop include: **A**wareness raising, a **S**urveillance system, an **A**dvocacy campaign, and a **P**reventio n programme.

The objective for developing A.S.A.P. is to create a simple, modular but comprehensive model for RF/RHD control in Africa, based on interventions of proven efficacy, which can be adopted in part or *in toto* by national departments of health or non-governmental organisations with a commitment to reducing the burden of disease attributable to RF/RHD in Africa. This document presents: (*i*) the rationale; (*ii*) barriers; (*iii*) best practice of what works; and (*iv*) action points (online) in relation to the four focus areas of A.S.A.P.

Awareness raising

Rationale

RF/RHD case detection is an essential component of the A.S.A.P. model. In the absence of adequate case detection, the magnitude of the RF/RHD burden cannot be estimated accurately and undetected cases will not receive treatment and antibiotic prophylaxis. Maximised case detection within a community requires that all key members of the community be aware and

alert to the risks and signs of both the preceding streptococcal pharyngitis and to RF. Awareness must be highest among child caregivers, teachers and health care workers, especially those likely to be the initial point of contact with the health care system.

Barriers

There are several explanations for the low levels of awareness of RF/RHD in communities often most affected by the disease.[7] One of these barriers arises from the reality that communities at highest risk for RF/RHD are also frequently burdened with high rates of other major diseases such as HIV/AIDS and tuberculosis. These diseases inevitably receive higher priority from those in charge of distributing scarce resources for disease-control programmes. Inadequate resources and the lack of prioritisation of RF/RHD educational programmes have effectively maintained a public that is largely ignorant of the causes, symptoms and risks associated with RF/RHD.[7]

Another barrier was identified through interviews with children who have suffered an acute attack of RF and their family members in the Western Cape of South Africa.[7] It is assumed that patients and their parents receive extensive information on the causes, course of disease, and importance of adhering to secondary prophylaxis from the treating physician at the time of diagnosis. Yet the interviews revealed high levels of ignorance among this group suggesting that they either had not received the appropriate information, or had not understood the information when it was given to them.[7] The complex aetiology and pathogenesis of this disease make knowledge transfer to the patient difficult but no less essential.

Best practice

Community awareness has been found to be essential for case detection. A 10-year educational programme, undertaken in two French Caribbean Islands beginning in 1981 which sought to reduce the incidence of RF, provides evidence for the link between awareness and case detection.[8] One year after implementing an educational campaign that consisted of widely distributed pamphlets and posters, television advertisements and educational videos, the reported cases of RF increased 10 - 20%. This increase was entirely attributed to an increased awareness of the disease in the community. The study[8] also found that over the course of the 10-year educational intervention, the incidence of RF progressively declined on both islands by 74 - 78%. These findings support the argument that a community-based educational programme aimed at raising awareness of RF is essential for case detection and may be a critical first step in a comprehensive plan for RF/RHD control.

The Bach study[8] also highlights the importance of addressing the elements of RF/RHD control not as discrete entities but as interconnected principles with efficacy levels reliant on the successful execution of activities in all areas. The example above illustrates the importance of raising community awareness to improve incidence reporting. The reciprocal relationship also holds, whereby incidence reporting is a valuable tool for monitoring and evaluation of the effectiveness of an educational programme in reducing the burden of RF/RHD. In order to take advantage of this reciprocal relationship, community RF/RHD control programmes should combine the efforts of raising awareness with incidence reporting.

Awareness among health care workers of the importance of treating streptococcal pharyngitis with antibiotics, the appropriate method for diagnosing RF (using the revised Jones criteria),[1] and the obligation of case reporting to local authorities, where RF is a notifiable condition (such as in South Africa), is also needed for a functional RF/RHD control system.

Awareness action plan

See www.pascar.org

Surveillance

Rationale

As highlighted by the 2001 World Health Organization (WHO) Report on RF and RHD,[9] collection of epidemiological data is a crucial step in planning and implementing a national programme for the prevention and control of RF and RHD. Epidemiological data allow policymakers and practitioners to identify groups or locations that are most affected by RF/RHD in order to direct and concentrate control efforts appropriately. Ongoing surveillance of the incidence of RF and the prevalence of RHD is therefore the second pillar of the A.S.A.P. model, which has a symbiotic relationship with an awareness-raising campaign, the critical first step.

The current state of RF/RHD surveillance programmes in countries most affected by the disease is deficient.[1] The aforementioned systematic review[4] of RHD prevalence studies highlights the lack of quality prevalence data and the absence of reports on RF outbreaks from developing countries. The scarcity of reliable surveillance data has been one of many barriers preventing developing countries from mounting an appropriate and effective response to combat RF/RHD. Therefore, an immediate priority for getting the A.S.A.P. programme off the ground is to bolster surveillance programmes in a step-by-step fashion to achieve the establishment of a sustainable comprehensive surveillance system.

Barriers

Barriers to effective surveillance of RF/RHD are multiple but tend to be rooted in the following: (*i*) lack of surveillance capacity; (*ii*) lack of awareness among health professionals regarding their obligation to report cases;[7] (*iii*) lack of

awareness among the public to ensure accurate case detection;[7] and (*iv*) lack of political will on the part of national departments of health.

Best practice – the stepwise approach to surveillance

The stepwise approach to RF/RHD surveillance advocated in the A.S.A.P. programme is modelled after the 'WHO STEPwise approach' used to collect epidemiological data on risk factors for non-communicable diseases in developing countries.[10] The approach is based on the premise that in resource-constrained settings the collection of a small amount of accurate data is more valuable than large quantities of inaccurate data or no data at all. The ultimate goal of the stepwise approach is to eventually create a sustainable comprehensive national and continental surveillance system by achieving smaller, more realistic goals one step at a time.

The following steps are recommended to implement a RF/RHD surveillance system. The achievement of each subsequent step requires increased surveillance capacity so the plan should be followed in a progressive manner. Each step requires the establishment of several sentinel sites that capture high-risk populations living in a variety of environmental conditions. In order to evaluate the effects of various environmental conditions on the risk of developing RF, sentinel sites should capture rural, peri-urban and urban populations: Step 1: Creation and maintenance of RF/RHD registers, Step 2: Prospective RF incidence surveys, Step 3: Cross-sectional RHD prevalence surveys, and Step 4: Epidemiology of streptococcal throat and skin infections.

Step 1. The creation and maintenance of a register or database of RF/RHD cases is a proven strategy for the secondary prevention of the disease.[11] It can also be used as a tool for case management to track cases and ensure that they are receiving appropriate prevention and treatment. Registers have been implemented successfully in several developing countries at low cost using existing infrastructure. The establishment of registers is a minimum requirement that can be achieved in almost any setting where the will to establish a RF/RHD control programme exists. The registers may be used as a basis for incidence (step 2) and prevalence (step 3) studies of RF/RHD.

Step 2. Owing to their intrinsic relatedness, prospective RF incidence studies should be incorporated into a health education campaign aimed at raising awareness of RF/RHD. The incidence studies will monitor and evaluate the efficacy of the awareness campaign, while the awareness campaign will improve the level of case detection thereby improving the quality of incidence data.

The A.S.A.P. model recommends as step 2 of the surveillance initiative, the implementation of a medium-term pilot programme (e.g. 5 years) that combines community awareness building with incidence surveillance at a sentinel site. Elements of the programme that are continuous over several years include health education activities and passive incidence reporting through pre-existing reporting systems. Every 3 years, beginning 1 year after the implementation of the education programme (to maximise case detection), a formal prospective incidence survey relying on active surveillance activities should be undertaken. The goals of this intermittent active surveillance are: (*i*) to obtain more accurate incidence data (including baseline data); (*ii*) to improve existing reporting practices by highlighting discrepancies between active and passive surveillance datasets; and (*iii*) to more accurately monitor and evaluate the impact of the awareness campaign on RF incidence.

Following completion of the initial cycle of the pilot programme at a sentinel site, a permanent system should be implemented at national level for maintaining community awareness of RF/RHD and for maintaining the accuracy of passive disease reporting.

Step 3. A prevalence study is an important element in the progression of surveillance activities as it provides a snapshot view of the burden of disease in a defined population. The recommended study design is one that utilises echocardiography to detect clinical and subclinical evidence of RHD in school-aged children in a defined population. The resources needed for executing a prevalence study are substantial owing to the required investment in echocardiography machines and trained staff.

Step 4. The fourth step is to monitor the epidemiology of streptococcal throat and skin infections in the population. Patterns of streptococcal infection, related to infection rates and serological typing, exhibit seasonal and geographical variations. Describing these variations provides a more complete understanding of the epidemiology of RF/RHD, thereby improving the capacity to identify high-risk populations and increasing the likelihood of detecting outbreaks. This information is vital for the development of effective vaccines for streptococcal infection.

According to the revised Jones criteria, laboratory confirmation of RF requires evidence of a preceding group A streptococcal (GAS) infection – indicated by at least 1 elevated antibody titre. The most common antibody tests include anti-streptolysin-O (ASOT) and antideoxyribonuclease B, with serum levels peaking 3 - 4 weeks after an acute RF attack.[9] Therefore, laboratory services needed to support a GAS monitoring programme include the ability to test for antibodies to streptococcus, ability to culture throat swab samples, and the capacity to provide GAS serological and genetic typing. Because of the absence and/or inadequate capacity of the microbiological infrastructure in developing countries, the fulfillment of this step will require significant improvements in all other surveillance areas and discrete investment to improve laboratory capacity at all service levels.

The 2001 WHO report on RF/RHD[9] highlights the critical role that microbiological laboratories play in both primary and

secondary RF/RHD prevention programmes. The report also provides recommendations for the establishment of laboratory capacity at each level of care. Recommended levels range from peripheral laboratory facilities capable of immediate testing to international reference laboratories capable of co-ordinating regional GAS epidemiological information.

Surveillance action plan

See www.pascar.org

Advocacy

Rationale

Effective methods of RF/RHD prevention have been available for over 50 years, yet the developing world has not succeeded in controlling the disease.[12,13] Conversely, the developed world has succeeded in nearly eradicating the disease, resulting in the unfortunate side-effect of de-emphasising the persistent toll it takes on populations around the globe. Advocacy is needed to reverse this trend and to spotlight the devastating effects of RF/RHD on the health of the majority of children worldwide.[2]

A population affected by RF/RHD that requires immediate attention and resources is the current cohort of patients with RHD who require medical and surgical intervention to repair or replace faulty heart valves.[14] There is also a need to provide facilities for monitoring of anticoagulation in patients who have received mechanical heart valves. The latter facilities are woefully inadequate in developing countries.[15]

Proper treatment for existing RHD must be prioritised alongside enhanced prevention efforts. Increased surveillance is urgently needed to quantify the burden associated with RHD in order to support the advocacy efforts needed to persuade governments to increase resources for the management of patients with rheumatic valve disease.

Barriers

The barriers preventing an adequate level of government prioritisation for RF/RHD include: (*i*) competition with larger-scale health problems; (*ii*) lack of reliable epidemiological data that can be used to quantify the burden of RF/RHD; (*iii*) lack of public demand for increased prioritisation because of low levels of awareness; and (*iv*) a drop in prioritisation of RF/RHD on the international health agenda.

Advocacy action plan

See Annex C www.pascar.org

Prevention

Rationale

The prevention of RF/RHD can be achieved through two discrete strategies, namely primary and secondary prevention. Primary prevention works by treating the preceding streptococcal infection with antibiotics. Secondary prevention is used after the initial RF attack to prevent the recurrence of RF and progression to RHD. Secondary prevention requires the prolonged or life-long administration of regular antibiotic injections. Both primary and secondary prevention strategies have been shown to be efficacious and cost-effective for the prevention of RF.[12,13]

Barriers

Some of the barriers that can make primary prevention programmes difficult in the developing world include: (*i*) lack of awareness among the public and health care providers with regard to the link between streptococcal infection and RF; (*ii*) lack of policy for the prevention of RF based on use of antibiotics in the appropriate setting; and (*iii*) the high prevalence of subclinical GAS infection.[1]

Some of the barriers to effective secondary prevention programmes include: (*i*) the burden of making regular trips to the clinic for penicillin injections; (*ii*) migration of patients in developing country settings, making continuity of care difficult; (*iii*) patient fear of intravenous injections; and (*iv*) perceived risk on the part of health care providers of inducing anaphylactic shock.[12]

Best practice

The prevention strategy recommended in the A.S.A.P. model is grounded in the evidence on efficacy and therefore advocates for the implementation of both primary and secondary prevention programmes in the developing country setting.[12,13] Because the A.S.A.P. model includes as one of its core principles the implementation of an education programme to increase awareness of RF/RHD, including primary prevention as one of its key messages does not require much additional investment. It is logical to implement all proven strategies to prevent the occurrence of RF whenever possible. The additional benefits gained through primary prevention add minimal costs to the programme yet yield the added benefit of preventing the burdensome and prolonged nature of secondary prevention for its benefactors.[13]

Prevention action plan

See www.pascar.org

Moving forward

Implementing national A.S.A.P. programmes

The first step to implementing a national A.S.A.P. programme is to create a National Advisory Committee on RF/RHD under the auspices of the Ministry of Health. The Committee would serve as the primary decision-making body of the programme and would be responsible for designing, implementing and adapting the A.S.A.P. model to fit the needs of the country. Committee members would consist of key stakeholders in the programme such as nurses, family physicians, paediatricians,

cardiologists, microbiologists, epidemiologists, policymakers, administrators and planners.

The initial task for the National Advisory Committee should be to perform an assessment of the current state of RF/RHD control in the country. This assessment should include: (*i*) the identification of specific barriers to control efforts; (*ii*) a review of the current investment and pattern of resource allocation for RF/RHD control; (*iii*) an assessment of the health infrastructure available to support programme activities; and (*iv*) any other situation analysis the Committee deems valuable. Once these assessments have been made, the Committee should then proceed with the design and implementation of specific elements of the A.S.A.P. programme. A timeline for the progressive implementation of programme activities will be an essential element to ensure an objective-led plan for RF/RHD control.

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The Drakensberg Declaration on the Control of Rheumatic Fever and Rheumatic Heart Disease in Africa

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The delegates of the 1st All Africa Workshop on Rheumatic Fever (RF) and Rheumatic Heart Disease (RHD) gathered at the Champagne Sports Resort in the Drakensberg, South Africa on 15 - 16 October 2005 are acutely aware of the fact that RF and RHD remain a major public health problem in Africa. Whereas Africa has 10% of the world population, as many as half of the 2.4 million children affected by RHD globally live on the continent. RHD accounts for a major proportion of all cardiovascular disease in children and young adults in African countries, and the disease has the potential to undermine national productivity, since young adults are the most productive segment of the population.

We are mindful of the fact that the major determinants of RF and RHD are poverty, overcrowding, poor housing and shortage of health care resources. We call on African governments and the world community to accelerate investment the initiatives designed to improve the living conditions of the world's poor, which will lead to the permanent eradication of RF/RHD in the long term.

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In the short to medium term, we recognise that cost-effective strategies for the prevention (primary and secondary) and treatment (or tertiary prevention) of RF/RHD are available. We are aware that the primary, secondary and tertiary prevention of RF and RHD are woefully inadequate in almost all African countries. We note that the World Health Organization regards the establishment of national prevention programmes as an essential step in countries where RF and RHD remain significant health problems.[1] We undertake to develop pilot programmes at selected sentinel sites that will ultimately serve as the basis for the establishment of national programmes for the control of RF/RHD in our individual countries.

We furthermore support the development of a common programme that concentrates on four areas of activity: (*i*) raising the **awareness** of the public and health care workers with regard to RF and RHD; (*ii*) improving the quality of information available on the incidence, prevalence and burden of RF/RHD through epidemiological **surveillance**; (*iii*) working together as **advocates** to change public policy for the improvement of health care facilities needed to treat and prevent the disease; and (*iv*) working towards the establishment of national primary and secondary **prevention** programmes for RF and RHD. This programme, which is the called the A.S.A.P. programme, will be co-ordinated throughout Africa by the Pan African Society of Cardiology in collaboration with the World Heart Federation and the World Health Organization.

We commit ourselves to meet on a regular basis to evaluate progress made in our efforts to control RF and RHD in Africa until the objectives of this action plan are achieved.

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