

Prevalence of Heart Disease in School Children of Islamabad

By

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Several reports have been published 1-5-10-17-19-20-25 which indicate that heart disease is an important health problem in developing countries. Many studies were based on the examination of the selected age groups of the school children and the number of sample was not large enough. Such studies have the disadvantage that the results did not reflect the true prevalence of heart disease in the school children as many children with heart disease were left out due to the selected and relatively small samples.

An attempt has been made in this report to present more accurate appraisal of the prevalence of heart disease in school children in Pakistan based on the study of the total school population of Islamabad.

Material and Methods:

Islamabad is the new capital of Pakistan and is about 18 years old with the population of 150,000. It is situated 33° 36'N, 72°-50'S and 73°-24' East of Greenwich at the foot of Margala Hills at the altitude of 503-610 meters. The temperature varies from a maximum of 42°C in Summer to a minimum average of 3.4°C in Winter. The average annual rainfall is 114.3Cm. Being a new city it is wellplanned with all the basic facilities of electricity, water supply, pro-

per sewerage drainage and gas supplied to all the categories of the houses. But considerable over-crowding has developed in the residential areas meant for low income group. Majority of the residents are government servants and their families and comprise of different ethnic groups.

The survey covered all the 31 schools located in Islamabad city and 15,100 students were examined over a period of fourteen months from April, 1978 to June, 1979. There are three types of schools, Model Schools, High Schools and Primary Schools representing children from high socio economic, middle to low socio economic and low socio economic groups respectively in a roughly proportionate manner. Age group 5-15 years was selected so as to include all the children in the schools. In case of younger children a questionnaire was issued to the parents enquiring, about the annual income, type of accommodation number of family members and the medical history of the child with particular reference to Rheumatic Fever. The particulars were documented in a properly designed proforma. According to a pre-arranged programme with school, we examined the children. Several attempts (2-4) were made to examine the children who were absent on the first visit. Each child was examined in a quiet room in the sitting position with breath

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held in the expiratory phase. Special attention was paid to the significant murmurs and were cross checked by the other doctor.

The children who were considered to have heart disease at the Primary examination were referred to the hospital for further study where each child was examined by two independent observers in detail under optimum conditions. In every case following investigations were carried out:- Xray chest PA and lateral view, 12 lead E.C.G. Throat Swab, ASO Titre, Hb and ESR estimation.

The intensity of the murmur was graded on Levine¹² scale of 6. Grade 1-2 systolic murmur heard best along the lower left sternal border and at the apex which changed with position and respiration was considered as innocent murmur.⁷ Apical systolic murmur was considered significant if it fulfilled Irvington House Criteria.

Aortic systolic murmur was deemed significant if it was graded 3 or above and was conducted to the neck and the aortic component of the second sound was relatively soft.

Results

A Total number of 15,100 children were examined out of which 8,607 (57%) children were male and 6,943 (43%) children were female.

Age Distribution

Age Years	05—07	08—10	11—13	14—15	Total Number of children
	2,857	4,326	4,981	2,936	15,100

Socio Economic Background:

Family Income

Annual income in Pak rupees.	Upto 7,500	7,501 to 20,000	20,000 and above.
No. of families.	7350	6512	1238

About 50% have a monthly income of upto Rs. 625/-

Number of Rooms Per Family

Number of rooms.	1—2	3—4	5+
Number of families.	8,280	5,369	1,181

More than 50% of the families lived in 1-2 rooms.

Number of Family Members Per House

Number of family members	1—4	5—8	9—12	13+
Number of families.	1,561	9,866	3,402	271

Only about 10% of the families were small, 1-4 members in a family. Rest were large families comprising of 5-13 members living in one house.

The initial absentee rate was 20% which could not be reduced to below 12% inspite of over two visits to the schools.

Out of 16,100 children that were examined, 172 children were referred to the hospital for further assesment. From this group 76 children had definite heart disease giving an averall rate of 4.77 per thousand. Of these 26 had rheumatic heart disease (1.52 per thousand) and 50 had congenital heart disease (3.25 per thousand).

Rheumatic Heart Disease Group

It comprised of the following:-

Mitral incompetance.	13
Mitral incompetance and stenosis	4
Mitral stenosis.	3
Aortic stenosis with incompetance	2
Aortic stenosis with incompetance and mitral incompetance	1
Aortic stenosis and mitral incompetance	3

The age distribution of the children is given as below:-

Age	05—07	08—10	11—13	14—15	Total
Number of cases	4	4	11	7	26

77% of the children in this group belonged to the families with monthly income of less than Rs. 625/-.

30.7% of the cases with rheumatic heart disease gave the history of fever with joint pains, 46.1% of recurrent sore throat and colds, 30.7% of polyarthrits, 15.3% of polyarthralgia and 4% of Chorea. 11.5% of cases gave a history of previous hospitalisation for rheumatic fever/rheumatic heart disease. A.S.O. titres of more than 200 units were noted in 53% of the cases and Beta haemolytic group A Streptococci were isolated in 43.7% of the cases.

Congenital Heart Disease Group:

It comprised of the following:—

Ventricular Septal Defect.	18
Aortic Stenosis.	14
Atrial Septal Defect.	13
Fallot's Tetralogy	2
Patent Ductus Arteriosus	1
Pulmonary stenosis	1
Cardiomyopathy	1

The age distribution of the cases is given as below:-

Age	05—07	08—10	11—13	14—15	Total
Number of cases	12	14	17	7	50

2% complained of undue dyspnoea on exertion. 60% children belonged to the families with monthly income of less than Rs. 625/-. 17.2% of the Throat Swab Cultures were positive for Beta Haemolytic group A Streptococci and A.S.O. Titre were 200 units and above in 29% of the cases.

Discussion:

A comparison with some of the other similar studies is given below:—

Country	Age of sample (Years)	Number examined	Incidence per thousand	
			RHD	CHD
India Simla Hills ⁴	5—16	1,515	39	—
India Delhi ²⁷	5—16	39,198	10.9	—
Japan ²⁶	5—16	800,000	0.2	2.5
U.S.A ¹⁰	6—8	33,026	1.3	2.1
Colorado ¹⁵	6—11	6,311	1.1	2.1
Australia ²⁴	5—16	34,863	1.0	2.1
Pakistan (Karachi) ²²	8—14	4,002	1.8	1.8
Pakistan (Peshawar) ¹¹	5—15	20,340	9.0	—
Present study	5—15	15,100	1.52	3.25

Our figures for rheumatic heart disease (1.52) per thousand are comparable to those of Abbasi et al., from Karachi, Miller et al., from USA and Stuckey et al., from Australia. Other

reports from Pakistan, India, Iran, Morocco, Egypt²³ show a very high prevalence rate which may be due to selection of slums and over crowded areas in the survey. There may be some factors in our survey which tend to lower the prevalence rates. We could not examine 10-12% of the school children who were absent from the school for health or other reasons during the survey period and we used strict diagnostic criteria.

Mitral incompetence was the commonest valvular lesion (50%) followed by mitral incompetence with stenosis (15.5%) and pure mitral stenosis (11.5%). In 26 cases of rheumatic heart disease the ratio of females to males was 15:11. All the female children had mitral valve involvement either as a single or a double lesion. Similar observation was made by Berry³. Aortic valve was involved in 23% of the cases. These figures are comparable with those of Padmavat,¹⁸ from Delhi.

In the congenital heart disease group our prevalence rate of 3.25 per thousand is comparable with those of Yuichi Sehiokawa²⁶ Stuckey²⁴ and Miller¹⁴. Abbasi²² et al., from Karachi showed the prevalence rate of 1.8 per thousand which may be due to a relatively smaller sample of the children and exclusion of the age group 5-7 from the survey.

Innocent murmurs were heard in 20% of the total school children. Some studies⁶⁻⁷⁻¹³ show the incidence varying from 8-20%, while others²⁻¹² have reported much higher incidence of 40-60%. The variability in the reported incidence of innocent murmurs in normal children may be attributed to these different clinical groups and different techniques employed by

respective investigators. The height and weight of the children in rheumatic heart disease and congenital heart disease group were 88% and 80% below the normal average¹⁶ respectively. As these children are more susceptible to upper respiratory tract infections, and relapse of rheumatic fever and they generally come from poor over-crowded homes their general health and development was below par.

In the developing countries including Pakistan factors like malnutrition, over-crowding, poor socio-economic conditions, rapid increase in population and lack of medical care contribute to the high incidence of rheumatic fever/rheumatic heart disease. This incidence goes down as the living conditions and standards improve, as has happened in Europe and some of the Asian countries like Japan and Singapore. We feel that low prevalence rate of 1.52/1000 in Islamabad school children population is due to better living conditions in the newly constructed metropolis.

Eradication of rheumatic fever/rheumatic heart disease in Pakistan can only be achieved with improved socio-economic conditions.

Summary

A survey of all the schools in Islamabad (Pakistan) was conducted to assess the prevalence rate of rheumatic and congenital heart disease. A total number of 15,100 boys and girls between the age of 5-15 years were examined. By standardised and well accepted criteria 4.77 per thousand were found to have heart disease. 1.52 per thousand had rheumatic heart disease and 3.25 per thousand had congenital heart disease.

Of the rheumatic heart disease group mitral valve was involved in 77% .Aortic in 7.5% and both the valves in 15.5%. All the female children in the group had mitral valve disease. 77% children belonged to the families with monthly income of less than Rs. 625/-. Only 30.7% gave positive history of rheumatic fever. Of the congenital heart disease group V.S.D. was the commonest lesion. Benign systolic murmurs were present in 20% of the children.

The general health, average height and weight of children with heart disease were found to be below the normal.

The prevalence rate of rheumatic heart disease in this study appeared low as compared to the reports from other developing countries and from some other over-crowded cities of Pakistan. This is considered to be due to better living conditions in Islamabad.

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