

The team fights the scourge of poliomyelitis

*S. A. AJAO and *G. A. A. OYEMADE

**Physiotherapy Department, *Orthopaedic and Trauma Unit,
Department of Surgery, University College Hospital, Ibadan.*

Abstract

Poliomyelitis is still a medical problem in Nigeria, the aftermath of which leaves patients with muscular paralysis, contractures and abnormalities which require elaborate treatment. One thousand one hundred and twenty patients affected with poliomyelitis and treated at the polio-clinic of Physiotherapy Department of the University College Hospital, Ibadan were studied. The multi-disciplinary approach of a professional health team was used to integrate the polio victims back into the community so that they do not constitute an economic liability. A case of a poliomyelitis victim who resorted to crawling is illustrated, effective treatment being given by the team approach resulting in his ability to maintain himself in the community. The importance of prophylactic immunization to prevent the wide spread of the disease in the community is also stressed.

Introduction

Many developing and African countries are endemic zones for poliomyelitis "One of the most perplexing facts in the history of infective diseases is that the incidence of paralytic poliomyelitis in contrast with almost all other infective disease is increasing" (Gear, et al 1955). Records of the Department of Medical Statistics, Federal Ministry of Health, Lagos (Table 1) show that poliomyelitis is still prevalent

Table 1. Reported cases from notifiable diseases (polio) 1969-1978

Year	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
No. of cases	72	182	187	300	387	452	569	627	437	677

All correspondence to be addressed to Mrs. S. A. Ajao, Physiotherapy Department, University College Hospital, Ibadan, Nigeria.

in all the nineteen States of Nigeria. The monthly distribution of the disease as it occurred in 1978 is shown in Table 2.

Table 2. Monthly summary of reported cases from notifiable diseases (polio)—1978

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acute poliomyelitis	37	30	55	33	55	47	40	30	54	128	39	36
Paralytic poliomyelitis	1	3	6	4	4	11	9	3	17	20	4	11
Totals	38	33	61	37	59	58	49	33	71	148	43	47

The few hospitals in Nigeria which have physiotherapy services are always overcrowded. Some 500 new cases of poliomyelitis are treated annually in Ibadan of which 400 are seen at the University College Hospital (UCH), Ibadan alone. Immunization against this disease as a public health priority has been widely recommended and the introduction of the effective poliovirus vaccine has been known to drastically reduce the incidence of poliomyelitis in developed countries (Drozdov and Cockburn, 1967; Cockburn and Drozdov, 1970; Lancet, 1970).

Most patients attended UCH between the onset of the disease and six months after. Therefore, they attended not only with paralysis but also with complications. Those who were unable to walk adopted a crawling position and eventually took to begging for alms in the streets in later years and they constitute an economic liability to the community (Collis et al, 1961). The paralysis and its consequential effect is the scourge left by an attack of the disease.

The purpose of this communication is to focus attention on the multidisciplinary approach and to emphasize the role of the team as an answer to the scourge left by poliomyelitis.

The multidisciplinary approach

Figure 1 illustrates the multidisciplinary team approach which has been successfully applied against poliomyelitis at UCH. The handling of the poliomyelitis patient is a typical example of team work and shows how various disciplines are responsible for the effective management of the patient where no single profession or discipline alone can successfully rehabilitate the patient. The team consists of different

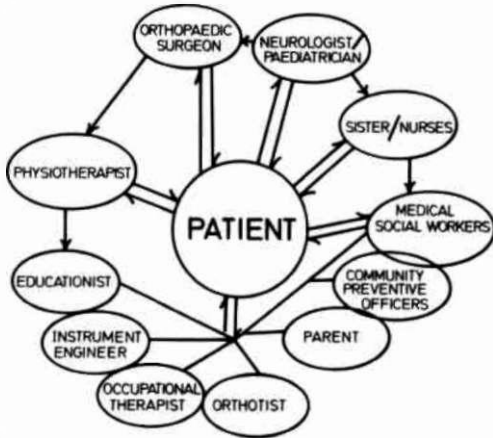


Fig. 1. The multidisciplinary approach to the treatment of the patient with poliomyelitis.

professionals who are co-ordinated by the most suitably placed member of the team depending on local circumstances. At UCH during the postparalytic stage, the physiotherapist fulfils this role and is the co-ordinator of the team.

The children with poliomyelitis are first referred by the community/preventive health officers. The first port of call at the hospital may be at the children's neurology clinic at which both the paediatrician and physiotherapist are present and where an average of ten new cases of poliomyelitis are seen weekly. Other patients, are seen at the orthopaedic clinic which is held weekly in the surgical out-patient department. The most important is the polio clinic held at the physiotherapy department jointly by the orthopaedic surgeon and the physiotherapist where an average of twelve patients are reviewed weekly. All clinics give an opportunity of discussing fully each patients needs, assessment, treatment and rehabilitation programme. Complete assessment including grading of paralyzed muscle, testing for contractures and

examination of general health are carried out before the treatment is commenced. If there are contractures, these may have to be released and tendon transplants may also be necessary.

In general the consultant orthopaedic surgeons, paediatricians and neurologists examine the patients, diagnose the condition and map out a plan for treatment which is then given by the various specialities. The physiotherapist assesses the patient for muscle strength and contractures. They treat the patients to maintain erect posture and balance, re-educate for walking and build up muscle strength. The orthotists provide the splints to prevent and correct deformities and supply walking calipers and corsets as may be required. The occupational therapists make the knee cages, adjust walking aids and give the patient vocational training. The medical social workers help with sorting out financial and other social problems of the patient which includes the regular attendance for treatment. The medical record officers are responsible for registering and recording patients for statistical purposes.

The parents sometimes find their way to the respective clinics with their children and as they also help with the home programme they are instructed on how to look after their children. Instruction on diet, general hygiene, and good care of the calipers, shoes and walking aids is given. This helps to complement hospital treatment. Parents are advised to encourage the use of walking aids, night splints, to tie the children's legs together at nights, and to discourage crawling. They are discouraged from carrying their children on their backs in order to prevent contractures at the hips and knees.

Post-polio paralysis may leave many children crippled for life in a developing country where treatment is not available. This affects both mother and child socially, psychologically and economically. The family unit may be disrupted and the polio victim may eventually find himself begging for the rest of his life. It is the aim at UCH to ensure that this does not happen.

Preventive measures

It is presently estimated by the World Health Organization (WHO) that some five million children die yearly from six deadly diseases; diphtheria, pertussis, tetanus, measles, poliomyelitis and tuberculosis. The WHO goal

by 1990 is to protect every child in the World from these diseases.

Today in Nigeria, the Sabin oral type of vaccine is used for the prevention of poliomyelitis. The disease could be eradicated or brought to a low incidence by immunization yet adequate preventive measures have not been generally taken. However, in Oyo State, an

expanded immunization programme (EPI) is in operation and the result of this shows that even in a developing economy, polio can be eradicated. In Oyo State, progress had been made between 1974 (pre-EPI) and 1978 (post-EPI) and today over 80 percent of first contact are immunized as an important part of the team effort. (Tables 3 and 4).

Table 3. Oyo State Ministry of Health Immunization Programme

	B.C.G.	D.P.T.	POLIO	MEASLES	SMALL POX
				376,716 (Total)	2,410,946 (Total)
1974 (Western State)	233,844	61,765	24,802 (represented only 6.2% of eligible population)	133,835 (To infants ½-1 year old, 18,052 cases of measles were notified)	1,897,649 (by M F U to all ages, 32,088 by MCHC units)
1975	167,685	68,051	37,203	259,257 (Total)	1,713,564 (Total)
(For Oyo State and most of former Western State 75% returns)	147,664 (88.1% to 0-1 yr. old)	82.6% (2nd dose) (69.4% had all 3 doses)	(represented only 8.3% of eligible population)	42,372 (to infants ½-1 yr. old 16,052 cases of measles were notified)	1,005,138 (by MFU given to all ages). 52,976 (by MCHC units)

Table 4 Oyo State Ministry of Health Expanded Immunization Programme (EPI) Report of 2 years of operation

	1st Contact Antigens (BCG; 1st DPT; 1st Polio given at 3/12)	2nd Contact Antigens (Small Pox; Measles 2nd DPT; 2nd Polio given at 6/12)	Tetanus Toxioid immunization (for women in 15-45 age group)
June 1976-May 1977	277,721	197,872 (approx: 71% of 1st contact coverage)	327,721 (1st contact) 201,320 (2nd contact)
June 1977-May 1978	221,752	179,727 (approx: 81% of 1st contact coverage)	287,524 (1st contact) 188,205 (2nd contact)
June 1978-May 1979*	105,258	62,935 (approx: 60% of 1st contact coverage)	53,935 (1st contact) 65,437 (2nd contact)

*The extremely low figures for June 1978-May 1979 reflect the near-total inactivity of the Mobile Immunization teams due to a shortage of vehicles.

Patients and results

One thousand, one hundred and twenty patients with diagnosis of paralytic poliomyelitis attending the polio clinic of the Physiotherapy Department at UCH between January 1968 and December 1977 were considered. The diagnosis was based on a clinical history of febrile illness followed by flaccid muscular paralysis and atrophy without any sensory loss. Complete muscle tests and records were made. The complication of contracture was noted and graded as mild, moderately severe and severe. Mild cases have fixed flexion deformity (FFD) of 25°, and are treated by stretching and manipulation. Moderately severe cases have FFD between 25° to 50° and are treated by manipulation and application of plaster of Paris. Severe cases have FFD above 50° and are treated by release operation followed by application of plaster of Paris.

Of the 1,120 patients, 723 were male and 397 female showing a male preponderance of ratio 2:1. The highest incidence was within the first to second year and the peak was in the second year of life. The youngest case was four months old.

Table 5. Distribution of Paralysis in Poliomyelitis

Both lower limbs	85
Right lower limb	79
Left lower limb	61
Both lower limbs and trunk muscles	10
Both lower limbs, both upper limbs and trunk muscles	5
Right upper limb	4
One lower limb and trunk muscles	3
Left upper limb	1
One upper limb and one lower limb	1
Both lower limbs, one upper limb and trunk muscles	1
One upper limb and trunk muscles	1

The gross anatomical distribution of the part of body affected is shown in Table 5. The highest incidence is recorded in paralysis affecting both lower limbs, the right lower limb being the next most affected. Table 6 illustrates the distribution of the lower limb muscle paralysis, the quadriceps muscle being the most affected (225 cases) and the gluteus maximus being the least affected (60 cases). Table 7 shows the distribution of the upper limb paralysis in poliomyelitis. The muscles of the shoulder girdle were the most affected and the muscles of the fingers were least affected.

Table 6. Lower limb paralysis—number of cases

Quadriceps	225
Hip abductors	158
Hamstrings	151
Hip flexors	149
Tibialis anterior	137
Hip adductors	137
Hip extensors	124
Toe extensors	115
Toe flexors	115
Flexor hallucis longus	110
Extensor hallucis longus	105
Peroneals	103
Gastrocnemius	102
Tibialis posterior	61
Gluteus maximus	60

The complications seen in the patients were in form of contractures. In the ten-year period, 513 patients were found to have appreciable contractures which needed treatment, 320 were male and 193 female. The age distribution of the onset of these contractures is shown in Table 8. The aetiology of contracture in poliomyelitis is not clearly understood, but it affects muscles where antagonists are severely paralyzed. It is the active muscle which undergoes contractures. When both antagonist and protagonist are paralyzed the contracture opens in the direction of gravity. Table 9 lists the distribution of contractures.

Seventy-six cases of tensor fascia lata contracture were mild and treated with stretching and passive movement, 122 showed moderate contracture and 50 with severe contracture showed good response to operative procedure.

Seventy patients had genu recurvatum with 15 very severe who were treated with plaster of

Table 7. Upper limb paralysis number of cases

Shoulder flexors	11
Shoulder abductors	11
Shoulder extensors	10
Shoulder internal rotators	10
Shoulder adductors	10
Shoulder external rotators	9
Elbow extensors	7
Elbow flexors	7
Wrist extensors	5
Wrist flexors	5
Finger extensors	3
Supinators	3
Pronators	3
Palmar interossei	3
Dorsal interossei	3
Shoulder girdle elevators	2
Finger flexors	2

Table 8. Age of onset of contracture in poliomyelitis

1st year	115
2nd year	215
3rd year	83
4th year	56
5th year	24
6th year	12
7th year	5
8th year	3

Paris cylinders, and later rehabilitated with knee cages and calipers. One hundred and fifty-seven cases had contracture of the Achilles tendon, most of these were treated with stretching manipulation and application of plaster of Paris and a few ended by having triple arthrodesis. Thirty-three patients had flexion deformity of

Table 9. Distribution of contractures

Tensor fascia lata—		
unilateral	186 (36.3%)	(48.4%)
bilateral	62 (12.1%)	
Tendo-Achilles	157 (30.6%)	
Genu recurvatum	70 (13.6%)	
Knee flexion	33 (6.4%)	
Scoliosis	5 (1.0%)	

the knee and about two-thirds were treated with manipulation and application of plaster of Paris and one third had hamstring tenotomies. Five cases of paralytic scoliosis were treated with stretching, plaster of Paris and corset.

Team effort

All members of the team came into contact and handled a substantial proportion of the 1,120 patients under review. Some 784 patients were seen at the neurological clinic while 336 patients were seen at the orthopaedic clinic. All these patients were referred for physiotherapy and 100 patients required surgical treatment. Nearly all the patients were seen at the occupational therapy department because of the lack of a regular orthotic service. The occupational therapy service therefore complements the orthotic service by providing toe raising devices, splints and knee cages. This is also complemented by the help from the hospital instrument engineer. The prosthetic and orthotic unit of Oyo State Ministry of Health saw 600 patients and provided them with calipers. The medical social worker was helpful in seeing 160 patients. A major drawback in our service is inadequate prosthetic and orthotic service and

the same problem is encountered in other parts of Nigeria.

In parts of Oyo State the physiotherapists provide aids by joint effort with the local blacksmith and shoemaker. In Plateau State a shoemaker has become a regular supplier of calipers.

Illustrative case

T.A., a 20 year old Nigerian, contracted poliomyelitis when he was about two years old. He had traditional treatment which resulted in his being unable to walk on both feet and he crawled on his limbs (Fig. 2, left).

He managed however to take advantage of the free primary education and later got into the secondary school at Gbongan from where he appealed to the then military government for assistance to purchase a wheelchair. He was referred to the University College Hospital, Ibadan for clinical assessment by the Oyo State Government Ministry of Social Welfare, Youth and Sports. He was found to have contracture of the left tensor fascial muscle and also of the knee. The right lower limb was also affected but contractures in the limb were minimal. He was then referred to the Physiotherapy Department for thorough muscle assessment and also to plan his rehabilitation; he was admitted on 21/3/78.

He had an operation for release of contracture of the left tensor fascia and also of the iliotibial tract to correct the knee contracture. He was then put in the hip spica (plaster of Paris) for six weeks. After its removal he started physio-

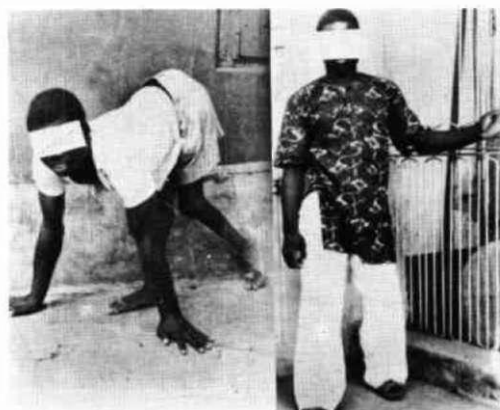


Fig. 2. Left, a poliomyelitis victim moving about on his four limbs. Right, the same patient after rehabilitation. He is able to stand erect and walk with the aid of calipers.

therapy with back slabs to both knees, walking with a pair of crutches. He later graduated to bilateral calipers and walking stick (Fig. 2, right). He is still being seen at intervals at the follow-up polio clinic of UCH.

Discussion

The incidence of poliomyelitis has reduced greatly in the temperate countries with the use of poliovirus vaccine but the disease is increasing in the sub-tropical and tropical countries (WHO 1968; Lancet 1970). Nigeria is still an endemic zone for the disease. Over a million untreated victims of poliomyelitis could be found in Africa alone who had been reduced to crawling for lack of treatment (Huckstep, 1975; Cross, 1977).

The present study agrees with previous reports that at the age of two years poliomyelitis affection was at the peak, and infants under the age of six months were also affected (Collis et al, 1961; Richard, 1967; Familusi and Adesina, 1977). The study also shows that more lower limbs were affected than any other part of the body and there were more contractures in the lower limbs, most especially in the hip joints; which agrees with the findings of Sharrard (1955, 1956).

In the individual muscle study the survey shows that the quadriceps muscles were mostly affected but this finding differs from Sharrard (1955, 1971). It agrees with his conclusion that muscles innervated by the second and third lumbar segments were most likely to be affected in the lower limb.

It is essential for various disciplines to team up in order to help poliomyelitis victims maintain their own in the community. This does not mean that all disciplines constituting the team must be available at the same time.

As there is no regular orthotic service at UCH, Ibadan, alternative arrangements were made by using the occupational therapy workshop, instruments engineer and in other cases local craftsmen.

With dedication between the community health workers, who probably first see the patients and whose department is responsible for the preventive programme, and the hospital team that strives to rehabilitate already struck by the disease—the scourge of poliomyelitis can be controlled and the disease itself can be eradicated.

Acknowledgements

The authors are grateful to the Orthopaedic Surgeons, Physiotherapists, Occupational Therapists, Instrument Engineers, and Medical Social Workers of the University College Hospital, Ibadan, for their co-operation at all times. They are also grateful to the Medical Illustration Unit of the University of Ibadan for the photographs, to the limb-fitters at the Orthopaedic Rehabilitation Centre, and the National Orthopaedic Hospital, Igbobi, to the Statistical Division of the Federal Ministry of Health, Oyo State Ministry of Health and Mr. Oluwole Oladeji for his secretariat assistance.

REFERENCES

- COCKBURN, W. C. and DROZDOV, S. G. (1970). Poliomyelitis in the world. *Bull. WHO*, **42**, 405–417.
- COLLINS, W. R. F., RANSOME-KUTI, O., TAYLOR, M. E. and BAKER, L. E. (1961). Poliomyelitis in Nigeria. *West African Med. J.* **10**, 217–222.
- CROSS, A. B. (1977). Crawling patterns in neglected poliomyelitis in the Solomon Islands. *J. Bone Jt. Surg.* **59B** (4), 428–432.
- DEBRE, R. et al (1955). Poliomyelitis. Geneva, WHO.
- DROZDOV, S. G. and COCKBURN, W. C. (1967). The state of poliomyelitis in the world. In: *Proceedings of the 1st International Conference on Vaccines against Viral and Rickettsial Diseases of Man*. Washington D.C.: Pan American Health Organization, 198. (Scientific Publication No. 147).
- FAMILUSI, J. B. and ADESINA, V. A. (1977). Poliomyelitis in Nigeria: Epidemiological pattern of the disease among Ibadan children. *J. Trop. Paediatrics and Environmental Health*. **23**:3, 120–124.
- GEAR, et al (1955). Poliomyelitis. Geneva, WHO.
- HUCKSTEP, R. L. (1971). British Solomon Islands Protectorate. In: *Orthopaedic problems in the newer world Report on a Commonwealth Foundation lecture tour*. Occasional paper No. 10, appendix H, 34–37. London, Commonwealth Foundation.
- HUCKSTEP, R. L. (1975). Poliomyelitis: A guide for developing countries, including appliances and rehabilitation for disabled. Edinburgh, Churchill Livingstone.
- JONES, R. and LOVETT, R. W. (1923). *Orthopaedic surgery*. London, Frowde, 456.
- KAPLAN, E. B. (1958). The iliotibial tract: Clinical and morphological significance. *J. Bone Jt. Surg.* **40A**, 817–832.
- KNAPP, M. E. (1953). Rehabilitation in severe poliomyelitis. *J. Iowa State Med. Soc.* **43**, 369–373.

- LANCET (1970). Editorial: The world's poliomyelitis. *Lancet*, **2**, 646.
- MEDICAL RESEARCH COUNCIL (1942). Aids to the investigation of peripheral nerve injuries. London, HMSO (War Memoranda No. 7).
- RICHARD, D. R. (1967). Lower limb contractures in poliomyelitis. *West African Med. J.* **16**, 20-23.
- SHARRARD, W. J. W. (1955). The distribution of the permanent paralysis in the lower limb in poliomyelitis: A clinical and pathological study. *J. Bone Jt. Surg.* **37B**, 540-558.
- SHARRARD, W. J. W. (1956). Muscle paralysis in poliomyelitis. *Br. J. Surg.* **44**, 471-480.
- SHARRARD, W. J. W. (1971). Paediatric orthopaedics and fractures. Oxford, Blackwell, 470-471.
- WHO (1968). Poliomyelitis on the increase in warm climates. *WHO Chronicle* **22**, 257-259.
- WHO (1979). Report on the consultation of direction of rehabilitation centre-Brazzaville.
- YOUNT, C. C. (1926). The role of the tensor fascia femoris in certain deformities of the lower extremities. *J. Bone Jt. Surg.* **8**, 171-193.