STUDIES OF THE MALARIA PROBLEM IN PORTO RICO

PAPER III

INCIDENCE OF MALARIA

well as to learn as much as possible about habits of people, medical

In order to determine the amount and distribution of malaria as treatment, etc., three indexes were determined:

(1) History index
(2) Spleen index
(3) Parasite index

The work was done in May, June and first part of July, at a time of year usually quite dry but sometime before time of highest rainfall. The indexes were repeated again in January and first part of February 1925 at end of period of highest rainfall.

CLINICAL HISTORY INDEX

This is based on observations that, given a fairly intelligent population, the people in malarious regions are quite familiar with the symptoms of the disease and that therefore considerable information ought to be obtainable by questioning a large percentage of the people as regards sickness in the past. The farther into the past one goes the more inexact the memory; so for the purpose of this work information was obtained only about sickness in the past year. Cases were called positive only when symptoms were definite and characteristic of the disease. The intermittent character of the fever and symptoms, unassociated with other obvious causes as respiratory infections, etc.; the prompt response to adequate doses of quinine; and if case was recent, the results of blood and spleen examinations were the points of importance in arriving at a diagnosis.

Information directly or indirectly was obtained from practically the population in the area under study. It will be seen from Table VII that there was a comparatively low index of 9.0, and that when considered by age groups there is a relatively low index for the first five years of age, a sustained rate for adults and then a slight rise in those over sixty.

TABLE VII

Results of First Clinical History Index According to Age and Sex Groups

Age groups	Male			Female			Total		
	Total Hist.	Pos.	% Pos.	Total Hist.	Pos.	% Pos.	Total Hist.	Pos.	% Pos.
0–4	538	24	4.5	477	17	3.6	1,015	41	4.0
5–9	412	31	7.5	391	32	8.2	803	63	7.8
10–14	366	33	9.0	360	35	9.4	726	68	9.4
15–24	275	28	10.0	332	40	12.0	1,294	129	11.5
20–24	432	38	8.8	314	33	10.5	746	71	9.5
25–39	698	67	9.6	596	62	10.4	1,294	129	10.0
40–59	455	53	11.6	369	35	9.5	824	88	10.6
60–Over	112	16	14.3	111	14	12.6	223	30	13.4
Total.....	3,388	290	8.8	2,950	268	9.1	6,238	558	9.0

AMOUNT OF QUININIZATION

In this survey it was found that 30 per cent of the people had received treatment from doctors; 60 per cent had bought quinine in some form or another at the drug store or had obtained it from the local inspector on their own initiative; and only 10 per cent had not taken any quinine.

Quinine dispensed by the local inspector was generally the sulphate in capsules or for children, the bisulphate in powders to be given in water. The adult dose was about one gram a day and no attempt was made to extend treatment beyond the time necessary to relieve acute symptoms.

From the drug store the people usually obtained one of two tonics, that called Wintersmith's, or another called Leonard's, neither of which contain large amounts of quinine in the doses given. These tonics were used for practically all sickness with fever. Treatment was usually only for the acute attack. Many French and Italian preparations were also on sale, especially for hypodermic injections. It would seem that in Barceloneta, at least, the majority of patients with malaria received their treatment directly from the drugstores.

PRACTICE OF PHYSICIANS

Answers from over 100 doctors throughout the Island to a questionnaire concerning treatment of malaria showed that about 40 per cent preferred, whenever possible, to give quinine entirely by mouth; about 40 per cent gave it entirely by intramuscular injec-

tions or gave intramuscular injections until acute symptoms had passed and then quinine by mouth; while about 20 per cent gave it intravenously as a matter of choice mainly until acute symptoms had passed and then by mouth.

Three-fourths of the doctors felt that 1.5 grams or less daily by mouth was sufficient during the acute attack while only one-fourth gave two or more grams. One-half of the doctors did not attempt to give quinine more than from two to four weeks after acute symptoms had subsided. Only a few attempt to give it more than three months. A high percentage combined the use of quinine with that of arsenical preparations.

In reading the various answers to the questionnaire one is struck by the emphasis laid upon intramuscular injections and actually the percentage using intramuscular injections is probably higher than shown by the above figures. The common attitude seems to be that oral administration is all right for mild cases of infection with vivax; but in all cases that are at all severe, or of infection with *P. Falciparum,* other methods are necessary. Since the percentage of cases from which blood samples are examined is very very small in Porto Rico, the matter of type of parasite probably does not enter into consideration. The majority seem to reserve intravenous injections for the extremely pernicious cases, feeling that it is a dangerous and difficult method.

There is repeated mention of the unpleasant complication of intramuscular injections, as abscesses, nodules, paralysis, etc. Some have abandoned it for other methods while the majority seem to have figured out some way in which they say they avoid them. One doctor said he found after he boiled his syringes he didn't get so many abcesses, but the average training of Porto Rican doctors is much above this. Only one doctor mentions that there were cases in which quinine was contraindicated.

There is thus a lack of confidence in the oral administrations of quinine and this is not only found among doctors but also among the lay population. The people say the quinine burns internally and produces unpleasant nervous symptoms and therefore refuse to take it. They themselves seem to feel that medicine is more effective when given by injections and submit to series after series

of injections of everything. Many doctors say that the people will not take quinine by mouth, and further that it is not effective in the majority of cases when given by that route. For many the intravenous route is too difficult and dangerous so there only remains the intramuscular route. The mutilating effects of this latter practice are seen all over the Island and the practice of hypodermic injections has become so common that many others besides doctors give them. A short training course is given here to large numbers of individuals called "*practicantes*" who serve as aids to doctors, doing dressing, giving injections, etc. These *practicantes* give large numbers of injections on their own responsibility, as also do the pharmacists themselves.

Undoubtedly a large part of this practice has been brought about by an intense advertising campaign from certain European and American houses which specialize in material for hypodermic injection.

Doses of quinine given by mouth have not been large and the importance of the drug has not been impressed on the patient so that all doses may be taken. Diagnosis is not carefully made and therefore conditions are treated as malaria which are not that disease. Quinine does not then relieve the symptoms and one loses faith in the drug. A large bottle of beautifully colored patent medicine can be bought for the same price as a prescription of the pure drug and as many of these preparations contain only small quantities of quinine they are not any too effective. Quinine is commonly sold at three to four times its cost. Since intramuscular injections are so commonly given during the acute attack and the oral administration reserved for after treatment, the emphasis in the mind of the patient is on the injections and not on the drug taken by mouth.

It would seem that the distinction between relapses and new infections is not clearly made by the medical profession in general. This is evidenced by the fact that in the matter of follow-up treatment much emphasis is laid on the importance of screening or anti-mosquito measures, and when one lives in a highly malarious region treatment must be prolonged. The statement is also commonly made that within a few days after heavy rains malaria cases in-

crease markedly. These are called new infections and the general impression is that treatment has been effective enough to produce a high percentage of cures.

SUMMARY OF QUININIZATION

It is found that few patients receive no treatment at all since malaria is common on the coast where as a rule distances are not great to towns and where roads are good. A high percentage go directly to the drug store where patent medicine containing small quantities of quinine are usually sold or where injections of quinine may be given. Over one-half probably receive treatment in this way. About one-third go to doctors among whom the practice is commonly to give intramuscular or intravenous injections during the acute attack and then quinine by mouth for a period of two to six weeks. The adult dose per day in the majority of cases is one and one-half grams or less. It is thus seen that the majority of people receive some form of quinine though not in what is commonly considered effective doses, both from standpoint of daily amount or duration of treatment.