THE OBSERVATION REPORT
ON
INFECTIOUS DISEASES IN BANGLADESH

March. 1984

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PREFACE

The Japanese Government decided to conduct a basic study on the present state of infectious diseases in Bangladesh in consideration of the fact that the control and eradication of infectious diseases is an important subject in Bangladesh, and entrusted the study to the Japan International Cooperation Agency. The Agency sent to Bangladesh a study team headed by Dr. Yoshikazu Watanabe, Consultant of the International Medical Foundation of Japan from November 2 to December 26, 1983.

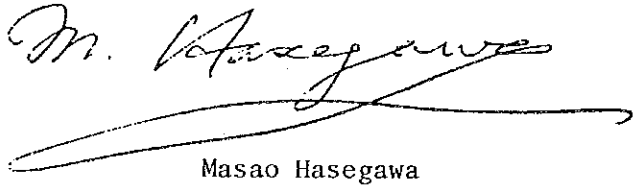
The study team exchanged views with the officials concerned of the Government of Bangladesh, and conducted a field survey in Dhaka and other parts of Bangladesh.

After the study team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will be useful for the further promotion of Japan's medical and health cooperation to Bangladesh in the future and also contribute to the promotion of friendly relations between our two countries.

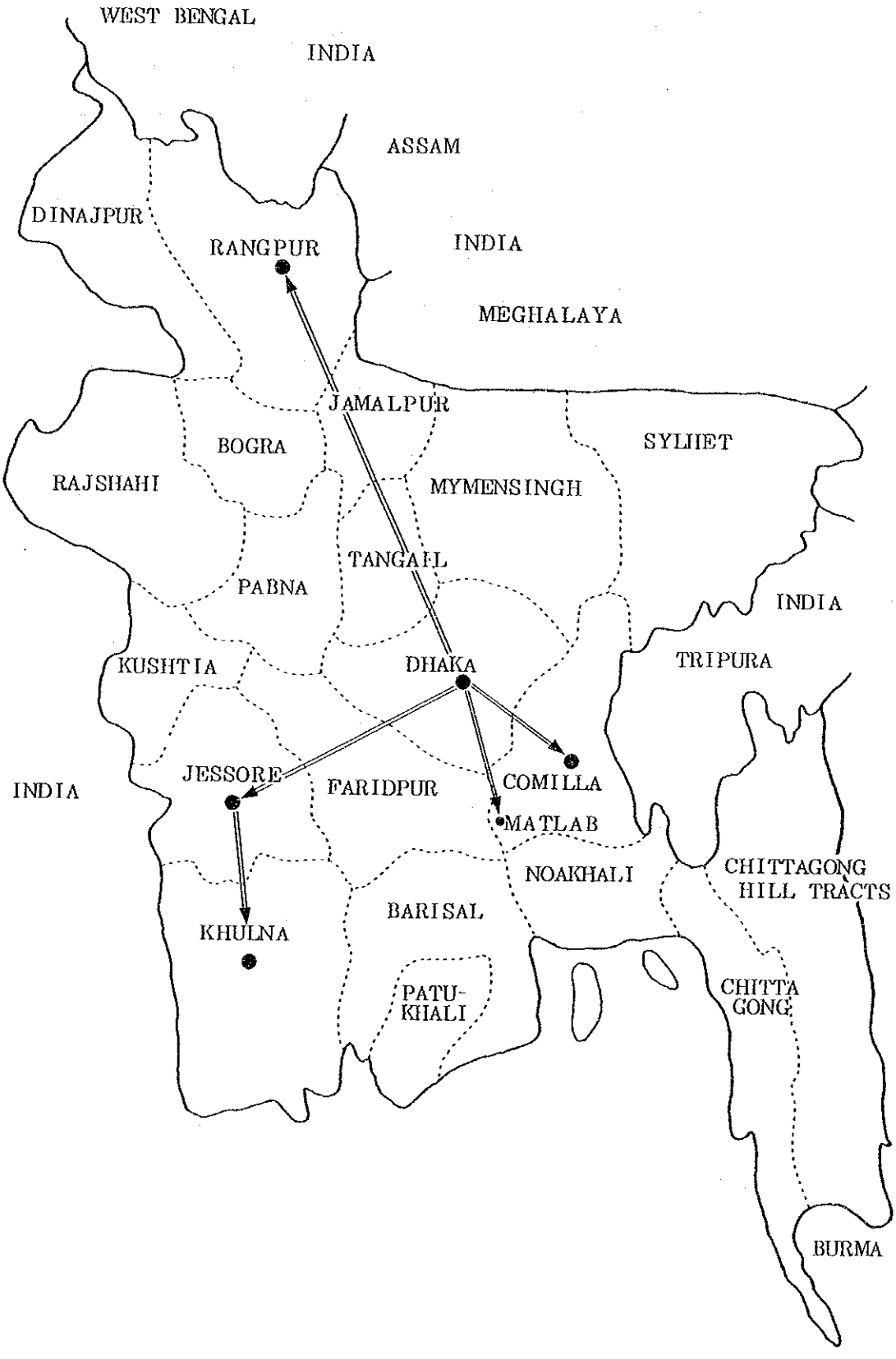
I wish to take this opportunity to express my deep appreciation to the officials concerned of the Government of the Bangladesh for the full cooperation and kind hospitality extended to the study team.

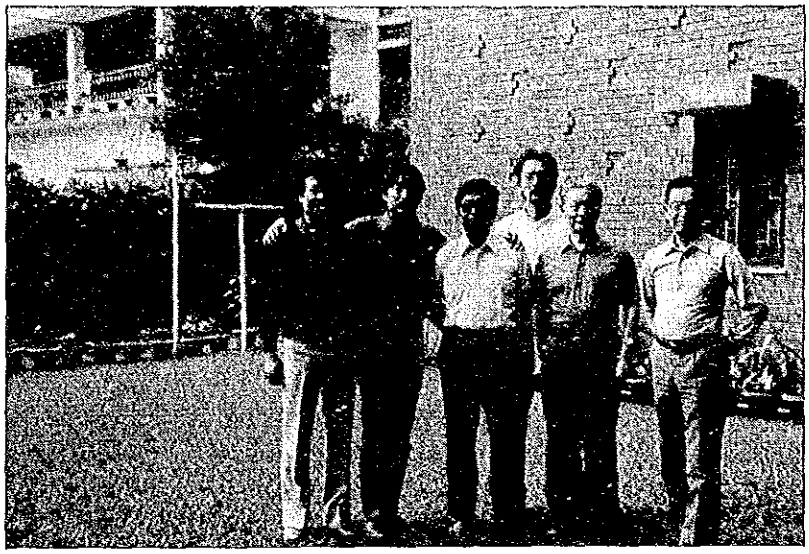
March 1984



Masao Hasegawa
Executive Director,
Japan International Cooperation Agency

Districts surveyed





Member of the Observation Team

ICDDR,B. Director Dr. Greenough

In the Village

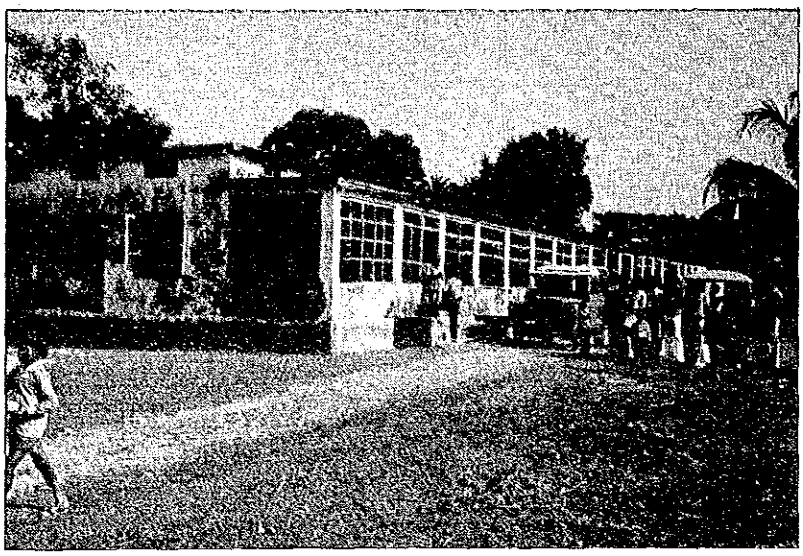
Deepwell

In the Village

In the Village

ICDDR.B. Hospital

Jesser District Hospital



KHULNA I.D. Hospital

COMILA Hospital

Poster

C O N T E N T S

1. Introduction

Japan International Cooperation Agency (JICA) has been extending its technical cooperation to the People's Republic of Bangladesh in various fields, among which health and medical cooperation is of vital importance. In order to establish the guidelines for more effective and valuable cooperation in the future, JICA planned to carry out a preliminary study on the existing situation of infectious diseases and control measures against them in Bangladesh, and entrusted the actual study to the International Medical Foundation of Japan (IMFJ). The IMFJ organized the study team which composed of four experts in the field of infectious diseases, namely one microbiologist, one parasitologist, one public health doctor and one pediatrician. The team has been in Bangladesh for thirty six days from November 21 to December 26, 1983. They visited various institutions and facilities which are in charge of medical and health services in Dhaka, Jessore, Khulna, Comilla and Rangpur. The visited institutions and facilities include: Ministry of Finance and Planning, Ministry of Health and Population Control, National Institute of Cardiovascular Diseases, Health Information Unit, National Institute of Preventive and Social Medicine, Institute of Tuberculosis, Institute of Public Health, TB Hospital, Family Welfare Clinic, Upazila Health and Family Planning Complex (Thana Health Complex), Paramedical Institute, Leprosy Hospital, Infectious Disease Hospital, Bangladesh Institute of Child Health, Dhaka Shishu Hospital, Sub-Union Centre and Division Health Office, International Centre for Diarrhoeal Disease Research, Bangladesh, etc..

They studied available statistical data and other documents, and observed the existing situation of medical and health care facilities, manpower and programmes and activities to control infectious diseases. However, the time was too short for performing a comprehensive observation of the actual situation of the diseases of the whole country. Therefore, this report will be limited to raise some important suggestions for more comprehensive and concrete studies in the future.

2. Summary and Recommendations

Upon request of the JICA based on the agreement between the Governments of Bangladesh and Japan, the Team headed by Dr. Y. Watanabe together with four doctors and two administrators, visited in Bangladesh to observe the present state of communicable diseases and related activities to devise the adequate means of technical cooperation between both countries in the field of infectious diseases.

The team has visited various institutions and other medical and health establishments in Dhaka and those in four districts - Jessore, Khuina, Comilla and Rangpur, and met many health authorities and other health workers between 22 November and 24 December, 1983.

The members also reviewed many documents and publications including excellent description entitled "Health" in the Second Five Year Plan, 1980-85 and "Statistical Pocket Book of Bangladesh 1982".

(1) Infectious Disease Control.

The team noticed that effective control of the major infectious diseases has been included as one of four major objectives of the Second Five Year Plan (SFYP) and that diarrhoea, diphtheria, tetanus, whooping cough, tuberculosis, measles, malaria, scabies, worm infestation etc. have been considered as prevalent infections.

(2) Strategies to Control Infectious Diseases.

In the SFYP the immunization and other related programme will be further expanded and strengthened in order to control infectious diseases effectively, and the following six (6) programmes being considered.

(i) Immunization against tuberculosis, tetanus, diphtheria, poliomyelitis, whooping cough, typhoid and cholera;

(ii) Production of vaccines and toxoids (DPT);

(iii) Oral rehydration for treating diarrhoeal diseases;

(iv) Malaria control;

(v) Public Health Laboratory for epidemiological services; and

(vi) Health education (through domicilliery health care)

Furthermore, a concerted effort has been emphasized by Public Health Engineering Department which is implementing a number of schemes for supply of safe drinking water and hygienic treatment of night soil.

In connection with immunization programme, the plan envisages completion of on-going scheme for production of DPT, expansion of I.V. fluid unit and setting up of a laboratory for production of antivenin and antisera for tetanus and diphtheria within the same premises of Public Health Institute, Mohakhali.

In this connection there are a few points to be mentioned. During our visit to the districts the effectiveness of BCG vaccine was questioned, since some of the vaccinated developed tuberculosis. It would be worthwhile to point out that at present many countries in the world are still continuing BCG vaccination campains, although there are divergent opinions on its effectiveness based on a field trial. Since there is good agreement among TB researchers that adequate control measure of tuberculosis must be a combination of BCG vaccination and treatment of cases, the above question must be carefully analysed in order to avoid misconception on the vaccination. On the other hand, effort to cover at least 80% of the target population should be another key factor, which requires adequate strategy. Although it was based on a limited evaluation through our observation in a few districts, it revealed to be extremely low, sometimes less than 1% of the total. Such results may be related to the shortage of vaccines. But if such low coverage rate should not be improved, vaccines and effort by health personnel involved in the programme, will be merely wasted. It will be most important to concentrate the effort to produce sufficient amount of DPT, DT and TT

in the Public Health Institute as the first priority as planned in SFYP. The production of other curative antisera should be the second and lower priority as compared with the above, since it also requires manpower much skillful than one anticipates. Therefore, the scarcely available manpower should not be dispersed. If human hyperimmunoglobulin is planned to produce, it would be worthwhile to attain the predetermined target of production.

There seems to be some problems on so-called "cold-chain", particularly, during the transportation of vaccines between the Headquarter in Dhaka and the branch offices at peripheries, and on the maintenance of facilities and equipments. All of such constraints seem to be due to managerial incompetence, while includes difficulty to procure the statistics of EPI at Thana levels.

In order to strengthen health education it will be helpful if the primary school employs a compulsory system, in which students are taught health education and hygienic practices including immunization, and given free luncheons to improve the nutritional status of children as well as food habitus gradually to spread it to peoples in their own community.

In connection with Malaria control programme, the team noticed and reviewed detailed "Plan of Operations for Malaria Control Programme Bangladesh". Although this document was excellent and useful, the team wondered why the data on "morbidity or mortality was not available" in the report. Due to the relatively high rate of tropical malaria, there must be some deaths caused by *P. faciparum*. Some explanation would be helpful. No information was also available on the effect of DDT to the various vectors; since this insecticide has long been used in this country, it must have been developed some resistant vectors against it.

As pointed out in the SFYP the available facilities of the Institute of Public Health are very limited to function as a system. To improve such situation the SFYP envisages the following activities.

(i) Establishment of a National Health Laboratory, expanding the existing Public Health Laboratory (in the Institute of Public Health) at Mohakhali, Dhaka as the apex institutions and to establish and expand the laboratories at every district, sub-division, Thana Health Complex and also, to the extent possible, at every union level, to serve as a network with each level doing specific sophisticated functions.

(ii) Development of the Public Health Laboratory components alongside the clinical laboratory facilities in the laboratories of medical colleges, district and sub-divisional hospitals to provide support to the field activities by health and family planning workers.

(iii) The system envisages quality control of drugs in four laboratories in each of the four divisions.

Judging from the team's observation in the limitted areas of this country, it seems impossible to attain the predetermined final goal regarding the ultimate expansion scheme of laboratory services in another two years (the SFYP). This is originated from various causes, e.g. serious lack of laboratory facilities and equipments, and shortage of adequately trained laboratory manpowers in all laboratory levels at the institutes, hospitals, and Thana Health Complex. Accordingly, to provide any laboratory equipment at present time would not give them any apparent impact. It is therefore strongly felt that this plan requires phasing out and stepwise approach in order to reach to the target at a steady pace.

(i) First, to establish a working group to discuss the whole strategies on the improvement of laboratory services including those related to public health (epidemiological, hygienic, environmental, etc.) and clinical services.

(ii) The contents of laboratory services will be investigated at different levels to find out various laboratory services.

(iii) The teaching institutions will be assigned according to the curriculum. It is very important that all available experts with knowledge of international level must be recruited for the teaching courses, and, if necessary, some teaching staff may be invited from abroad.

(iv) When a number of trainees completed their training and will take up new assignments, necessary facilities should be supplied according to the level of laboratory. (As far as the laboratories where the team visited, are concerned, the supply of facilities will not help them upgrade their services due to the lack of the training background on up-to-date laboratory equipment.

(v) Simultaneously, the Public Health Laboratory should be strengthened in order to play a role of the National Reference Laboratory as well.

Since approximately 50% of the population are children, the improvement of their health status will certainly contribute to the development of this country. Although the importance of the preventive measures for children cannot be overlooked, still in reality the curative services should be considered as another key to improve their health status who are already suffering, from various illnesses. Thus, the Dhaka Children (Shishu) Hospital can play an important role not only in curative services but also in a nucleus of the teaching institution for specialized pediatritians.

3. Existing Situation of Infectious Diseases (A)

Infectious diseases are the major health problem in Bangladesh. Table 1 shows the morbidity of the prevalent diseases of this country. It is clear that the control of the infectious diseases is the basic requirements to promote the health and welfare of the people. The government of Bangladesh, having recognized the actual state of the diseases, indicated the policy to control them and tried to carry their plan into effect. Among the infectious diseases, diarrhea, respiratory infection, intestinal worm infestation, skin infection, malaria, measles, tuberculosis, tetanus, poliomyelitis and leprosy are more prevalent in the country, as shown in Table 1. Some of the diseases with high morbidity can be effectively controlled by active immunization with vaccine and are included in the "Expanded Program on Immunization (EPI)" supported by WHO. Distribution of the prevailing diseases among districts is illustrated in Table 2 and Figures 1 - 13; hatching in the figures shows the districts with high morbidity, ranking from the first to the fifth in the rate.

(1) Diarrhea

The term "diarrheal disease" includes acute gastroenteritis, colitis, dysentery and cholera. The morbidity of "diarrhea" is the highest among prevailing diseases, the rate being 4,170 per 100,000 population as shown in Table 1. However, Table 3 shows that the figure varies greatly depending on the source of informations. Such discrepancy may be due to the difference in the criteria of "diarrhea" adopted by the reporters, whether or not simple and less severe gastroenteritis were included in the reports. It is also relevant to the lack of laboratory examination which is important to support the confirmatory diagnosis of "diarrhea" which is caused by a variety of pathogenic agents. In spite of such difference in the information, it must be admitted that the morbidity of

"diarrhea" in Bangladesh is rather higher than other southeast Asian countries, on the basis of the analysis of the information collected by the visiting teams as shown in Table 1 (B).

(2) Tuberculosis

Tuberculosis is one of the most important chronic diseases prevailing in Bangladesh. Tuberculosis and other respiratory infections are more prevalent in the districts north of Dhaka (Figures 2 and 3). The prevalence of tuberculosis is estimated to be approximately 450,000 (smear positive); about 150,000 new patients are discovered every year and number of death amounts to 60,000 per year. Twelve specific hospitals with 566 beds and 44 tuberculosis clinics (without beds) are available for the treatment of TB patients. Diagnosis of the disease is carried out mostly by the aid of microscopic examination of sputum and partly by the X-Ray photography. Tuberculin test is not carried out routinely. The patients are treated free of charge mostly at the tuberculosis clinics as the outpatients. Drugs such as INH, thiacetazone and streptomycin are commonly used for the treatment. Immunization by BCG vaccine is planned but the coverage is still very low.

(3) Whooping cough

Statistics of the disease is scanty. The report from Thana Health Complex (Table 4) shows 19,344 patients (21.3/100,000), but another estimate of the patient suggests a very high incidence of the disease (18/1,000), as will be shown later in Table 21. The disease is therefore considered as one of the important diseases in the SFYP.

(4) Diphtheria

Table 4 shows only 200 patients in 1981 (0.22/100,000). However, the team noticed 1,072 patients and 176 deaths (case fatality rate 16.4%) in Dhaka Infectious Disease Hospital in 1983 (from January to September),

as shown in Table 5. Table 21 also suggests a incidence rate of 0.11/1,000. It seems difficult even in the hospital to treat respiratory embarrassment and heart failure properly. Diphtheria is one of the most important infectious diseases in this country because of its apparent prevalence and high case fatality rate.

(5) Tetanus

The disease is one of the leading causes of death in hospital, as illustrated in Table 5. The case fatality rate of neonatal tetanus is about 90 percent; the figure is the highest among the Southeast Asian countries. Table 6 shows a high prevalence of the disease in this country (56.7 per 100,000 population). The document of the SFYP (Table 21) also indicates a very high incidence rate amont children under one year of age and a high mortality among children under 5 year. The figures in Table 4 may show only a small portion of the patients in the whole country. Antitoxin and antibiotics are used for the treatment of tetanus, but it seems difficult to carry out an adequate respiratory management. A high incidence of neonatal tetanus is due to the malpractices at birth by the midwives. A high incidence of tetanus in other age groups may suggest the inadequate surgical treatment of wounds. Since neonatal tetanus can be prevented effectively by immunization of pregnant women with toxoid, it is desirable to proceed the program of active immunization.

(6) Leprosy

Leprosy is one of the important diseases because of its social influence. The prevalence is estimated to be about 200,000 in 1981. The disease is more prevalent in Dhaka, Rangpur, Mymensingh, Sylhet and Rajshahi districts. The patients are treated free of charge, but the number receiving adequate therapy does not amount to ten percent of the patients in the whole country, as shown in Table 7. Most of the cases are treated with DDS at the clinic as the outpatient, only some severe cases with complications are admitted in hospital.

(7) Measles

Measles seems to be very common among children in Bangladesh. The incidence was estimated to be more than 270,000 in 1981, as shown in Table 8. Most of the patients (210,000) were found among children under 12 years. A higher prevalence is illustrated also in Table 21. The disease may not be serious among well nourished children, but may be fatal for undernourished persons by concurrence of severe complications such as bronchitis and pneumonia. Since the disease is preventable by vaccination, it is desirable to proceed the immunization program.

4. Existing Situation of Infectious Diseases (B)

MALARIA

(1) Malaria Situation in Bangladesh

Malaria has been a major public health problem in the country. During the fifties malaria was hyperendemic in the western border districts of Dinajpur and Kushtia and the eastern border districts of Chittagong Hill Tracts. Malaria was highly meso-endemic in parts of Dinajpur, Kushtia and Chittagong the western border district of Rajshahi and northern border districts of Rangpur and Mymensingh.

Limited malaria control activities consisting of anti-larval measures and drug distribution in a piece-meal manner were carried out in the fifties. In 1961, a time limited phased malaria eradication programme was launched in the country which progressed steadily except in some bordering areas in the northern and eastern parts of the country until 1971. During 1971, the year of liberation the programme too suffered due to the war. In June 1977, the vertical malaria control programme was merged with the Integrated Thana Health Complex Scheme and a Plan of Operations was signed by the Government and WHO in April-June 1977 laying down the strategics of Malaria Control dividing the country broadly into low malaria risk and high

malaria risk areas.

The increase in the number of malaria cases in Chittagong during 1979 and 1980 is attributed to mass population movements as well as to the establishment of a refugee camp in the high risk areas.

The recorded ABER for the whole country was 1.6 and API 0.38 per thousand in 1978. The higher incidence occurred in the Chittagong Hill Tracts, Bandarban, Chittagong district and parts of Sylhet district. In 1981 the ABER recorded was 2.44% and API 0.51 per thousand. The majority of cases came from the Chittagong Hill Tracts, Bandarban, Chittagong, Sylhet, Noakhali, Mymensingh, Jamalpur, Comilla, Barisal and Faridpur. In 1980, 33% of the total positives were recorded as *P. falciparum*. This figure was 41% in 1982 for the whole country most of which came from the Chittagong Hill Tracts, Bandarban and Chittagong district. (Tables 9 - 13) (Fig. 14)

The positive case rate by PCD taking the country as a whole is nearly thirteen times higher than that detected through ACD.

(2) Mortality and Morbidity

No reliable mortality data at any level of the health structure is available. However there is information of a high mortality during 1982 among non-immune settlers in the Chittagong Hill Tracts and of two deaths in Ramgonj in Noakhali and one death at Madhabpur Thana of Sylhet during 1981. A number of deaths were also reported to have occurred at Kalmakanda Thana of Mymensingh and Dharmapasha Thana of Sylhet district during 1979.

Reports on clinical malaria cases from hospitals and dispensaries for the whole country are also not available and surprisingly at the Thana Health Complex level malaria morbidity data are not obtainable.

(3) Seasonal Pattern of Malaria Transmission

The climate and ecological conditions are suitable for perennial malaria transmission in Bangladesh. Prior to the malaria eradication campaign in the plains the seasonal peak transmission occurred during the pre-monsoon (April-May) and the post-monsoon (September-October) periods.

In forested hills and foot hills, malaria transmission was high during the monsoon months i.e. June through September. In the coastal areas the seasonal increase of transmission generally commenced in July and continued until the end of December. A change in the reporting of cases by date of blood smear collection rather than date of examination would be indicative of the transmission season.

(4) Malaria Vectors of Bangladesh

There are four confirmed malaria vectors in Bangladesh:
1. *Anopheles philippinensis*, 2. *A. minimus*, 3. *A. sundaicus*, 4. *A. balabacensis*.

A. philippinensis : The vector is found throughout the country. It breeds in rice fields, tanks, pools, dead rivers, marshes etc.(fresh water).

A. minimus : It has been collected from hilly and foothill areas. It breeds in clean slow-moving water streams with grassy edges, seepages etc. It has been recorded in very low density in recent times from Chittagong Hill Tracts and Sylhet.

A. sundaicus : It has been collected from the coastal belt of Khulna, Barisal, Patuakhali, Noakhali and Chittagong districts. In recent times it was recorded from Cox's Bazar area in very low density. It breeds in brackish water of tanks, ponds, borrow pits, rice fields etc.

A. balabacensis balabacensis : It is a notorious malaria vector of Bangladesh. It has been collected from Hilly and jungle areas of

Mymensingh, Sylhet, Chittagong and Chittagong Hill Tracts. It is a jungle breeder. It breeds in slow moving streams, seepages, small rain water collections in jungles such as hoof prints wheel tracts, ditches, etc.. The larvae are adopted to breeding in temporary rain water collections in jungles. Its density is high during monsoon rains and it transmits malaria on a large scale from May to October.

Distribution of malaria vectors in Bangladesh is shown in Fig. 16.

(5) Chloroquine-Resistant *P. falciparum* Strains

Chloroquine resistant *P. falciparum* malaria is found in Chittagong Hill Tracts such as Longadu, Ramgorh and Chandraghona, Bandarban, Cox's Bazar, Rangunia, Mirershari in Chittagong district, small confined localities in Sylhet, Mymensingh, Feni Division (Noakhali), Comilla and Jamalpur. The RIII level resistance has gradually increased from 4% in 1978 to 6% in 1979, 7% in 1980, 11% in 1981 and 16% in 1982. (Table 14, Fig. 15). Localised epidemics of *P. falciparum* have occurred in Chittagong Hill Tracts and Bandarban in 1982 and 1983.

INTESTINAL PARASITE INFESTATION

(1) Helminthic Infestations

There are several reports which indicate that intestinal parasitism is wide spread in Bangladesh. Muttalib (1979) found about 99 percent of the rural children in Bangladesh were afflicted by intestinal parasitic diseases.

Ascariasis was the commonest condition being detected in 1,245 cases (23.18%). More than one helminth was noted in 568 cases (10.57%). Trichuriasis was found in 555 cases (10.33%) and hookworm infections were detected in 337 cases (6.27%). Infections by *S. stercolis, H.nana*

and *E. vermicularis* were detected in 51 (0.95%), 29(0.54) and 15(0.28) cases respectively. Table 15 presents the frequency distribution of helminthic infections.

A study in the rural children population involving 6000 childrens (1-5 yrs) in thirteen villages and also in the urban children population the prevalence of intestinal parasite have been very high (Table 16).

Among the intestinal parasites Ascaris is the commonest and having high prevalence rate and also high load. Next in prevalence is the *Trichuris trichiura*. There had been high prevalence of poly parasitism indicating entire bowel involvement. In some area, high prevalence of *F. buski* has been found. Hook worm infection is low in the flooded areas and the species he found are *Necator americanus*.

(2) Amoebiasis

Muttalib reports the prevalence, in patients attending private city clinic as *E. histolytica* 55 percent (Table 16). He also found in the new entrants (majority from village) of Dhaka University as *E. histolytica* 11.07 percent.

In the rural children population the prevalence of *E. histolytica* was also very high (40.88%).

5. Nutrition

Nutritional condition of the people has a serious influence on the prevalence and prognosis of infectious disease. The fatality of the disease such as diarrhea may be increased greatly in under-nourished persons, especially in children. Bangladesh is a young country in that 42 percent of the population is belonging to the age groups under 15 years. Infant mortality is estimated to be 127.7 - 152.5 per 1000 live birth and child mortality rate of children of 1 - 4 years

22.9 - 55.0 per 1000 (Table 17);the values are very high when compared with the similar figures in other Southeast Asian countries. Malnutrition may be an important factor which may lead to high mortality stated above.

Intake of the essential nutrients has been decreased recently as shown in Tables 18 - 20; shortage of essential vitamins is remarkable and calorie intake is also short for the people with low income (Table 20). It is well known that night blindness which is prevalent in this country is caused by the dificiency of vitamin A. The team recognized that 78.8 percent of the children under five years were in the second and third stages of malnutrition according to Gometz criteria, and the similar figure is as high as 89.5 percent among children of age groups of 5 - 11 years. These observations show that the problem of nutrition is a very important health problem in this country.

6. Strategy to Control Infectious Diseases

(1) General Aspect of Control Measure

In the strategy of the SFYP to control the infectious diseases, the following programs were stressed:

(i) Immunization against tuberculosis, tetanus, diphtheria, polimyelitis, whooping cough, typhoid fever and cholera;

(ii) Production of vaccines and toxoids (DPT) for immunization against diphtheria, whooping cough and tetanus;

(iii) Oral rehydration for treating diarrheal diseases;

(iv) Malaria control;

(v) Public Health Laboratory for epidemiological service; and

(vi) Health education.

The infectious disease pattern and target setting is shown in Table 21.

While control of infectious diseases will also be augumented under the primary health care program, it needs concerted effort of other agencies like Public Health Engineering Department which is implementing a number of schemes for supply of safe drinking water and hygienic disposal of night soil with special emphasis in rural areas. These schemes are of critical importance in preventing incidence of cholera, other diarrheal diseases and parasitic infestitation.

The Government has also a plan to strengthen the facilities for medical care.

(2) Surveillance System of Infectious Diseases

(i) Notification is required for the following diseases:

a) Gastroenteritis

1) Cholera
2) Dysentery
3) Diarrhea

b) Fevers

1) Plague
2) Influenza
3) Diptheria
4) Cerebrospinal meningitis
5) Poliomyelitis
6) Malaria
7) Pulmonary tuberculosis
8) Typhoid fever
9) Mumps
10) Smallpox
11) Typhus

c) Others

1) Tetanus
2) Rabies
3) Yellow fever

(ii) Method of notification: All health informations including incidence of diseases are compiled by Health Information Unit (HIU) under Directorate of Health Service. The system of information is illustrated in Fig. 18.

In case of epidemic outbreak of cholera or diarrhea, information is transmitted by field workers to the THFPO, Civil Surgeons Control Room through a messenger, telephone or telegram.

(iii) Constraints

Almost all disease reports are based on lay reporting system as only a small fraction of patients can go to a physician for proper diagnosis and treatment who themselves are handicapped for want of adequate laboratory facilities and trained manpower.

Existing laboratory facilities in the THFPCs, district hospital and I.P.F.I are absolutely inadequate for diagnostic purposes.

For this reason surveillance can not be done as it should be done.

The way to overcome this difficulties is to strengthen laboratories at different levels and surveillance system and to impart training.

External resources are necessary for this purpose.

(3) Laboratory Services

Laboratory services are integral parts of all health care services. However, the available facilities of the government laboratories are very limited and not working as a system. Microscopy is the only laboratory examination at district level. Comprehensive bacteriological examination may not be expected in any government laboratory, with the exception of ICDDR. In order to improve laboratory service, the following plans were formulated in the SFYP (1980 - 1985).

(i) Establishment of a National Health Laboratory, expanding the existing Public Health Laboratory at Mohakhali, Dhaka, as the apex institution;

(ii) To establish/expand the laboratories at district, subdivision, Thana (THC) and also to the extent possible at union level (FWC), to serve as a network with each level doing specific functions.

(iii) The sophistication and complexity of the service will increase in the larger establishments.

(iv) Development of the Public Health Laboratory components alongside the clinical laboratory facilities in the laboratories of medical colleges, district and sub-divisional hospitals to provide support to the activities of the field level health and Family Planning workers.

(v) Control of drugs will be started in four district laboratories.

However, improvement of the quality of manpower is not involved in this program. It seems difficult to improve the ability of medical personnels in the present scheme of education. Facilities and manpower of laboratories are shown in Table 22.

(4) Hospitals and Clinics

Medical facilities available in 1982 are 545 hospitals (governmental and private) and 23,907 beds. Governmental hospitals are classified as follows:

(i) General Hospital

District Hospital	14	(1:4,000,000 population)
Sub-divisional Hospital	40	(1:1,000,000)
Thana Health Complex Hospital	312	(1:200,000)

(ii) Special Hospital

12 Tuberculosis Hospitals, 7 Leprosy Hospitals, 5 Infectious Disease Hospitals and 1 Mental Hospital

(iii) Hospitals in sectors other than Health Division, e.g. Police, Railway and others.

The team recognized several problems as follows:

(i) There is a risk of hospital infection due to inadequate precaution for highly infective cases.

(ii) Facilities and equipments in all hospitals are insufficient to apply the modern medical technology. Diagnosis and treatment including surgical operation are insufficient, especially in rural hospitals.

(iii) Medical and paramedical manpower is insufficient in many hospitals. The problem will be stated in another chapter.

The Government has a plan to improve medical care as follows:

(i) Increase of beds at sub-divisional hospital up to 150. The total bed strength under Health Division will be 25,382 at the end of the program.

(ii) Establishment/expanding of special hospitals such as Cardiovascular Institute, Institute of Ophthalmology and Cancer Research institute.

(iii) Establishment of five hospitals for industrial workers.

Total bed strength including private sector would be 32,465 at the end of the plan, and the bed population ratio would be 1:3018.(Table 23.)

Diseases treated in the hospitals and leading cause of death are shown in Tables 24 - 26.

It must be added that various kinds of traditional medicine are deeply rooted in the country since long. The government has a plan to develop them on a proper scientific line and to integrate them into the Primary Health Care System (see SFYP, Chapter XVI, Health).

(5) Immunization

Immunization has been launched along the line of Expanded Program on Immunization (EPI) since 1980, at first in the urban area, and about 30 percent of Thana Health Complex (THC) have been involved in the program in 1982. At present, 1925 EPI centers are established and a THC manages 5-6 satellite EPI centers, by sending EPI technicians once a work to carry out immunization at the center. The following six diseases are included in the program: diphtheria, whooping cough, tetanus, tuberculosis, measles and poliomyelitis. However, an active follow-up or evaluation of the immunization schedule has rarely been tried; the only data available are those carried out in Dhaka by WHO in 1981 and 1983. As shown in Tables 27 and 28, the immunization rate is still very low; in 1983, only 12 percent of target population received a complete immunization with all vaccines (Table 28). The immune status is far from the level necessary to prevent the diseases.

The team also investigated the immunization status at several Thanas and the results are summarized in Table 29. The target population were estimated from the population of the area by using the population distribution by age of the whole country. The coverage rate is much lower in the rural district than that of the urban area. (also refer to 29B). The promotion of the immunization program is urgently required to improve the health condition of children in this country. However, many problems as follows should be solved to

proceed the EPI program effectively: control of vaccine, improvement of the facilities as well as the technique of immunization, follow up system of the program and health education of the people.

(6) Malaria Control

(i) Current Malaria Control Activities

The current malaria control activities were based upon a stratification of the country into low and high risk areas according to the situation prevailing in 1976 (Fig. 19), the latter areas being those where the annual parasite incidence exceeds one per thousand population.

Malaria Control Activities were carried out through the Integrated Thana Health Complex Scheme in both high and low risk areas. The main activities employed were passive and active case detection by multi-purpose health personnel.

Epidemiological investigation of all foci in low risk areas is also part of the strategy.

In high risk areas the strategy is to spray DDT 1gm/m^2 in two rounds, one pre and one post-monsoon, and to conduct case detection and treatment by multipurpose and unipurpose health workers. (Table 30)

In general chloroquine 1500mg to 1800mg base over three days are used for the radical treatment of clinically suspected and laboratory diagnosed cases. In both *P. vivax* and *P. falciparum* 15mg of primaquine is avocated daily for five days.

The strategy of insecticide usage upto 1983 was residual spraying with 1gm/m^2 of DDT based on criteria for high risk areas of an API of one per thousand as determined in 1976 and an API of one per thousand in low risk areas as reported in the preceeding year (for focal spraying).

In the high risk areas the unipurpose health worker becomes the spray squad leader during the pre and post-monsoon spray operations and the Health Inspector (Malaria) and Assistant Health Inspector (Malaria) are responsible for supervision.

The malaria diagnostic services are performed by laboratory technicians in the Thana Health Complexes and at district and sub-divisional levels in all areas. In the high risk areas additional laboratory services are provided at the malaria zones and divisions. Blood smears from the multipurpose health workers are examined at the respective THC and if there is no technician posted, then at the Sub-divisional level. On the other hand the blood smears taken by the unipurpose malaria workers are sent to the malaria zone for examination.

Cross checking of the malaria zone laboratory slides is carried out by the malaria division laboratory. Upon request, 10% of the negatives (last digit of the slide serial number) and all the positives are sent for cross check. At the district level slides examined at the THC are cross checked.

(ii) Entomological Investigations

Table 31 is a table giving the District-wise results of Entomological Investigations yearly from 1979 upto October 1981.

In 1979, 271 localities were investigated in 20 Districts excluding Khulna, Patuakhali, Tangail and Jamalpur. Vectors were found in 39 localities in Comilla (17), Sylhet, Mymensingh, Noakhali, Chittagong, Chittagong Hill Tracts, Dhaka and Pabna. *A. minimus* was found in one locality each in Chittagong and Chittagong Hill Tracts. *A.sundaicus* was not found but *A. minimus* was found in Chittagong and Chittagong Hill Tracts/Bandarbon. *A. philippinensis* was the predominate vector found mostly in Comilla, Noakhali, Chittagong Hill Tracts/Bandarbon, Sylhet, Mymensingh, Dhaka and Pabna. *A. balabacensis* only in Chittagong Hill Tracts/Bandarbon and Chittagong.

In 1980, 332 localities were investigated in most of the Districts except for Patuakhali and Jamalpur. In 54 localities in the districts of Chittagong Hill Tracts/Bandarbon, Chittagong, Noakhali, Comilla, Jamalpur, Mymensingh, Dhaka, Rajshahi, Bogra and Rangpur vectors were found.

(iii) Training : Training of various categories of personnel is carried out at different echelons. Courses for professional staff are

carried out at the Institute of Epidemiology, Disease Control and Research which is now marged into the National Institute of Preventive and Social Medicine (NIPSOM). Training is also carried out at Divisional and District level too.

There is no specific National Budgetary allocation for training. As a result there is no organized training course for the new recruits who receive training merely through attachment to existing field staff. There is also no provision for refresher training of existing personnel.

(iv) Health Education:

A review of the last 4 years shows a serious vacuum in the Health Education Activities. To counteract this a conference was held in May this year between the Central Health Education Bureau and the Malaria Division together with the W.H.O.counterparts. It was decided that a programme of activities be carried out in 3 spheres: (i) Utilization of voluntary collaborators for case detection and treatment, (ii) Improvement of spray coverage during pre-monsoonal and post-monsoonal spray cycles and (iii) Improvement of existing Health Education materials such as pamphlets, posters and booklets etc.

Village Voluntary collaborators (about 80) who have already been recruited and trained in Chittagong Hill Tracts, are actively participating in Drug Distribution. One voluntary collaborator per 50 - 60 households had been envisaged.

(7) Health Manpower

(i) Medical doctor : A number of the registered medical doctors are 10,513 in 1982 and 7,000 of them are working for the Ministry of Health. The population/physician ratio is 8810, but the ratio is higher in the rural area since 90 percents of physicians are living in the urban area where only 10 percent of the population inhabit.

There are 8 medical schools with 8,176 students. Graduates should be trained for one year in the institutions designated by the Ministry of Health and designated to work in a rural area for two years, and maintain freedom to chose their place to work.

About 1,200 students are graduated from medical school every year and the number of physician will be 17,000 at the end of the SFYP in 1985. (Table 32) Table 33 shows the comparion of the number of physicians among several Asian countries.

(ii) Dentist: The registered dentists estimate 248, although about 600 dentists are available in the whole country. There is only one dental school in the country.

(iii) Medical assistant: There are 16 Medical Assistant Training Schools (MATS) throughout the shole country. The number of medical assistants is approximately 2,000. The government intends to increase the number to 3,240 by the end of SFYP.

(iv) Nurse: The total number of nurse is only 2,700 and the ratio of population/nurse is 33,333. Senior nursing training centers (4 years' course) and junior nursing training centers (3 years' course) are available in some districts.

(v) Paramedics: The training of paramedics is carried out at Paramedical Institute. Dhaka Institute provides the following courses of training: Sanitary Inspector (10), Laboratory technician (100), Radiography diagnostic technician (25), Radiography therapeutist (0), Dental technician (20) and Pharmacist (50). Figures in parentheses show the number of the trainee. Post-graduate course has not been established yet. (Tables 34 and 35)

(vi) Malaria worker: Malaria control program is under Directorate General of Health Services. At the field level, Health and Family Planning Worker is responsible for the implementation of the program. Specialists for malaria control are assigned at the high risk area; they are malaria divisional officer at division level and zonal malaria officer for 15 zones. Malaria worker for DDT spraying are attached to 623 subsectors of the designated zones.

(8) Hygiene and Sanitation

Environment is one of the important factors which influence the incidence and prevalence of infectious diseases. Hygiene and sanitation are especially important and more influential than any other factors such as agent and host in the control of intestinal infection like cholera and dysentery. Bangladesh is notorious for abundant rainfall and 20 percent of the country suffer from flood every year. It is not easy to improve the sanitary conditions such as supply of safe water and sewage disposal because of insanitary mode of living and ignorance of health among people as well as difficulty in health education due to the high rate of illiteracy (up to 74%). The Government of Bangladesh planned to establish more facilities for water supply, as shown in Tables 36 and 37. However, realization rate of the plan is not so high, and 5 - 7 percent of the tubewells become out of order every year. Directorate of Public Health Engineering enrolled 190,000 volunteers to serve as the first line field worker to keep and repair the tubewells as well as to extend health education regarding the safe water supply and improvement of the sanitary condition. The UNICEF supports the implementation of the project and supplies the parts of the equipment necessary to repair tubewells.

In the urban area, the local government is responsible for sewage disposal, while the burden is left to the responsibility of each family in the rural district. The Government strives to support rural inhabitants to establish private latrine by the aid of the UNICEF and several foreign countries, although the outcome is limited.

(9) Production and Supply of Drugs and Vaccines

The supply of drugs and medicines to the health institutions at Thana level and below has been augumented through the supply of DDS kits by the aid of UNICEF. The Government plans to increase the production of essential drugs through the Industries Division's program. The program involves also completion of on-going scheme for production of DPT and expansion of I.V. fluid unit, as well as setting up of a laboratory of antivenin and antisera for tetanus and diphtheria at Public Health Institute, Mohakhali.

7. Acknowledgement

The observation team would like to take this opportunity to express our gratitude to the Ministry of Health and Population Control and Ministry of Finance and Planning. Our observation in Bangladesh could not have been accomplished without their cooperation.

It is deeply appreciated also that the International Center for Diarrhoeal Disease Research, Bangladesh cooperated to our team.

Finally, the observation team express its sincere thanks to cordial treatments and assistance given by

Mr. A.B.M. Golam Mostafa, Secretary of Health,

Dr. A.H.M. Abdur Rahman, Additional Director General of Health services,

Dr. Mobarak Hossain, Section Chief, Commossion Planning, Ministry of Finance and Planning,

and others.

The team also acknowledges to the coordination by

Dr. Imdadul Islam, Assistant Director, Leprosy Control,

Dr. Md. Rafiguddin, Epidemiologist,

Dr. M. Rahman, Assistant Director,

who accompanied with the team visits to various institution, facilities and trips.

INCEPTION REPORT OF OBSERVATION TEAM ON INFECTIOUS DISEASES IN BANGLADESH

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Fig. 1 Distribution of Diarrheal Diseases
(including Dysentery)

Fig. 2 Distribution of Respiratory Infection

Fig. 3 Distribution of Tuberculosis

Fig. 4 Distribution of Tetanus

Fig. 5 Distribution of Leprosy

Fig. 6 Distribution of Measles

Fig. 7 Distribution of Poliomyelitis

Fig. 8 Distribution of Malaria

Fig. 9 Distribution of Intestinal Worm Infestation

Fig. 10 Distribution of Scabies/Skin Rash

Fig. 11 Distribution of Malnutrition/Severe Anemia

Fig. 12 Distribution of Night Blindness/Xeropthalmia

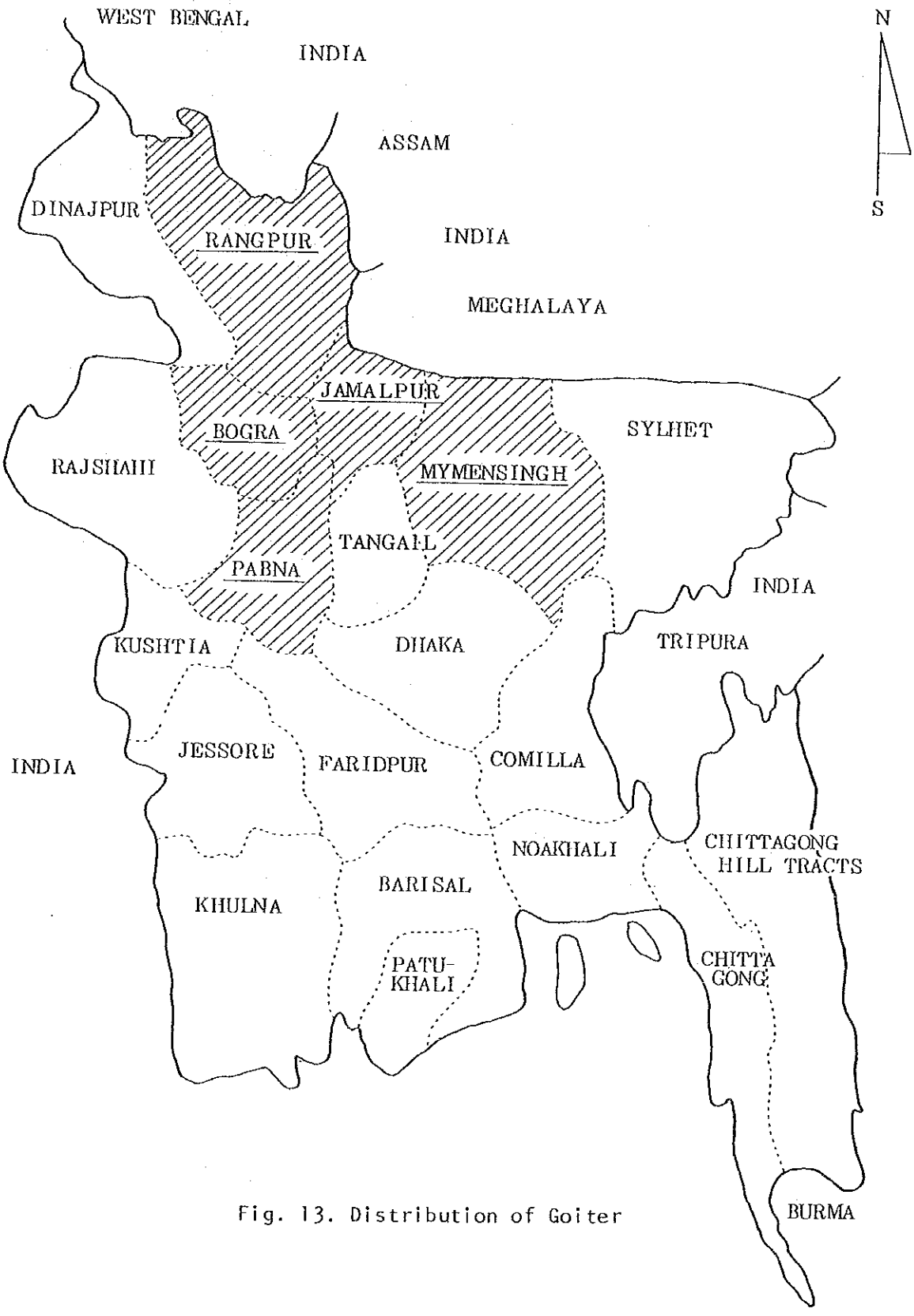


Fig. 13. Distribution of Goiter

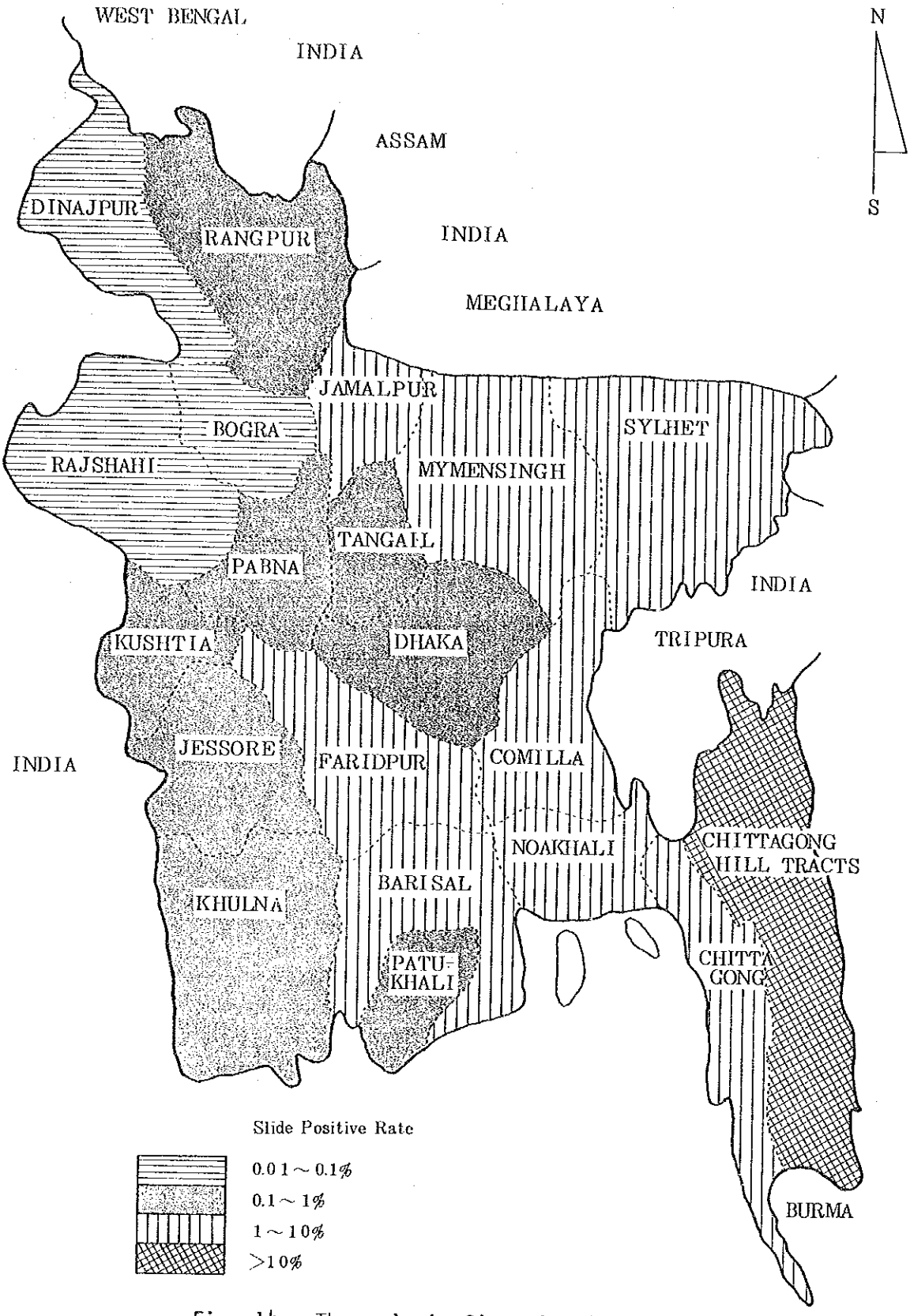


Fig. 14. The malaria Situation in Bangladesh

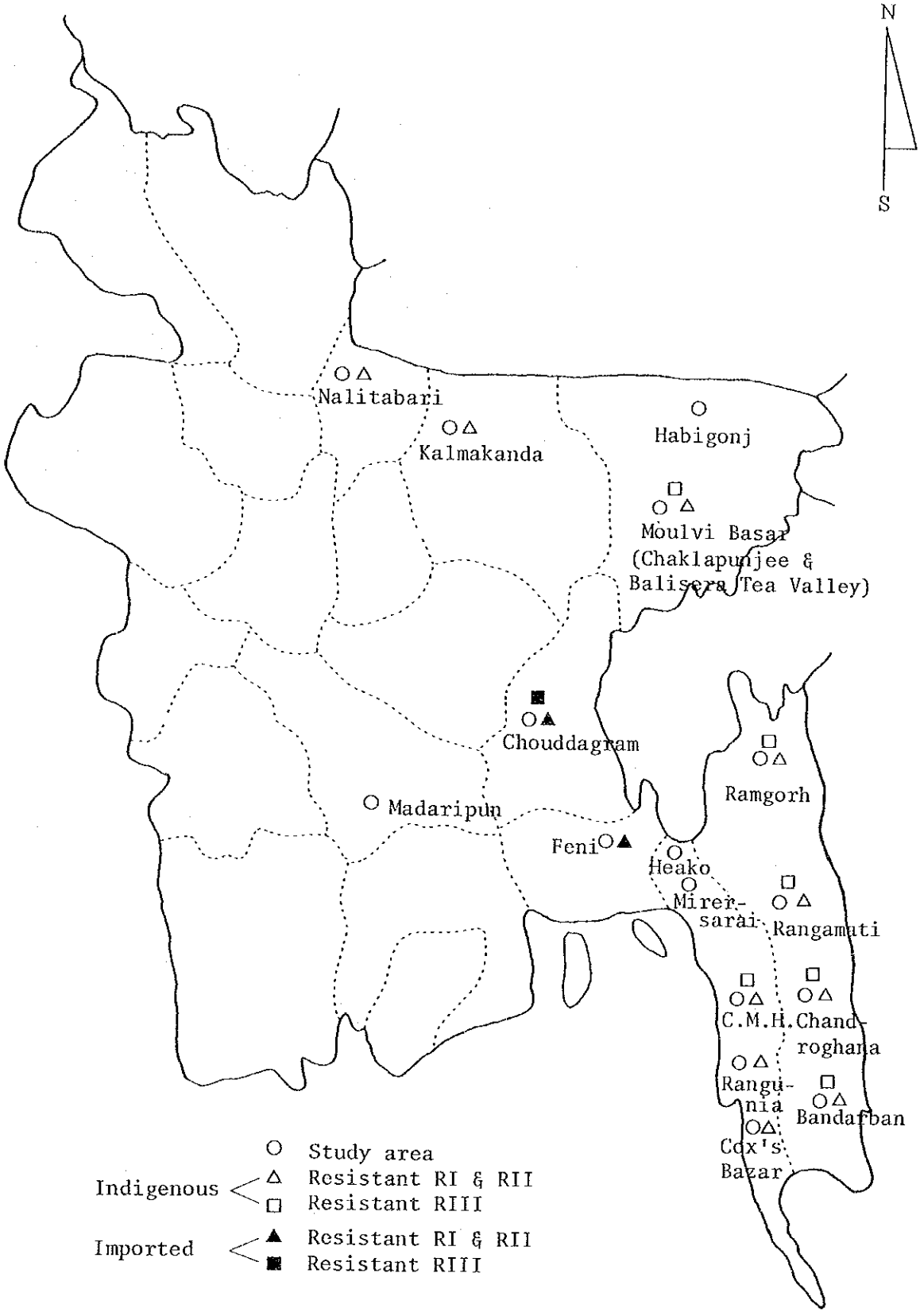


Fig. 15. Map showing areas of drug resistance studies of *P. falciparum* to chloroquine and level of resistance detected during the period 1978 to 1981

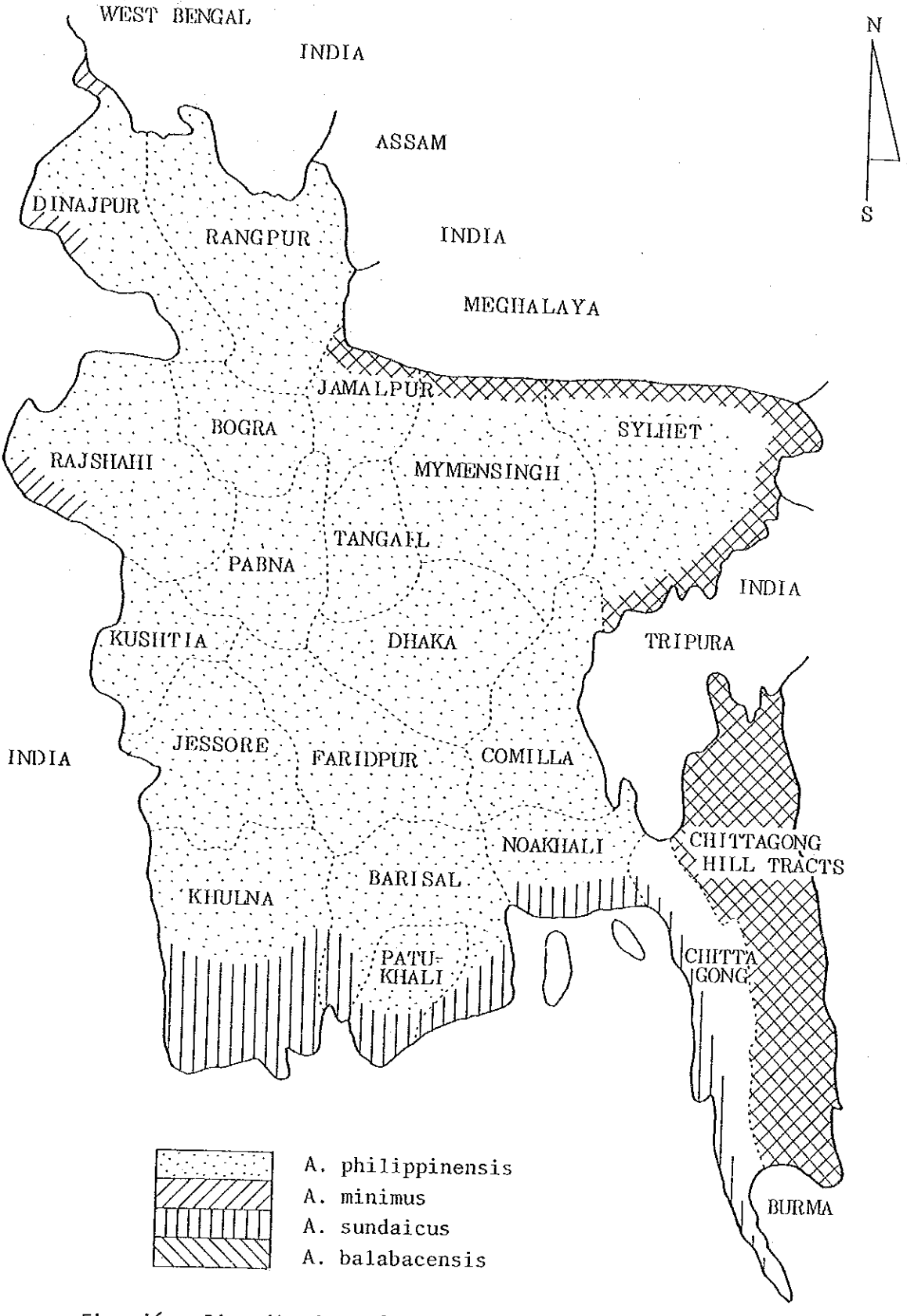
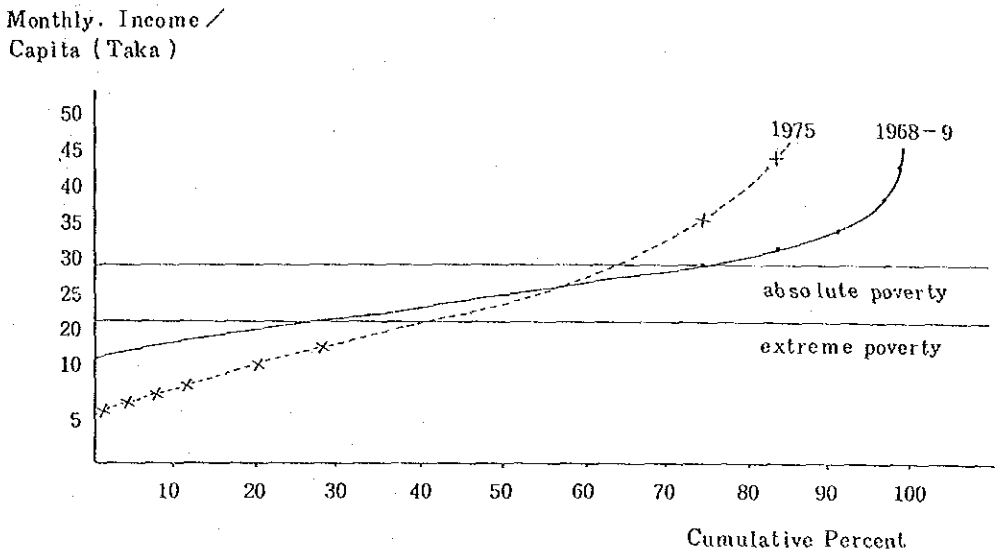


Fig. 16. Distribution of Malaria Vectors in Bangladesh



Source: Nutrition in Health

Fig. 17. Bangladesh: Cumulative Distribution of Per Capita Monthly Income, 1968-9 and 1975

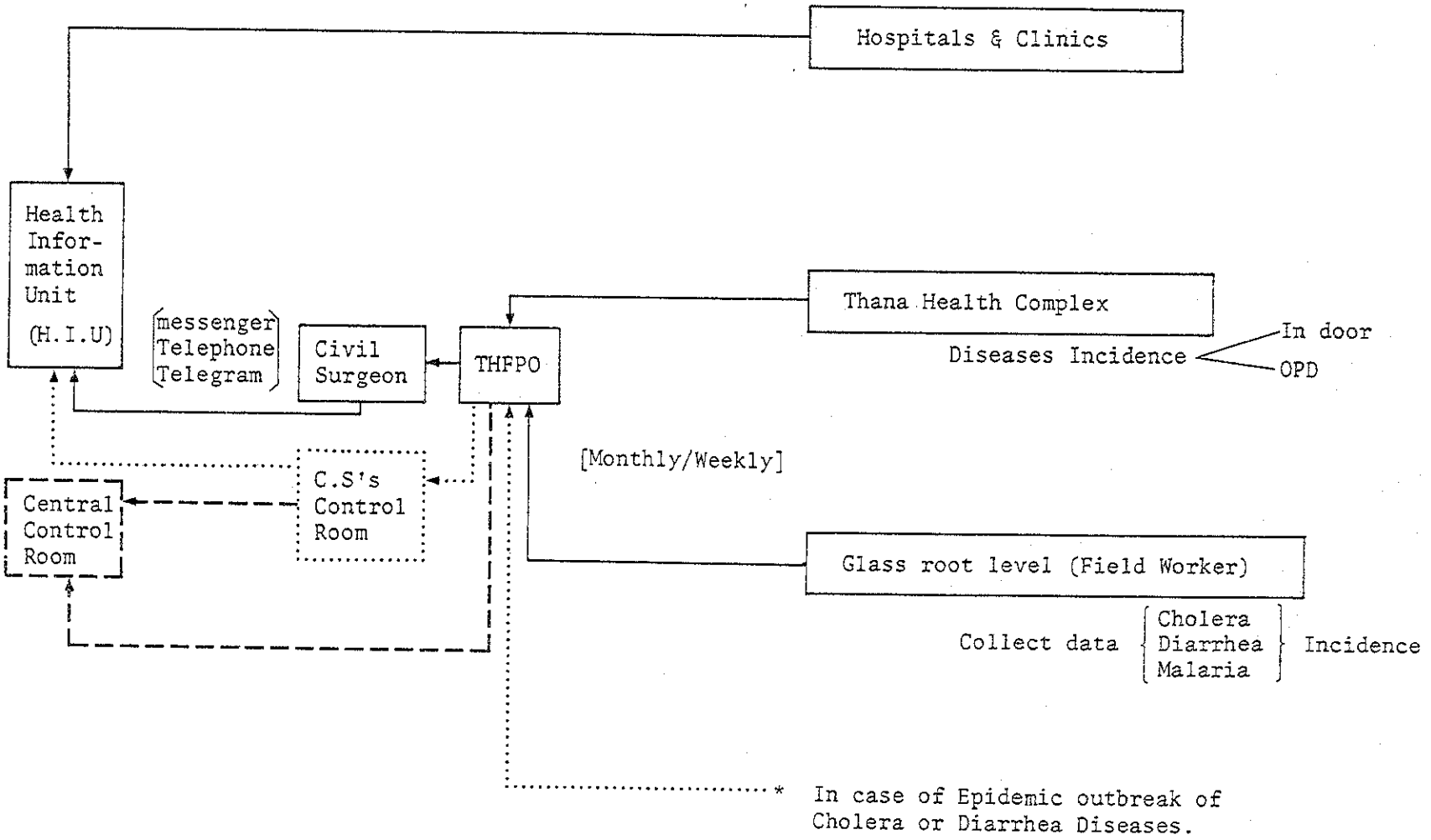


Fig. 18. Surveillance of Notification Required Diseases in Bangladesh

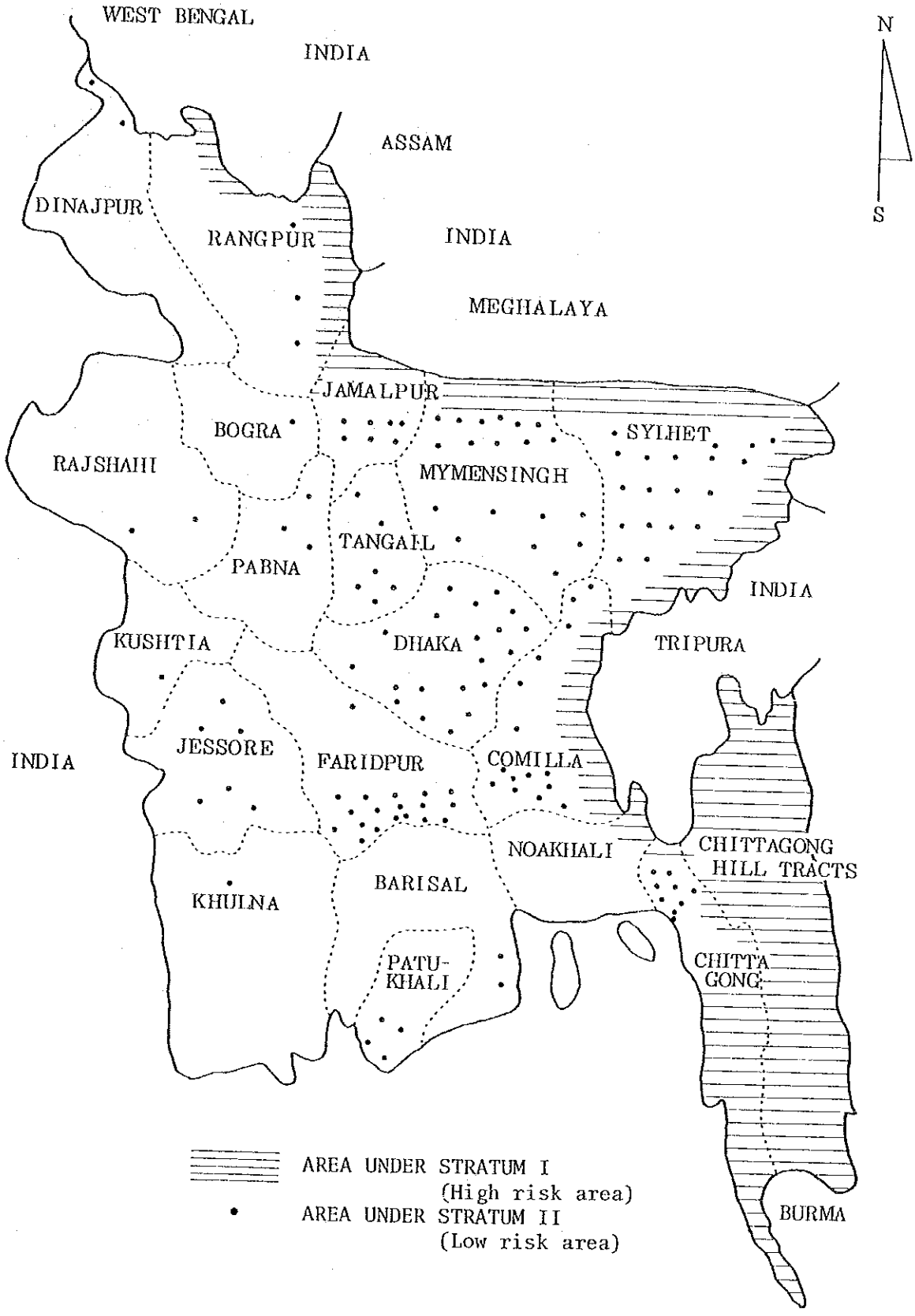


Fig. 19. High Malaria Risk and Low Malaria Risk Areas in Bangladesh

Table 1 Morbidity of Prevailing Diseases in Bangladesh, 1981

Major Diseases	Mobidity Rate per 10^5	Children		Adult (13 ∿)	Remarks
		0 - 6	7 - 12		
1. Diarrhea/ Dysentery	4,170	3,530	5,101	3,894	
2. Cold cough Respiratory Infection Diseases	3,110	2,617	3,964	2,872	
3. Intestinal Worm Infestation	2,710	2,628	4,258	2,197	
4. Malnutrition/ Severe Anemia	2,280	2,023	3,149	2,011	
5. Scabies/ Skin Rash	2,250	2,382	3,508	1,765	
6. Night Blindness Xeropthalmia	650	777	1,141	454	
7. Malaria	440	136	382	532	
8. Measles	320	639	657	110	
9. Tuberculosis	160	12	31	235	
10. Goiter	70	23	77	84	
11. Tetanus including Neonatal	60	111	174	17	
12. Poliomyelitis	40	73	74	19	
13. Leprosy	20	3.8	15	25	

Source : HIU "Patients on Diseases, 1981"

Table 1 (B)

Morbidity of Prevailing Diseases in Asian Countries[1)]

Bangladesh (1981)	Indonesia[2)] (1980)	Philippines (1977)	Thailand[3)] (1979)
Acute diarrhea 4170	Upper respiratory tract infection 3130	Influenza 614	Acute diarrhea 387
Respiratory infection 3110	Acute diarrhea 1230	Gastroenteritis 465	Pyrexia of unknown origin 178
Intestinal parasitic diseases 2710	Lower respiratory tract infection 858	Bronchitis Asthma 400	Malaria 164
Malnutrition 2280	Skin infection 835	Tuberculosis 238	Tuberculosis 99
Skin infection 2250	Tuberculosis 604	Pneumonia 231	Dysentery 71
Night blindness 650	Cardiovascular disorders 591	Malaria 67	Influenza 70
Malaria 440	Eye infection 372	Measles 62	Dengue hemorrhagic fever ·Encephalitis 29
Measles 320	Diseases of musculoskeletal system & connective tissue 364	Pertussis 48	Measles 29
Tuberculosis 160	Malaria 271	Tumor 46	Hepatitis 27
Goiter 70	Arthritis and rheumatism 265	Dysentery 46	Other viral infection 30
Tetanus 60	Disorders of tooth and tissues of teeth 242		Food poisoning 28
Poliomyelitis 40	Diseases of nervous system 209		Enteric fever 22
Leprosy 20	Anemia 206		Pertussis 11
	Accident 205		Leprosy 7
	Other infections 221		Tetanus 4
	Others 2422		

1) Figures show morbidity per 100,000 population.

2) Most of the data were taken from 1980 House Hold Health Survey except for diarrhea and malaria, for which a complete statistics was available at CDC.

3) Only the communicable diseases were shown.

Table 2 Morbidity of Prevailing Diseases by District (1981)

	Diarrhea/ Dysentery	Resperitory Infection	Intestinal Worm Infestation	Malnutritian/ Severe Anemia	Scobies/ Skin Rash	Night Blindness/ Xeropthalmia	Malaria	Measles	TB	Goiter	Tetanus	Polio	Leprosy
Dhaka	4,260	1,880	1,840	1,780	1,150	340	200	230	20	50	15	40	3
Mymen-singh	4,930	3,510	3,960	3,060	2,560	1,300	650	530	940	110	40	50	0.4
Tangail	9,590	5,550	4,380	4,190	4,020	1,130	210	560	170	40	10	5	2
Jamalpur	4,590	3,340	2,370	2,570	2,350	1,050	520	450	630	200	40	160	1
Haridpur	3,670	2,010	1,830	2,000	2,200	280	220	250	50	50	15	30	0.6
Khulna	3,960	2,060	1,760	1,070	1,590	130	40	140	70	30	40	10	3
Jessore	980	1,220	1,400	210	1,280	310	7	380	80	11	11	8	13
Kushtia	3,120	2,300	3,090	1,610	1,460	400	170	280	290	50	9	50	0.7
Borisal	5,630	3,160	5,600	2,730	3,240	490	360	260	40	80	9	70	15
Patuk-bali	4,350	2,450	3,800	2,640	2,220	370	730	460	100	30	70	110	30
Rajshahi	6,290	7,240	4,620	4,830	6,220	460	-	860	170	40	100	20	110
Rangpur	6,520	3,290	2,930	3,260	2,090	1,200	20	350	80	240	4	8	40
Dinajpur	5,630	2,740	2,430	3,690	2,060	1,200	80	210	50	50	1,090	240	20
Bogra	5,330	4,880	3,660	2,440	4,450	860	3	310	110	280	10	2	1
Pabna	6,120	4,130	3,260	2,850	3,640	2,180	130	720	230	80	8	2	0.4
Chittagong	2,980	3,040	1,880	2,030	1,500	240	1030	3	80	14	0.7	50	0.7
Comilla	1,340	2,250	880	600	670	220	320	250	50	80	2	40	0.1
Noakhali	2,480	1,510	1,530	1,460	1,120	350	60	110	30	2	2	5	1
Sylhet	1,170	4,240	2,930	1,900	1,940	770	2,220	60	70	-	-	-	90
Ctg.Hill Tracts	3,330	2,150	2,650	1,730	1,950	230	5,900	150	60	18	9	8	2
Ground Total	4,170	3,110	2,710	2,280	2,250	650	440	320	160	70	60	40	20

Table 3 Morbidity of Diarrhea - Difference depending on the source of information

Year	Attacks	Deaths	CFR %	Sources	Morbidity Rate per 10^5
1980	86177	437	0.5	Diarrheal Diseases by Months and Year - Bangladesh	97.9
1981	328752	1373	0.42	Diarrheal Diseases by Months and Year - Bangladesh	362.7
	549348	2105	0.38*1	Reported to Control Room by *1 civil surgeons and to HIU through WER *2 WER:Weekly Epidemiological Report	606
	134614	1297	0.96*2		148.5
1982	630854	3898	0.62	Diarrheal Diseases by Month and Years - Bangladesh	685.7
	550442	4471	0.81*1	Control Room	598.3
	532845	3090	0.58*2	WER	579.2
	706384	15297	2.17	District and Monthwise Epidemic Report of Diarrhea Diseases for the Year 1982.	767.8
1983	319582	2699	0.84	Diarrheal Diseases by Month and Years - Bangladesh (1983.1.1 ∿ 1983.11)	338.9
	184602	3025	1.64	Epidemic Report of Diarrhea Diseases (1983.1.1 ∿ 1983.10)	195.8
	319565	2699	0.84	Summary of Diarrheal Diseases Cases Reported by District Through WER	338.9

Table 4 Reported Cases and Deathes of Communicable Diseases of Priority Importance (Thana Health Complexes, Bangladesh, 1981)

	Whooping Cough		Measles		Tetanus		Diphtheria	
	Case	Death	Case	Death	Case	Death	Case	Death
Dinajpur	114	17	214					
Rajshahi	4,448		1,448		82		90	4
Bogra			57					
Pajshahi	2,037		2,085		33	2	2	
Pabna	1,777				94	23	15	2
Kushtia			15		27			
Jessore	57		351		3		10	1
Khulna	2,004		1,575		58	6	56	2
Patuakhali								
Barisal								
Paridpur	283		133		54	4	8	
Dhaka	219		1,169	7	14	1	1	1
Tangail	1,897		378				4	
Jamalpur	4,615		985				4	
Mymensingh	711		681		19	1	3	
Sylhet								
Comilla								
Noakhali	40		37	3	3	2		
Chittagong	69		600		1	1	4	
Ctg. H.T.	828		550		26		3	
TOTAL	19,344	17	10,278	10	414	40	200	10
Morbidity per 100,000 population	21.3		11.3		0.45		0.22	

Table 5 Major Diseases in Dhaka Infectious Disease Hospital

Disease	Inpatients	Deaths	CFR (%)
Tetanus neonatorum	521	473	90.8
Tetanus (except T. neonat.)	741	131	18.9
Diphtheria	1,072	176	16.4
Other Diseases	82	5	6.1
Total	2,416	785	32.5

CFR : Case fatality rate

Table 6 Prevalence of tetanus (1981)

Children		Adult		Total
0 - 6	7 - 12	Male	Female	
21,380	20,394	3,881	5,718	51,373

Source : HIU

Table 7 LEPROSY - Treated Cases (1981)

Children		Adult		Total
0 - 6	7 - 12	Male	Female	
721	2,130	8,270	5,971	17,092

Source : HIU

Table 8 MEASLES (1981)

Children		Adult		Total
0 - 6	7 - 12	Male	Female	
122,451	91,267	34,836	28,322	276,876

Source : HIU

Table 9. Year-wise epidemiological data from 1969 to 1982

Year	Total B/S Examined	Total +ve Cases	ABER %	API '000'	SPR %	P.f. Ratio %
1969	488,051	7,871	7.3	0.11	0.16	35
1970	6,107,144	6,660	9.1	0.09	0.11	50
1971	2,212,660	2,944	3.3	0.04	0.13	57
1972	5,311,988	18,384	7.8	0.20	0.35	35
1973	3,259,190	14,007	4.8	0.20	0.43	57
1974	1,884,109	15,855	2.7	0.20	0.84	68
1975	2,929,935	31,247	3.5	0.44	1.07	62
1976	3,537,269	48,844	4.1	0.64	1.38	58
1977	1,346,926	28,818	1.6	0.38	2.14	44
1978	1,391,055	33,326	1.7	0.44	2.40	20
1979	1,374,104	49,776	1.8	0.66	3.62	21
1980	2,634,773	67,707	2.78	0.78	2.57	32
1981	2,338,853	45,902	2.44	0.51	1.96	35
1982	2,374,921	38,204	2.46	0.42	1.61	41

ABER: Total blood smears collected by ACD & PCD in one year x 100/Total population of the area

API : No. positive cases in a year x 1,000/Total population of the area

SPR : Slide positivety rate (%)

P.f.: *P. falciparum*

Table 10. District-wise epidemiological data, 1980

Sl. No.	Name of District	Estt. Popu.	Total B/S Exam.	Total +ve	P.f.	Classification		
						ABER %	API '000'	SPR %
1.	Dinajpur	3,004,525	183,458	108	30	5.55	0.03	0.06
2.	Rangpur	6,405,240	336,364	1,733	80	5.7	0.27	0.5
3.	Bogra	2,806,880	123,671	229	73	3.41	0.08	0.2
4.	Rajshahi	5,153,990	104,804	252	105	1.78	0.05	0.2
5.	Pabna	3,400,245	81,879	214	8	2.16	0.06	0.3
6.	Kushtia	2,419,499	46,942	235	17	1.53	0.10	0.5
7.	Jessore	4,110,315	128,525	602	11	2.80	0.15	0.5
8.	Khulna	4,336,324	113,241	536	3	2.44	0.12	0.5
9.	Jamalpur	2,350,485	40,635	1,775	204	2.05	0.65	4.4
10.	Mymensingh	5,687,801	202,889	8,701	852	3.54	1.46	4.3
11.	Tangail	2,481,293	64,514	273	30	2.42	0.11	0.4
12.	Dhaka	9,610,472	219,202	3,063	31	2.21	0.32	1.4
13.	Faridpur	4,753,736	326,125	6,533	8	8.10	1.37	2.0
14.	Barisal	4,631,301	69,320	1,319	3	1.27	0.28	1.9
15.	Pakuakhali	1,794,895	22,523	188	-	1.25	0.10	0.8
16.	Sylhet	5,350,495	77,918	4,258	479	1.62	0.60	5.5
17.	Comilla	7,006,327	183,963	4,905	422	2.31	0.70	2.7
18.	Noakhali	4,060,834	66,312	1,607	423	1.55	0.40	2.4
19.	Chittagong	6,395,899	214,770	24,895	14,065	2.61	3.89	11.6
20.	Chittagong H/T.	745,026	27,730	6,261	5,360	0.05	8.40	22.6
		86,545,582	2,634,773	67,707	22,180	2.78	0.78	2.57

Table 11. District-wise epidemiological data, 1981

Sl. No.	Name of District	Estt. Popu.	Total B/S Exam.	Total +ve	P.f.	Classification		
						ABER %	API '000'	SPR %
1.	Dinajpur	3,135,860	153,338	40	12	4.73	0.01	0.03
2.	Rangpur	6,597,397	245,781	2,110	149	3.59	0.31	0.86
3.	Bogra	2,891,086	90,627	87	4	2.99	0.03	0.09
4.	Rajshahi	5,308,609	136,162	274	26	2.35	0.05	0.02
5.	Pabna	3,502,252	91,974	315	28	2.47	0.08	0.34
6.	Kushtia	2,492,083	40,613	151	4	1.26	0.06	0.37
7.	Jessore	4,233,624	118,492	269	7	2.59	0.06	0.25
8.	Khulna	4,466,413	124,270	564	3	2.47	0.12	0.45
9.	Barisal	4,770,240	72,420	1,737	33	1.36	0.36	2.39
10.	Patuakhali	1,848,741	19,057	103	-	1.02	0.05	0.54
11.	Dhaka	9,898,786	235,982	1,872	13	2.34	0.18	0.79
12.	Faridpur	4,896,348	193,621	3,422	1	3.80	0.69	1.79
13.	Mymensingu	5,858,435	143,097	4,043	127	2.36	0.69	2.83
14.	Jamalpur	2,420,999	42,299	1,600	85	1.66	0.66	3.78
15.	Tangail	2,555,731	61,609	192	10	2.32	0.07	0.31
16.	Sylhet	5,511,509	90,303	3,988	807	1.43	0.72	4.42
17.	Comilla	7,216,516	209,147	3,916	400	2.72	0.47	1.87
18.	Noakhali	4,182,659	92,282	2,187	336	2.11	0.52	2.37
19.	Chittagong	6,587,775	143,901	11,147	6,331	1.92	1.69	7.75
20.	Chittagong H/T.	767,776	33,878	7,885	6,840	-	10.26	23.27
		89,142,839	2,338,853	45,902	15,216	2.44	0.51	1.96

Table 12. District-wise epidemiological data, 1982

Sl. No.	Name of District	Estt. Popu.	Total B/S Exam.	Total +ve	P.f.	Classification		
						ABER %	API '000'	SPR %
1.	Dianjpur	3,308,000	127,327	41	11	3.39	0.01	0.03
2.	Rangpur	6,897,000	251,983	1,217	75	3.55	0.17	0.48
3.	Bogra	2,818,000	90,727	46	7	3.11	0.01	0.05
4.	Rajshahi	5,510,000	110,320	195	3	1.86	0.03	0.17
5.	Pabna	3,571,000	78,202	77	1	2.13	0.02	0.09
6.	Kushtia	2,474 000	65,425	220	20	2.38	0.08	0.33
7.	Jessore	432,000	165,987	436	154	3.54	0.10	0.26
8.	Khulna	4,622,000	158,834	558	28	3.14	0.12	0.35
9.	Barisal	4,739,000	93,262	1,696	31	1.81	0.35	1.81
10.	Patuakhali	1,840,000	19,570	110	-	1.05	0.05	0.56
11.	Dhaka	10,123,000	222,730	2,334	20	2.17	0.23	1.04
12.	Faridpur	4,930,000	192,770	2,296	2	3.64	0.46	1.19
13.	Mymensingh	6,500,001	151,940	3,505	534	2.31	0.53	2.30
14.	Jamalpur	2,870,999	54,107	1,009	60	1.86	0.35	1.86
15.	Tangail	2,574,000	75,829	169	15	2.80	0.06	0.22
16.	Sylhet	5,918,000	61,431	1,415	199	0.92	0.23	2.30
17.	Comilla	7,168,000	207,724	2,695	257	2.76	0.37	1.29
18.	Noakhali	3,996,000	72,747	2,078	363	1.76	0.52	2.85
19.	Chittagong	5,836,000	134,820	9,656	6,268	2.04	1.65	7.16
20	Chittagong H/T.	607,000	39,186	8,451	7,529	3.55	13.92	21.56
		90,625,000	2,374,921	38,204	15,577	2.46	0.42	1.61

Table 13. District-wise epidemiological data, Jan-June 1983

Sl. No.	Name of districts	Estt. Popu.	A.C.D.	P.C.D.	Others	Total B/S Exam.	Total +ve	P.f.
1.	Dinajpur	3,308,000	34,979	3,715	13,001	51,695	6	3
2.	Rangpur	6,897,000	72,992	7,117	1,360	81,469	346	3
3.	Bogra	2,818,000	39,465	3,276	4,791	47,532	54	6
4.	Rajshahi	5,510,000	44,436	7,988	6,276	58,700	44	2
5.	Pabna	3,571,000	31,367	1,228	2,507	35,102	68	-
6.	Kushtia	2,474,000	20,065	3,434	4,197	27,696	66	9
7.	Jessore	4,323,000	53,715	6,588	7,352	67,655	116	25
8.	Khulna	4,622,000	57,315	3,331	2,915	63,561	122	8
9.	Barisal	4,739,000	14,211	2,043	1,154	17,408	185	4
10.	Patuakhali	1,840,000	4,727	338	37	5,102	18	-
11.	Dhaka	10,123,000	78,117	10,703	1,737	90,557	1,027	105
12.	Faridpur	4,930,000	67,286	2,863	4,269	74,418	558	-
13.	Mymensingh	6,500,001	83,296	6,736	433	90,465	1,264	69
14.	Jamalpur	2,870,999	33,202	2,622	325	36,149	388	19
15.	Tangail	2,574,000	29,309	1,841	1,114	32,264	51	-
16.	Sylhet	5,918,000	22,419	2,059	6,636	31,114	589	68
17.	Comilla	7,168,000	66,255	5,272	4,043	75,570	865	124
18.	Noakhali	3,996,000	33,447	2,353	1,858	37,658	738	66
19.	Chittagong	5,836,000	64,557	15,389	14,500	94,446	4,166	2,262
20.	Chittagong HT	440,222	3,469	4,443	4,910	12,822	2,333	1,882
21.	Bandarban	166,778	194	2,033	5,169	7,396	1,170	966
GRAND TOTAL		90,625,000	854,823	95,372	88,584	1,038,779	14,174	5,621

Table 14. Table showing the response of *P. falciparum* to chloroquine in-vivo 1979 - 1982

Year	Study locality	Month	Number Tested	In-vivo response			
				S/RI	RI	R II	R III
1979	Rangunia, Chittagong	Nov.-Dec.	20	18	2	0	0
	Chuddagram, Comilla	Nov.-Dec.	9	5	0	1	3
			29	23	2	1	3
1980	Ramgorh, Chittagong H/T.	June-July	28	13	9	5	1
	Nalitabari & Sreebordi, Jamalpur.	July-Aug.	11	11	0	0	0
	Sreembngal, Chaklapunjee, Sylhet.	October	28	15	5	5	3
	Cox's Bazar, Chittagong.	October	15	7	0	8	0
	Rangamati,Chittagong H/T.	Oct.-Dec.	27	18	0	5	4
	Bandarbon,Chittagong H/T.	December	12	7	2	2	1
			121	71	16	25	9
1981	Mirersharai, Chittagong	April	7	7	0	0	0
	Nalitabari, Jamalpur	March	14	13	0	1	0
	Bandarban, Chittagong H/T.	May-June	6	0	0	5	1
	Khargabil, Chittagong H/T.	May-June	20	11	5	3	1
	Chaklapunjee, Sylhet.	June-July	31	23	3	2	3
	C.M.H., Chittagong.	June-July	8	3	2	1	2
	Rangamati, Chittagong H/T.	Aug.-Sept.	33	16	8	6	3
	Bandarban, Chittagong H/T.	September	7	1	0	5	1
	Balisora, Sylhet	August	26	7	7	12	0
	Balisora, Sylhet	Oct.-Nov.	20	7	3	8	4
	Chandraghona, Chittagong Hill Tracts.	Oct.-Nov.	11	0	1	5	5
			183	86	29	48	20
1982	Chaklapunjee, Sylhet	September	20	14	0	3	3
	Nalitabari, Jamalpur	October	42	19	0	21	2
	Ramgorh, Chittagong H/T.	Aug.-Sept.	35	13	0	16	6
	Chandraghona, Chittagong Hill Tracts.	July-Aug.	33	16	1	7	9
			130	62	1	47	20
		Total	463	242	48	121	52
		%	-	52.2	10.4	26.1	11.2

Table 15. Frequency distribution of the types of helminths* (Total No. stool specimens: 5,372, Total positive for helminths: 1,710)

Type	No. positive	%
A. lumbricoides	1,245	23.18
T. trichiura	555	10.33
Hook worm	337	6.27
S. stercoralis	51	0.95
H. nana	29	0.54
E. vermicularis	15	0.28
More than one helminth	568	10.57

* Muttalib,M.A.: Impact of parasitic infection and infestation on nutritional status of children in Bangladesh

Table 16. Prevalence of intestinal parasite in different population *

	Random city clinic 800	Random city clinic 3230	University students 925	1-5 years village children 5960	ZPG	Children Health Centre Urban children
Ascaris lumbricoides	40.00	39.42	40.06	92.21	82.61	27.61
Hookworm	8.00	14.43	7.00	9.91	4.83	0.26
Trichuris trichiura	18.00	27.68	10.06	52.40	21.23	14.54
Strongyloides stercoralis	2.5	5.35	0.3	2.26	-	-
Enterobius vermicularis	-	-	-	37.11	-	-
Fasciolopsis buski	-	-	-	4.71	-	-
Hymenolepis nana	-	-	-	0.1	-	0.08
Tape worm	2.00	0.99	-	-	-	-
Entamoeba histolytica	55.00	50.45	11.07	40.88	-	17.16
Entamoeba coli	-	-	-	1.38	-	1.83
Giardia lamblia	21.00	11.88	1.07	6.04	-	8.1

*Muttalib,M.A.: Impact of parasitic infection and infestation on nutritional status of children in Bangladesh

Table 17. Infant and child mortality rates:

Source	Infant mortality rate 1-11 months per 1000 live birth.	Child mortality rate 1-4 years per 1000 live birth.
Bangladesh Bureau of Statistics	152.5	22.9
Matlab Bazar Cholera Research Laboratory Study.	127.7	22.7
Teknaf Cholera Research Laboratory Study.	148.0	23.0
Companignj Health Project.	142.0	55.0

Source: Rural Pediatrics in Developing Country

Table 18. CHANGE IN PER CAPITA FOOD INTAKE IN BANGLADESH BY THEIR SOURCES (1975-76 COMPARED TO 1962-64)

Sl. No.	Source	Intake level per person per day		Change	% +Increase -Decrease
		1962-64	1975-76		
1.	All forms of food/ total inta l (gm)	885.9	807.3	(-) 78.6	(-) 8.9
2.	Animal food (gm)	56.5	44.0	(-) 12.5	(-) 22.1
3.	Cereals (gm)	546.8	523.0	(-) 23.8	(-) 4.4
4.	Pulses (gm)	27.6	23.8	(-) 3.8	(-) 13.8
5.	Fish (gm)	27.7	22.3	(-) 5.4	(-) 19.5
6.	Vegetables (gm)	142.0	125.7	(-) 16.3	(-) 11.5

Source: Computed from Institute of Nutrition and Food Science, University of Dacca, Nutrition Survey of Rural Bangladesh, Dacca, December 1977.

Table 19. PER CAPITA NUTRIENT INTAKE AGAINST REQUIREMENT AND THE CHANGE IN NUTRIENT INTAKE IN BANGLADESH(1975-76 COMPARED TO 1962-64)

Sl No.	Nutrient	Intake level per person per day		Change	%+Increase -Decrease	% of Requirement
		1962-64	1975-76			
1.	Calorie (Kcal)	2,301	2,094	(-) 207	(-) 9.0	93
2.	Protein (gm)	57.9	58.5	(+) 0.6	(+) 1.0	129
3.	Fat (gm)	15.8	12.2	(-) 3.6	(-) 22.8	
4.	Carbohydrate (gm)	482.0	439.0	(-) 43	(-) 9.0	
5.	Calcium (gm)	273.0	305.0	(+) 32	(+) 11.7	68
6.	Iron (gm)	10.3	22.2	(+) 11.9	(+)116.0	284
7.	Vitamin A (i.u.)	1,070.0	730.0	(-)340.0	(-) 61.0	36
8.	Riboflavin (mg)	0.50	0.87	(+) 0.37	(+) 74.0	64
9.	Vitamin C(mg)	48.0	9.51	(-) 38.5	(-) 80.0	37

Source: See Table 18.

Table 20. CALORIE CONSUMPTION IN RURAL AREAS BY INCOME, 1975-76

Per Capita Monthly Income (Taka)	Calorie Intake Per Capita Per Day	Percentage of Calorie Requirement Fulfilled
Less than 25	1987 [a]	88.3 [a]
25-49	1937	86.1
50-74	2199	97.7
75-99	2375	105.6
100 and more	2312	102.7

Source: Institute of Nutrition and Food Science, University of Dacca, Nutrition Survey of Rural Bangladesh - 1975-76, Dacca, December 1977.

a. This income-specific data probably overestimates the calorie intake of the poorest population groups. When an overall socio-economic score was used, the average calorie intake of the lowest 15 percent was 1,756 or 78 percent of requirement.

Table 21 Communicable Disease Pattern and target settings

Problems	Index	Level 1980	Target 1980-85
1. Cholera	Incidence rate	0.2/1,000	Reduction by 50%
2. Diarrhoeas/ dysenteries	Incidence rate	16.5/1,000	Reduction by 15%
3. Tuberculosis	Prevalence rate	25/1,000	(a) 100% immunization. (b) Case detection and treatment of all cases.
4. Malaria	Annual parasite incidence rate	1.4/1,000	Reduction by 50%
5. Measles	Incidence rate	7/1,000	Reduction by 10%
6. Worm infestation	Incidence rate	36/1,000	Reduction by 30%
	Prevalence rate	80% of children under 15 years.	Deworming of children under 15 yrs. every six months.
7. Tetanus	Incidence rate under 1 year of age.	27.1/1,000	Reduction to zero level
	Mortality rate under 5 years of age.	8.6/1,000	Reduction by 50%
8. Diphtheria	Incidence rate	0.11/1,000	Immunization of under 5 Population.
9. Whooping cough	Incidence rate	18/1,000	- Ditto -
10. Poliomyelitis	Prevalence rate	0.8/1,000	- Ditto -
11. Leprosy	Prevalence rate	0.22/1,000	40% case detection & treatment of all cases.
12. Scabies	Prevalence rate	5.95/1,000	Reduction by 25%.

From SFYP, Chapter XVI Health

Table 22 Facilities and Manpower of Laboratories
- Present Situation and Future Plan

Item	1980	1985	No. will be increased
District Laboratory	2	63	61
Sub-divisional Hospital	35	45	10
Thana Health Complex	290	356	66
Union Center	1,773	3,150	1,377
Health Laboratory	2	63	61
Total	2,102	3,677	1,575
Medical Technologist(Lab.)	0	40	40
Laboratory Technician	740	1,360	620
Total	740	1,400	660

From SFYP, Chapter XVI Health

Table 23 Number of Bed in Asian Countries

Country	Bed No.	Population/Bed
Bangladesh	23,907 (1982)	3,848
Indonesia	82,945 (1976)	1,660
Japan	1,319,406 (1980)	88.5
Malaysia	33,483 (1974)	348
Philippines	72,144 (1977)	616
Singapore	8,443 (1978)	278
Thailand	59,482 (1977)	740

Table 24 (A) Diseases of Outpatients of District Hospital and Thana Health Complex

Adults	Children	Survey of 1977*
o Diarrhea/Dysentery	o Diarrhea/Dysentery	o Diarrhea/Dysentery
o Anemia/Parasite infestation	Malnutrition	o Scabies/Skin disease
o Scabies/Skin disease	o Scabies/Skin disease	o Upper respiratory infection/Sore throat
Ulcer of digestive tracts	o Parasite infestation	o Arthritis/Rheumatism
Malnutrition	o Pneumonia	o Bronchitis
o Fever	o Bronchitis/Sore throat	Accident
Fructure/Wound	o Measles	Eye disease
o Bronchitis/Common cold	Fructure	o Fever
o Malaria		

Diseases were arranged in the order of frequency.

o Showing infectious disease

* Survey carried out by random sampling on 16,000 outpatients of 146 Thana Health Complex (WHO Country Health Profile, 1977).

Table 24 (B) Diseases of Inpatient of District Hospital and Thana Health Complex

Adults	Children	Survey of 1977*
o Diarrhea/Dysentery	o Diarrhea/Dysentery	Ulcer of digestive tracts
Ulcer of digestive tracts	o Pneumonia	Suicide
o Anemia/Parasite infestation	Malnutrition	o Anemia/Parasite infestation
o Scabies	o Scabies	Fracture/Wound
Malnutrition	o Parasite infestation	o Hepatitis
Ascites	o Tetanus	Abortion
Fracture/Wound	o Otitis media	Malnutrition
o Malaria	o Diphtheria	Heart failure
Heart failure/ Cardic angina	o Pertussis	Nephropathy
o Meningitis	Fracture/Wound	o Arthritis/Rheumatism
Diabetes	o Meningitis	o Scabies/Skin disease

Diseases were arranged in the order of frequency.

o Showing infectious disease

* Survey carried out on 1,002 inpatients of 146 Thana Health Complex. (WHO Country Health Profile, 1977).

Table 25 Leading Cause of Death of Inpatients of District Hospital and Thana Health Complex

Adults	Children	Infants
Heart failure	o Pneumonia	o Tetanus
Liver disorder	Malnutrition	o Pneumonia
Hypertension	o Diarrhea/Dysentery	Asphyxia
Accident/Wound	o Meningitis	o Birth injury
o Diarrhea/Dysentery	o Encephalitis	o Sepsis
o Meningitis	o Tetanus	
o Encephalitis		

Diseases were arranged in the order of frequency.

o Showing infectious disease.

Table 26 Leading Cause of Death of Inpatient (Matlab Thana, 1977)

Adult	Children	Infants
o Diarrhea/Dysentery	o Diarrhea/Dysentery	o Tetanus
o Fever	o Fever	o Pneumonia
o Disease of respiratory tract	o Pneumonia	o Fever
Heart failure	o Measles	o Diarrhea/Dysentery
Icterus	o Tetanus	Skin disease
Accident	o Skin disease	o Measles
o Tetanus	Accident	o Rheumatism

Survey carried out by Cholera Research Center in 1977 at Matlab Thana.

o Showing infectious diseases.

Table 27. Survey of immunization coverage (1981) in Dhaka (WHO)

	Dose	Coverage
DPT combined vaccine	1st dose	18 %
	2nd dose	16
	3rd dose	13
Tetanus toxoid	Pregnant women 2 doses	10 %
Poliomyelitis vaccine	1st dose	17 %
	2nd dose	15
	3 d dose	11
BCG vaccine		15 %
Measles vaccine		5 %

Source : EPI project.

Table 28. Survey of Immunization Coverage (1983) in Dhaka 27th Oct/'83 (by WHO)

30 Clusters	No.of Children contacted	214
Vaccines	No. of Children	Covarage %
Having Vac Cards	61	28.5
BCG Vaccinated	80	37.4
With BCG Scar	58	27.0
DPT combined vaccine (1)	95	44.4
DPT combined vaccine (2)	81	37.9
DPT combined vaccine (3)	69	32.2
Polio (1)	94	43.9
Polio (2)	79	36.9
Polio (3)	65	30.4
Measles	43	20.1
Children Full Immunization	26	12.1
Mothers (T.T.) 2 dose	77	36.0

Source : EPI project.

Table 29 Coverage of immunization in 1982

Vaccine	Khulna Sadar (Khulna)	Phultala Thana (Khulna)	Saidpur Thana (Rungpur)	Kotwali Thana (Rungpur)	Nilphamari Thana (Rungpur)
DPT combined vaccine	2.89	0.94	0.26	0.21	0.20
Poliomyelitis vaccine	2.78	0.94	0.25	0.15	0.12
Diphtheria· tetanus toxoid	1.53	1.15	0.14	0.17	0.19
BCG vaccine	1.63	7.7	0.98	1.7	4.3
Measles vaccine	1.60	0.07	0.1	0.12	0.08
Tetanus toxoid	41.2	44.2	>100	79.7	67,8

Figures show coverage rate in percent

Table 29(B) Coverage of Immunization in Asian Countries

Vaccine	Bangladesh (1981)	Indonesia (1980)	Philippines (1981)	Thailand (1979)
B.C.G. Vaccine	15	Primary 81 Booster 82	Primary 71 Booster 83	54
DPT combined V.	13	52	62	43
Tetanus toxoid (Pregnant women)	10	34	35	15
Poliomyelitis V.	11	Started in 1980	53	Started in 1979
Measles V.	5	-	-	-

Figures show the rate of immunization of the target population. In Indonesia about 60% of the whole country are involved in the EPI; the figures should be reduced for comparison with the data of other countries.

Table 30. Malaria control programme, Bangladesh spraying data from 1976 to 1982

Year	Type of Spraying	Planned to cover		Covered by spraying		% of coverage		DDT consume in MT
		Houses	Population	Houses	Population	Houses	Populaiion	
1976	Pre-monsoon	1084796	5421507	46161	254911	4.2	4.7	15
	Post-monsoon	1084796	5431507	34592	151730	3.2	2.8	18
	Focal	86176	465190	85199	450724	96.5	97.0	118.6
1977	Pre-monsoon	1136255	5718155	500821	2708315	44.0	46.8	179
	Post-monsoon	1136255	5718155	526944	2965540	46.4	51.3	190
	Focal	9725	55326	9496	44131	97.0	80.0	10
1978	Pre-monsoon	1136255	5956420	1025697	5669729	90.3	95.2	342
	Post-monsoon	1.3 million	6.0 million	1.2 million	5.4 million	90.0	90.0	322
	Focal	N o t D o n e						
1979	Pre-monsoon	3.4 million	20 million	0.77 million	3.8 million	23.0	19.0	343
	Post-monsoon	946927	4985417	907790	4805569	95.8	96.3	403
	Focal	80136	403943	75534	383505	94.2	95.3	35
1980	Pre-monsoon	904867	4462828	851873	4469809	94.1	100	287
	Post-monsoon	658179	3009588	441938	2511727	67.1	76.81	147
	Focal	115506	492388	115446	482644	99.4	98.0	32
1981	Pre-monsoon	930865	4677488	814552	4314841	87.50	92.24	339
	Post-monsoon	892921	4923428	783289	4118161	90.97	83.64	274
	Focal	451828	2536723	378991	2218667	83.87	87.42	128
1982	Pre-monsoon	919116	4861630	724659	3802894	74.56	78.2	262

Table 31 Results of entomological investigations conducted during the years 1979, 80, 81 & 82

Year	No. of localities investigated	No. of vector positive localities	No. of localities positive with vector mosquitoes			
			A. sundaicus	*A. minimus*	*A.philippinensis*	*A. balabacensis*
1979	271	39	0	2	39	5[2)]
1980	332	54	0	1	52	5[3)]
1981	347	45	0	2	42	8[3)]
1982	206	33	6[1)]	0	28	4[3)]

1) Chittagong District

2) Chittagong, Chit. Hill Tracts

3) Sylhet, Chit. Hill Tracts

Table 32 Number of Medical Colleges and Teachers and Students therein

Name of the Colleges	Number of Teachers						Number of Students					
	1980 - 81			1981 - 82			1980 - 81			1981 - 82		
	Male	Fem.	Total	Male	Fem.	Total	Male	Fam.	Total	Male	Fem.	Total
Dhaka medical college	77	34	111	90	26	116	885	234	1119	824	247	1071
Sir Salimullah medical college Dhaka	54	16	70	66	29	95	387	122	509	443	152	595
Chittagong medical college	50	17	67	71	13	84	1016	260	1276	963	261	1224
Sylhet medical college	49	8	57	52	9	61	895	157	1052	981	137	1118
Mymensingh medical college	71	8	79	61	8	69	872	268	1110	990	278	1268
Rajshahi medical college	59	13	72	54	5	59	908	246	1154	907	245	1152
Rangpur medical college	63	6	69	63	6	69	727	171	898	686	231	917
Barisal medical college	35	3	38	44	6	50	470	144	614	631	200	831
Dhaka dental college	17	3	20	14	3	17	214	50	264	183	55	238
Institute of post graduate medicine	67	8	75	67	10	77	106	21	127	142	18	160
Total	542	116	658	582	115	697	6480	1643	8123	6750	1824	8574

Source : Principals of the Colleges.

Table 33 Physicians in Asian Countries

Country	Number of Physician	Population/Physician
Bangladesh	10,513 (1982)	8,751
Indonesia	10,000 (1977)	14,071
Japan	133,416 (1976)	845
Malaysia	1,685 (1976-77)	7,283
Philippines	16,123 (1977)	2,755
Singapore	1,847 (1977)	1,261
Thailand	5,210 (1977)	8,453

Table 34 Health Manpower

	1978 (SFYP)	1980 (*)	1983 (SFYP)	1985 (SFYP)
Sanitary Inspector	1,125	1,210	?	1,600 (550*)
Laboratory T	600	740	1,200	1,630 (1,360*)
X-Ray T	160	190	220	555
Radio-therapic T	68	68	48	128
Dental T	58	80	100	500 (247*)
Blood Bank T(*)	38	40	65	300 (120*)
EPI T (*)	-	-	300	(400*)
Medical (*) Technologist	-	-	-	40
Physio (*) Therapic T	70	45	?	100
Pharmacist/Compounder	2,050	2,300	1,660	6,800

T : Technician ; SFYP : Second Five Year Plan

* : Estimation of the Director of Paramedical Institute

Table 35 Health Manpower in Asian Countries

Country	Physician		Medical Assistant		Nurse/Midwife	
	No.	Ratio	No.	Ratio	No.	Ratio
Bangladesh	10,513 (1982)	1.1	4,793 (1983)	0.52	13,500 (2,700*)	1.78 (0.29*)
Indonesia	11,681 (1980)	0.78	35,361 (1980)	2.3	32,854	2.2
Japan	148,580 (1979)	12.7			291,989 (1979)	24.9
Malaysia	1,438 (1977)	1.4	1,279	1.2	7,426	7.0
Philippines	6,963 (1980)	1.2			15,540 (1980)	3.2
Laos	127 (1979)	0.4	707 (1979)	2.0	98 (1979)	0.3
Singapore	2,096 (1980)	8.7			6,120	25.4
Australia	26,140 (1980)	17.4			76,800 (1980)	51.2

Ratio : Health manpower/10,000 Population

* : Nurse

Table 36 Planning and Establishment of Tubewell

Fiscal Year	Target	Established	E/T %
1978 - 1980	160,000	50,000	31.2
1981 - 1982	220,000	60,000	27.2
1983 - 1985	120,000		

Source: UNICEF, E/ICEF/P/L. 2127 (REC)

Table 37 Distribution of Tubewell

	1978	1980	1985
Population/10^3	76,374	79,740	88,938
Number of Village	82,355	85,650	95,900
Total Area (Km^2)	143,998	143,998	143,998
Number of Tubewell	280,000	330,000	450,000
Tubewell/Km^2	1.94	2.29	3.12
Tubewell/Village	3.39	3.85	4.69
Population/Tubewell	272.7	241.6	197.6

Source: UNICEF: E/ICEF/P/L·2127 (PEC)

The List of Persons Visited

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Mr. Saiful Hague
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Appendix 1

Some Practical Steps towards establishing the National Institute of Tuberoulosis in Bangladesh (NIT)

by Dr. G. Nabi, 1983

In addition to the proposal document for establishing the NIT in Bangladesh, some practical steps which have been already taking place or will be taken for enabling the plan more practical will be mentioned.

A) Supervision Project :

The supervision of the treatment services by motivation and follow up the patients is undergoing on Trial Basis at two TB centers in Dhaka in cooperation with NATAB. This study project was started on the recognition that the drop out rate from the TB treatment is very high. The study will reveal how the treatment of TB will be improved to gain higher completion rate. This project will be continued as a part of research and trial function of the NIT to provide a new skill and information on the treatment services which will be applied at various centers such as Thana Health Complexes.

B) Promotion of the TB services at the Thana Health Complexes through Mobile supervisory team (THC Project):

The main center for the TB services in Bangladesh has been "TB Clinic" in each Sub-division with about 2 million population. But as this covers too many population, a scheme has been taken since 1979 that the TB services should be integrated in the services of THCs; By the end of 1983 about 100 THCs have started the passive case-finding and treatment services. However, these centers are not functioning properly for the integration of a specific programme such as TB Control mainly due to the lack of proper supervision.

Therefore the National TB Control Project has set up the project by selecting a few THCs as Trial centers and giving them direct supervision by the mobile supervisory team. Based on the experience, this service will be expanded to the whole THCs, forming later the Programme Supervisory Unit in the NIT.

As a part of this project, a surveillance system of collecting the TB information from each THC will be developed.

C) Development of Epidemiological Surveillance (Manikganji Project) :

The Japan-Bangladesh Joint Research Project has recently set up and the prevalence survey by sputum bacteriology (smear and culture) is under going in a Sub-division of Manikaganji (Dhaka District, Population 2 million).

The sampled population is about 12000 randomly selected from the whole area, who will be followed up few years for the future investigation. Therefore this area will be a surveillance study area under the NIT. The computerization of the data will be very useful.

D) Training Courses :

Several training and refresher courses are undergoing through out a year but these need to be improved and strengthened.

Appendix 1: Recent information of the TB treatment services in Bangladesh is summalized in the article enclosed of Dr. G. Nabi 1983.

Appendix 2

Some Attempts for the Motivation of Tuberculosis Patients in Bangladesh

by Dr. G. Nabi, 1983

Introduction:

It is widely accepted that the motivation of the patients is the major key to the successful treatment of Tuberculosis. Particularly in Bangladesh as in many other developing countries, various social factors are obstacles for regular treatment, such as poverty or distance of the clinic. But the experiences show that among all these difficulties, lack of the motivation of patients is the major problem; which means, even in the present difficult social backgrounds, where there are attempts of monitoring the patients, there are better regularity and higher completion rates of the treatment. So I would like to review the present situation of the treatment of Tuberculosis in Bangladesh and some attempts to improve the regularity of the treatment in government and non-government organizations.

Present situation of Tuberculosis treatment in Govt. T.B.Clinics :-

Table I shows the recent trends of monthly attendence rate by the same cohorts of tuberculosis patient with positive sputum. The Clinic A & B are major TB. Clinics in Dhaka and Clinic C is one of the 44 peripherral TB. Clinics. The regularities are generally rather poor both in urban and peripheral clinic. Clinic A is the biggest TB. Clinic and yearly 3,834 new patients out of which 816 sputum positive cases but has no home visiting system. Clinic B has home visiting system. Clinic B showed better completion rate than that of Clinic A, which is probably due to home visiting. Clinic C has an enthusiastic doctor and its trend is fairly similar to that of Clinic B.

Table 2 shows the comparison of treatment completion rates among various government and non-government organization. The completion rates for the Govt. TB. Clinics as have been already shown, are fairly low less than 25% on the other hand, those for the non-government organizations are significantly higher, more than 50%.

* CNIMF, NATIONAL TB. CONTROL PROJECT, SMYAMOLI, DHAKA

Attempts and outcomes in the Non-Government Organization:

There are now more than 100 Non-Government Organizations who have health programme in Bangladesh. Among them information was collected from four groups which have systematic Tuberoulosis Programme. NGO No. 1 (H) covers the area of a thana with 150,000 population and it had 73 sputum positive patient in 1979. This has a unique motivation programme using puppet show, dramas and folk songs. Though supervised by a doctor, TB. programme is basically managed by paramedics. The completion rate for 1979 cohort was 79.2% NGO No. 2 (B) also cover one thana with 200,000 population, and the programme is run only by Paramedics in a good co-ordination with a Govt. TB. Clinic. They started first in Bangladesh taking the "security money" from the Patients. Patients must deposit some account of money (equivalent to the US $ 2) and will get it back after completing the 12 months treatment. Field workers point out that although the majority of TB. patients are poor, they can afford the money of such amount and become more motivated than the time when they were just given the drugs freely. By introducing this system, the regularity improved dramatically, being 98.7% in 1980.

To implement this system, the field workers had to get difficulty to convince and motivate the patients, families and community. But since it is accepted, people has become aware that this is much cheaper than going round local practitioners or drugs shops, they have become co-operative to the programme by donating the money at the end of treatment. So now this is not more security money after 4 years but a kind of community participation.

NGO No. 5 (K) is a clinic based programme run by Paramedics, a local boy after short training runs the TB/Leprosy Clinic under the supervision of a nurse. In the cohort of 1st half of 1979 patient with positive sputum the completion rate was only 33% but in the cohort of another half of the year after introducing the security money system it went upto 80%. The Paramedic commented "Previously see used to send a man for following up the patient but it did not work very much, but now patients come back themselves after starting the system".

NGO No. 4 (I) is also clinic based programme and covers smaller are. They charge about US$ 5 for the whole course of treatment. The completion rate was 72% for 1981. In this way recent tendency among the NGO's with successful treatment programme is charging some money as a part of motivation and participation.

Table 3 shows the comparison of the background factors and activities between Govt. TB. Clinics and NGO's. From this we understand more clearly the background of the low completion rate in the Govt. T.B. Clinic.

For the area to be covered, each Govt. TB. Clinic usually covers very big area of a sub-division with over 1 million population while NGO's usually cover much smaller area with not exceeding 200,000 population. Accordingly the number of yearly new patients in a Govt. Clinic is more than 2,000, NGO's usually diagnose tuberculosis only by Microscopy in smaller area, the number of patient is less than 100. Compared with Govt. Clinic case finding in NGO is much more efficient. Now, Govt. in integrating the Tuberculosis Services with other health services in Thana Health Complex covering each about 200,000 and case finding programme has already been started in Thana Health Complex by direct microscopy.

For facilities, Govt. Clinics are basically doctor oriented while in NGO's usually Paramedics run the T.B. Programme under supervision of a doctor. The stafs are usually more motivated in NGO's than in Govt. Clinic.

For the motivation scheme for the patients, NGO's put a special emphasis on it by various motivation activities which were already discussed before, on the other hand, Govt. TB. Clinics are very limited in motivation programme.

So from these our own experiences, it is suggested that many more smaller size clinics with simple facilities and some motivation programme are more efficient for successful national tuberculosis treatment programme.

Effect of the Motivation Programme:

It is recently found that regularity of the patients who were once interviewed for another study at the time of diagnosis in the Govt. T.B. Clinic A has been better than these who were not interviewed. The interviewer inquired and discussed with 76 newly detected patient, the process and problem of diagnosis. This included some explanation on the disease and treatment for the patients, which eventually worked as an initial motivation. One year completion rate was much lighter than that of other patient in that year.

This suggests that simple extra interview with each patient and explanation on the disease and treatment will effect significantly the regularity of treatment even in the limited situation of Bangladesh.

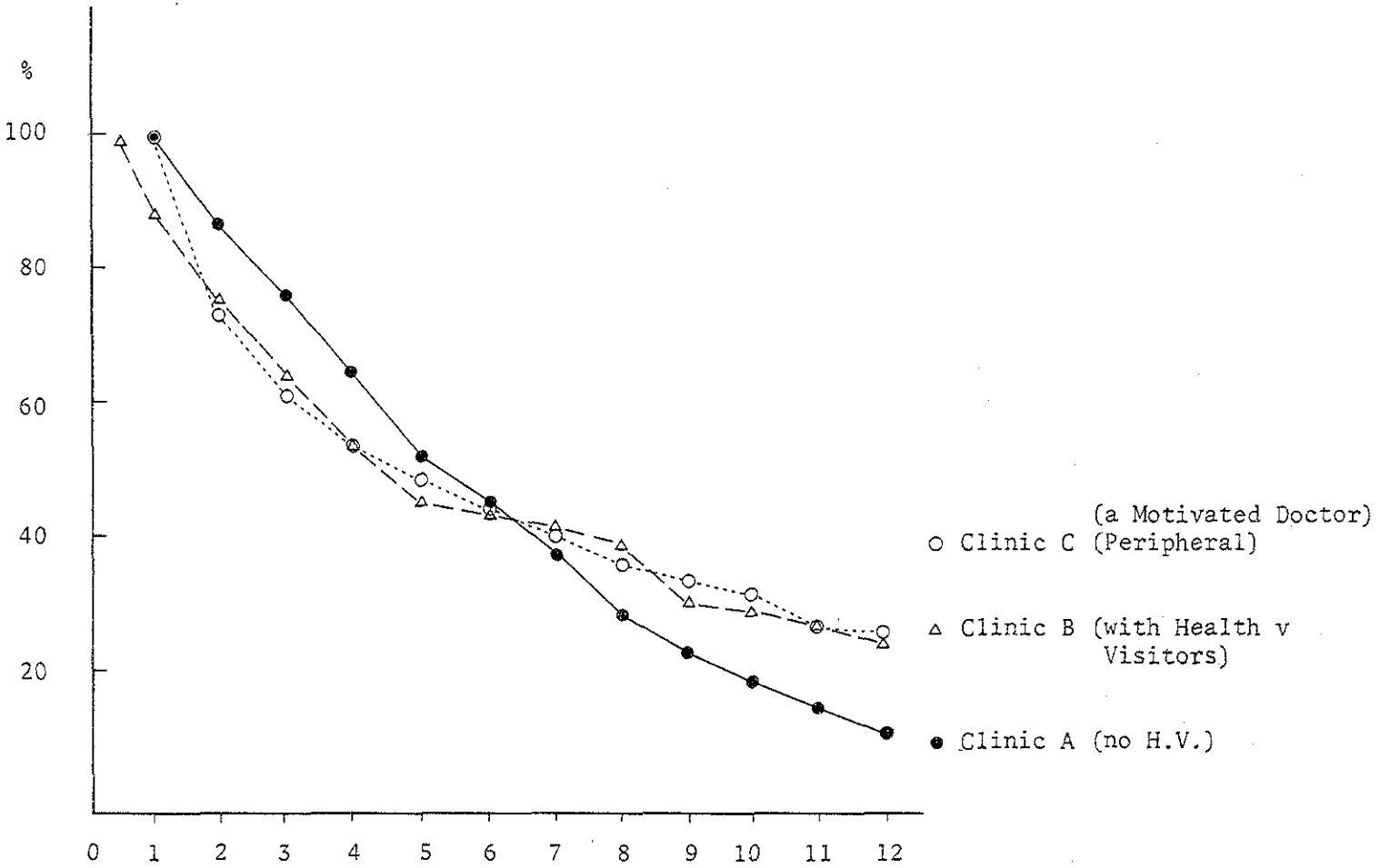
New Attempts by Government and T.B. Association:

So new attempts are started in a Govt. T.B. Clinic and a rural health Center, T.B. Association sends social workers to these institutions to help and motivate the patient.

As shown in Figure 5 usually the patient go through the course - reception - examination - doctor interview and examination and drug supply.

The clinic has set up a motivation room where social worker from NATAD make interviews. All the patients must go through this room before they get drug supply. This new scheme is now welcomed by the patient and the outcome seems to be very promising. So we hope that result of present scheme will be present in near future.

1. Monthly Attendance Rate of TB Patients (Sputum Positive) at TB Clinics (1981 Cohorts)



2. Comparison of Treatment Completion Rates by Organization (1979 - 81, Sputum Positive Patients)

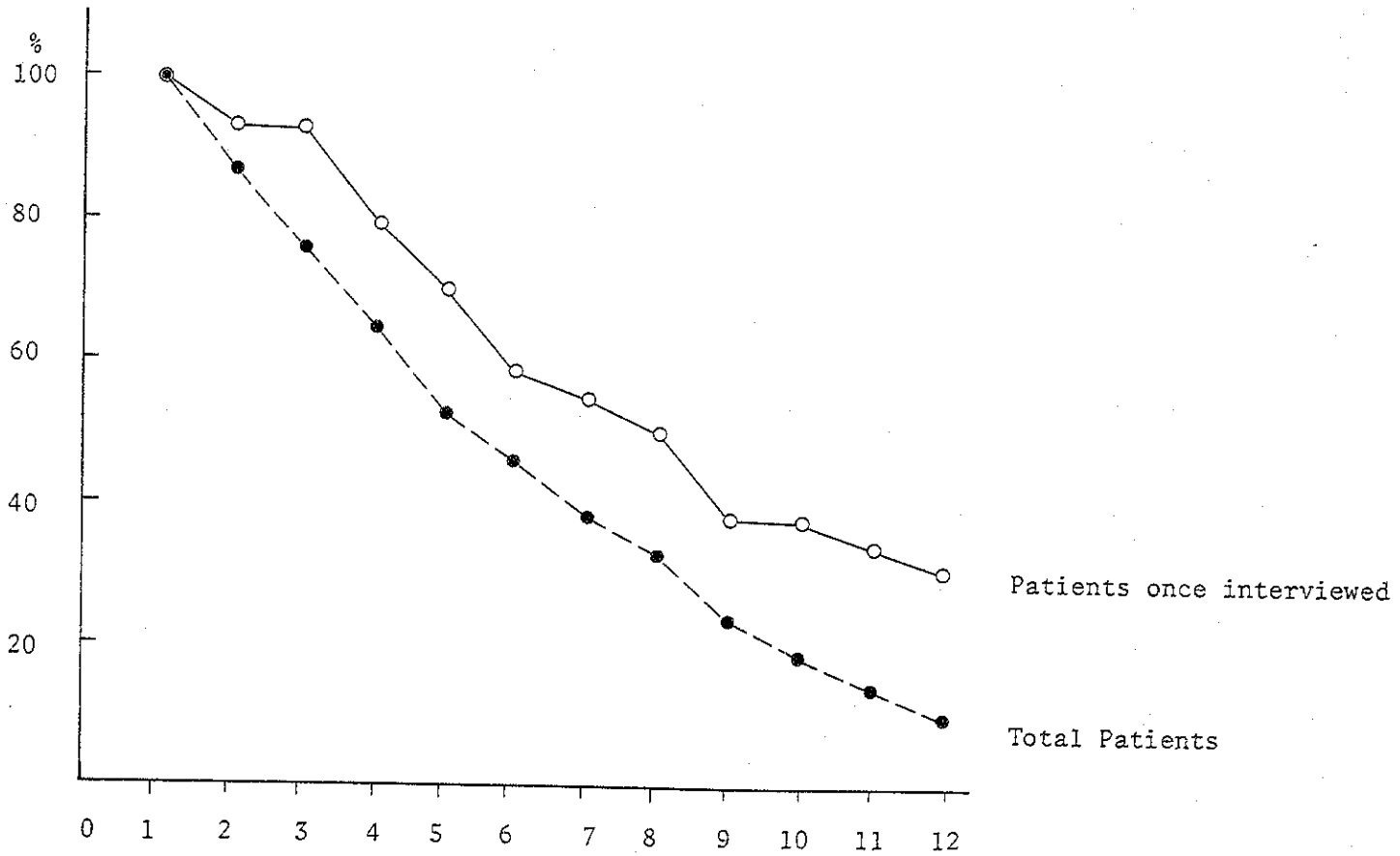
GO	Yearly Number of Patients (tve)	Total	Completion Rate	
1. Clinic A	(816)	3834	11.0%	
2. Clinic B	(774)	3397	23.9%	
3. Clinic C	(269)	1500	25.0%	
NGO				
1. H	73		79.2%	Health Education Prog.
2. B	105		98.7%	Security Money
3. K	110		51.3%	Security Money
	54		33.3%	Before Security Money
	56		80.4%	After Security Money
4. C	40		72%	Charging

3.

	GOs (TB Clinics)	NGOs
Area	•Big Area ≥ 10,000,000 Pop.	•rather Small Area ≤ 200,000 Pop.
No.Patient (year)	•Total Patients 2000∿3000 sputumtive 200∿ 300	•Sputumtve ≤ 100
Facilities	•Doctor oriented •X-ray/Microscope	•Paramedics Oriented •Microscope
Motivation of Staff	•Not good enough	•Good
Motivation Program	•None special •1-2 Health Visitors	•Usually Stressed •Special Health Education Progr. •Security Money •Charging Part of Cost

4. Monthly Attendance Rates of Patients once Interviewed

(Clinic A, 1981)



5. Government Clinic/TB Association Joint Motivation Programme