ORGANIZATION OF DIABETES HEALTH CARE IN INDIAN RURAL AREAS

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INTRODUCTION

India is the second most populous country in the world, accounting for 15% of the world population (1). The population in India has grown from 273 million in 1931 to 685 million in 1982 (2), and to 746 million in 1984, as estimated by the Population Reference Bureau of Washington (3). According to the 1991 census in India, total Indian population was 846,302,688. Urban population was 217,611,012 and rural population 628,691,676. Hence, the large population of India poses a major challenge, as the number of diabetic patients would be very high even with a low prevalence rate. This is particularly true because a large number of individuals could have undetected diabetes. When infectious diseases come under better control, there will be a tremendous increase in the number of people with diabetes.

India is predominantly an agricultural nation. A vast majority of cultivators are small farmers in villages; about 80% of total population live in rural areas (4). The literacy rate in India as a whole is still very low (about 36%). Shortage of trained personnel for teaching lay people regarding diabetes is yet another problem (4).

Emergencies in diabetes can be fatal if not attended promptly. Moreover, successful treatment of patients with diabetes depends on regular contact with the caring physician. There are thousands of villages in India where people have to walk or travel by bullock cart for miles together to obtain even a simple medical aid. A more challenging problem is the scarcity in rural areas of lavatory facilities, which are essential for proper care of diabetes patients (3). In India, facilities for even ordinary clinical and biochemical investigations are available only in large towns and cities but not in small towns or villages. Remedies for diabetes prescribed by native medical men include neem tree leaves, bitter gourd juice, honey, etc. Some quacks have made fortunes selling wooden tumblers made from a particular tree, claiming that cold water kept in a tumbler for a few hours has an antidiabetic action (4).

From the above description it is evident that there are many major problems and challenges in diabetic health care in India. Today, the position of India is unique in that it shares all health and economic problems of developing countries, and at the same time the incidence of diabetes, atherosclerosis and ischemic heart disease is not very low. A comprehensive approach is necessary for planning and implementing prevention and control programs for noncommunicable diseases including diabetes with common underlying risk factors (1,5).

In 1994, there were 20 million diabetics in India; there will be more than 33 million in 2005, according to the World Health Organization estimates. One in four diabetics will be Indian. Diabetes was responsible for 102,000 deaths in 1998. Up to 75 per cent do not even
know they are diabetics. Studies over the last three decades show a rising prevalence of non-insulin dependent diabetes (NIDDM), which affects Indians earlier than in the West. Diabetic retinopathy, the most common cause of blindness in urban, middle-class Indians, is on the rise, although most of it is preventable. Diabetes is also the most significant cause of end-stage kidney disease and of amputations in India. The costs of drugs for diabetes, already high for the average Indian, are expected to go up in the near future (5).

HEALTH CARE IN INDIA

The India’s healthcare sector has made impressive strides in recent years. Major corporations such as the Tatas, the Apollo Group, and many others have made significant investments in setting up state-of-the-art private hospitals in cities like Mumbai, New Delhi, Chennai and Hyderabad. Using the latest technical equipment and the services of highly skilled medical personnel, these hospitals are in a position to provide a variety of general as well as specialist services. These services are available at extremely competitive prices, encouraging patients not only from developing countries but even from a number of developed ones to come to India for specialized treatment.

AIIMS – All India Institute of Medical Sciences

This institute from New Delhi is the leading medical university of the Asian subcontinent, which comprises of the following member institutions:

- Apollo Hospitals
- Aravind Eye Hospitals
- Brahmaputra Hospitals Limited
- Lifeline Group of Hospitals
- Medwin Hospitals
- Nagarjuna Hospitals Ltd.
- Suyash Hospital Pvt. Ltd.
- MediCity Hospitals
- Hospitals in Chennai
- Hospitals in Delhi

Basic health indicators

India has a multiplicity of treatment regimens. These range from the allopathic system to traditional healing and home remedies. The advantage of standardization, packing and storage, documentation and different dispensing methods has ensured that the allopathic system is more acceptable.

The quality of life in relation to health can be gauged by morbidity information. The NCAER study reveals that the short duration morbidity rate (diarrhea, cough and cold, and unspecified fevers) is 122 per 1000 population. The major morbidity rate (epilepsy, heart disease, hypertension, tuberculosis, diabetes, mental disorders, and leprosy) is found to be 46 per 1000 population (1,2).

Short term morbidity and major morbidity are disproportionately high among the vulnerable population groups including wage earners and those with low levels of income. About 20 per 1000 children in the 0-4 age group and 29 per 1000 in the 5-12 age group suffer from physical disabilities such as Bitot’s spots, visual impairment, hearing impairment, speech impairment and locomotor disability.

Almost 80% of the diseases in India are waterborne or are caused by water organisms, i.e. cholera, diarrhea, typhoid, hepatitis A, malaria, and filaria. It is primarily the poor who are most affected. About half of all villages in India do not have any source of protected drinking water. Clearly, the quality of life from the health standpoint is far from satisfactory.

Guiding principles of health care according to Bhore Committee, 1946

In 1946, the Bhore Committee established the guiding principles for provision of health care to the citizens of India. They run as follows:

- That no individual should fail to secure adequate medical care because of inability to pay for it.
- The health program must, from the very beginning, lay special emphasis on preventive work with consequential development of environmental hygiene.
• The health services should be placed as close to the people as possible in order to ensure the maximum benefit to the communities to be served.
• The doctor – the leader of the health team, should be a social physician who should combine remedial and preventive measures as to confer the maximum benefit on the community, and the future doctors should be trained to equip them for all such duties (2).

Health for all

In Alma Ata (in the erstwhile USSR), a global initiative towards health-related research and action was held in 1978. All the participants, including India, affirmed to ensure health for all by the year 2000, with primary health care as their top priority. However, after 22 years, we are far from from achieving this goal (1).

Status of health care in India

India has worked continuously to improve its health care system in the last several decades, and considerable progress has been made in expanding the public health system and reducing the burden of disease. Other notable achievements include the establishment of an extensive network of government health care facilities both in the rural and urban areas, and determined efforts to upgrade the skills of health care workers, particularly in rural areas (1).

In just over five decades, life expectancy in India has doubled, and the infant mortality rate halved. However, during the same period the India’s birth rate has declined by only 25% (1).

Nevertheless, its performance requires much improvement in comparison with other emerging economies, including most comparable nations in the region. Deficiencies persist with respect to access, affordability, efficiency, quality and effectiveness, despite the high level of overall private and public expenditure on health.

Performance on selected health indicators

The India’s life expectancy was 49.1 years in 1970 and has increased to 62.6 years by 1997. The infant mortality rate (per 1000 livebirths) has decreased from 130 in 1970 to 71 in 1997.

Trends for demand in health care

The burden of disease is the cost a society bears, as measured in death and disability, from illness and disease (3). The health care system must anticipate and respond to this changing burden of disease, ideally through preventive as well as curative measures (4). The demand for health care will be driven primarily by demographic changes and changes in epidemiologic profile (3,5).

The population of India is currently around one billion and is still experiencing high population growth rates, at 1.3% per annum, which is high compared to most emerging nations.

DIABETES HEALTH CARE IN INDIA

The practical management of diabetes in developing countries is often made difficult by the scarcity of health care personnel, monitoring equipment and even drugs, especially in more remote areas (2). Poor general awareness of the disease due to inadequate or even absent diabetes education undoubtedly contributes to delayed presentation and missed diagnosis (5).

The development of diabetic complications is closely related to glycemic control, to accessibility to patient care, and to patient compliance with a rigid dietary regimen and lifestyle. These can be influenced by a number of factors (including age, comorbidity, socioeconomic status, and social health care support). Hence the risk of development of longterm complications could be avoided by improving the quality of diabetes care for patients by establishment of public health care system (2).

Diabetes is a lifelong disease, thus increasing the morbidity and mortality, and decreasing the quality of life. At the same time, the disease and its complications cause a heavy economic burden for the diabetics, their families, and the society.
Data for India suggest gross inequities in the availability of care for people with diabetes (4). Ramachandran et al. have estimated that the annual cost of care for one insulin treated patient attending their diabetic center in Madras (in 1996) was 350 USD. For a person treated with oral hypoglycemic agents or dietary modification alone, this figure was 70 USD. Using an estimate of the prevalence of diabetes in India of 1.8%, they calculated that 17.3 million people have diabetes, of whom around 20% (3.5 million) require insulin (4). Multiplying the Madras estimate for the cost of care by this prevalence of insulin treated and non-insulin treated diabetes produces a sum of 2.2 billion USD theoretically required to treat diabetes for the whole India. Given that the entire health care budget for the country in that year was only 720 million USD, something is obviously either away in these estimates or there is considerable imbalance in the care of diabetes in India.

The government is unable to provide proper health care, so most of the people depend on private hospitals for better care. There are a number of voluntary organizations and private clinics and outpatient services to pay the individual attention, patient education towards diabetes.

**DIABETIC ASSOCIATION OF INDIA**

Diabetic association of India was founded in Mumbai in 1955 with joint efforts of Dr. R.V. Sathe and S.S. Agaonkar (2). The aims and objectives of the Association are as follows:

- Study of the causes and treatment of diabetes
- Promoting of patient education through various media such as lectures, discussions and publication of books (2,3)
- Promoting plans for early detection of diabetes

There are about 25 branches distributed all over India. In South India, Madras association has been affiliated to the International Diabetes Federation (IDF) since 1955 (5). The Association also works in coordination with WHO. The Association takes active part in international congresses on diabetes, and organizes national congress on diabetes every three years (4).

There are a number of private and public trust hospitals. In South India, there is a diabetes research center in Madras, founded by Dr. M. Viswanathan in 1954 (6) and in school of diabetology at NIIMS in Hyderabad, headed by Dr. P.V. Rao.

**PRESENT SITUATION OF DIABETES IN INDIA**

Indians are more prone to diabetes than almost any other population in the world. Since very long, we believed that diabetes and heart disease are exclusive to the affluent societies. So, Indian health care policies emphasized prevention of infectious diseases only (6).

However, as the living conditions in India improved, we are increasingly following western dietary habits unsuited for our environs, adopting sedentary lifestyle, and are exposed to psychosocial stress. This has resulted in an unprecedented rise of diabetes to epidemic proportions during the last few decades in our country.

The only national study to date on diabetes completed in 1989 was coordinated by Prof. M.M.S. Ahuja from the All India Institute of Medical Sciences, and Dr. P.V. Rao, who is presently at the Nizam’s Institute of Medical Sciences. About 2% of the 12,000 people surveyed in Indian villages were found to be diabetic, and more alarming observation was that half of them did not know that they had diabetes. This infers that there are at least 20 million diabetics in India, which is the highest ever reported number from anywhere in the world.

Further, Indians tend to be diabetic at a relatively young age of 45 years, which is by about 10 years earlier than in the West. The life expectancy in a diabetic is just about 8 years after the onset of the disease, as they succumb to kidney as well as heart disease more often than others. This is very alarming indeed.

Another important consideration in this regard is the status of diabetes among migrant Indians living all over the world. There are several millions of Indians living outside India, either as recent migrants to Western countries such as England and United States, or as descendants of the ‘coolies’ indentured by the British to South Africa, Mauritius, Malaya, Fiji and to the Caribbean countries like Trinidad, Guyana and
Surinam. It is now well known that diabetes is more common in these migrant Indians than in the local host populations of these countries (6).

In a recent study concluded in 1992 and sponsored by WHO, Dr. P.V. Rao screened populations of Indian origin living in London, Malaysia, and British Guyana for diabetes and heart disease. Among these migrant Indians diabetes was at least four times more common than in Indians living in India. One of seven migrant Indians above 25 years of age was diabetic. Furthermore, more Indian women than men were affected with diabetes among immigrants, which was not the case within India. These higher rates for diabetes among migrant Indians, and in specific among women are attributed to the quality rather than quantity of dietary intake, lifestyle and social stress.

Indians eat less, weigh less, and work more than Europeans. But why are they more prone to diabetes than Europeans?

'Thrifty genotype' is the answer. It is a hypothesis on genetic inheritance, put forward way back in 1956 by James Neel, a geneticist. Prof. M.M.S. Ahuja has adapted this to the Indian context, and Dr. P.V. Rao has tested this hypothesis over the last five years in the frame of international research among Indians living within India and abroad (6).

Indians have lived through several centuries of famine and starvation, and largely survived on sustenance foods. Over generations, they evolved a 'thrifty genotype', which made them resistant to prolonged periods of starvation. We tend to store a part of our energy intake simultaneously while 'burning' it. Apparently this may be the reason for a 'big belly' on a small body frame among Indians.

The findings of the multinational study by Dr. P.V. Rao were that body fat around waist is the culprit for diabetes and heart disease among Indians. Overall body weight was not always high among Indians with 'big bellies'. This meant that total amount of food intake in an Indian was not high although the contents have changed over centuries from vegetable sources to 'fat rich' animal sources. Even the vegetable oils used for cooking such as coconut oil, which is widely used in Kerala, Malaysia and Guyana, are strongly related to the high rise in diabetes rates among the populations screened from these areas.

There is a need for a concerted effort from all concerned to first of all know that we Indians are more prone to diabetes and heart disease. It is also important to understand that dietary restrictions we follow blindly based on Western literature do not apply to the Indian context. It is not how much a diabetic eats nor the amount of 'sugar' one takes but what matters is the amount and nature of the 'fat' in food. This warrants an urgent reconsideration of the traditional understanding of diabetic diets; “no rice, no sugar in coffee, no fruits or no potatoes" just does not mean anything. “No oils, no fats, no food fats’ must be the first dietary advice for a diabetic, especially in India” (6).

Measure the waist and not just the body weight to know the progress of the disease. Warn those prone to avoid paunch, not just obesity. This requires better understanding among physiotherapists and 'weight-watchers' alike of the causes of diabetes and heart disease.

Who will be a diabetic? Now it is possible to make a reasonable 'guess'. If one is over 45, with a 'big belly' and a family background of diabetes, it is almost certain that he or she is going to be a diabetic. Then it may be possible to stop the disease process even before it appears.

Understanding diabetes, living with diabetes, and preventing further complications are the major concerns of the health education programs being developed at the Nizam’s Institute of Medical Sciences in Hyderabad.

Prescribing drugs and restricting diets are not the right answer for the emerging important problem of diabetes, but understanding the disease in our context and following specific measures against it are now more than ever urgently required (6).

PROBLEMS OF DIABETES IN RURAL INDIA

In Andhra Pradesh, a house to house survey was undertaken in a defined rural area of Eluru. The crude prevalence of diabetes was 1.6% (1.9% in males and 1.4% in females). In all subjects aged ≥40 years the prevalence of diabetes was 13.3% (6). The results are surprising because of the poor socioeconomic conditions, low health awareness, and limited access to medical facilities in the study population. In these
circumstances, diabetes is often diagnosed with the onset of vascular complications and potential morbidity from retinal, renal and arterial disease associated with diabetes.

The implications for the provision of health care centers throughout the Indian subcontinent are clearly enormous (5,6). Economic realities have to be taken into consideration. These include both the finances to make comprehensive and acceptable diabetes care services available to the people, and more importantly, the capacity of the people to afford these services. The Indian government spends around 1.2% of its annual budget on health. As communicable disease prevention and management is still an important aspect of health in India, the money routinely allocated to noncommunicable diseases, and especially diabetes, is sparse (7,8).

PLANNING OF DIABETES HEALTH CARE IN RURAL INDIA

The practical management of diabetes in developing countries is often made difficult by the scarcity of healthcare personnel, monitoring equipment and even drugs, especially in poor remote areas. Poor general awareness of the disease due to inadequate or even absent diabetes education undoubtedly contributes to delayed presentation and missed diagnosis (9).

The development of diabetic complications is closely related to the glycemic control, as indicated by the results of the Diabetes Control and Complications Trial (DCCT) on accessibility to patient care, patient compliance with a rigid dietary regimen and lifestyle (10). These can be influenced by a number of factors (including age, comorbidity, socioeconomic status and social health care support).

India has the largest number of diabetics in the world, with nearly 30,000,000 at present, which is likely to touch the 60,000,000 mark by 2025, the doctor said.

The ever increasing number of diabetics alarmingly stretch the disease burden beyond the limits of health care provisions. A primary care clinician with certain expertise in diabetes can barely look after some 30 persons with diabetes in a day by spending 10 minutes with each, and provide minimal care to one thousand persons with diabetes in a month.

Setting up diabetes health centers in rural areas of India is necessary as most of the people are illiterate, poor, and live in rural areas. To meet the diabetic patients’ requirements and ensure easy approach to the health center, it has to be set up in the center of the chosen place to reach the patients from the periphery and to allow for transportation of patients by ambulance to regional diabetes health center for further management (11).

Hence the risk of development or progression of longterm complications could be avoided by improving the quality of diabetes care for patients by establishment of a public health care system.

Diabetes is a lifelong disease. It increases the morbidity and mortality, and decreases the quality of life. At the same time, the disease and its complications cause a heavy economic burden for the diabetic patients themselves, their families and the society. The foundation of a diabetes health care system is the core of public health care for diabetics. However, this will not occur unless the government and public health planners are aware of the potential problem.

PRIMARY HEALTH CARE FOR DIABETICS

The health care for diabetics provides an excellent example of a chronic disease where primary health care must play a key role. The personnel involved at local and referral levels are physicians, nurses and midwives, auxiliaries and community workers, who should ideally work as a team. After a period of training, community health workers have a valuable part to play in the health care team. Their training should enable them to detect new cases, to test urine for glucose, to identify specific problems, to give advice, and to know when and where to seek advice themselves. They should also be able to prescribe follow-up care and to provide accurate information to the patient and his family relevant to the patient’s needs.

The primary health center should be staffed by a physician, a nurse, and some health auxiliaries. In addition to its health functions, it serves as an educational institution for both the staff and patients, as a center for dissemination of printed information such as diet sheets, and as a place where patient records are kept (12). It aims to offer continuous, comprehensive and coordinated care (13). Diabetic
health centers in rural areas should have an OP department, inpatient ward, ICU and hospital administrative wing to manage the hospital.

Staff required for the hospital

Staff requirements include: diabetologist, staff nurses (well trained in diabetology), health educator, dietitian, physiotherapist, ophthalmologist (consultant), dentist (consultant), podiatrist, laboratory technician, etc. (14).

Diabetes health care team

“We need a caring physician but also a dietitian and a caring educator. Today, diabetes treatment means team work and we need health care team that understand not only diabetes as a disorder but diabetes as a way of life. Physician and other health professionals should understand the need they have for one another. Each individual in the diabetes care team has his own particular knowledge that is required for the success of the treatment and the care the person with diabetes requires and deserves” (15).

Diabetologist

The work of the physician (diabetologist) is very different in the two models. In an acute emergency situation the physician directs the treatment; he intervenes and controls it directly. To passing from this role to that of an indirect actor by delegating the management of the treatment to the patient is a change, a difficulty of which the doctor is not often appreciated. This role change poses the problems of risk and responsibility for both the physician and the patient. Clear-cut in acute situations, what risks and responsibilities is the physician prepared to accept in the disease being treated outpatiently? It is understandable that the acute model, with direct responsibility rather than indirect support in chronic illness, should more readily shape the identity of the doctor.

In the acute model health personnel have learned to suppress their emotions; they gradually tend to develop a shell which may protect them but which may also have unfortunate consequences in their relationships with patients. In chronic cases, on the other hand, there cannot be prolonged care without involvement of the doctor to encourage, to guide and to listen to the patient. In urgent cases the physician's professional attention is mobilized by an external stimulus, the crisis (16-18). Inversely, in chronic situations longterm care requires a will, an internal motivation of the physician. This could explain why, paradoxically, a tired physician might be more efficient in an emergency case than when dealing with a chronic patient, where he or she would have to draw upon all available energy and attention to respond to the situation. Visibility of the medical act is also very different; attention getting in emergency medicine is much more humble and withdrawn in longterm care (19,20).

Diabetes nurse

Diabetes nurses play an important role in the public health systems. They work as assistants to diabetologists to give patients more detailed information and instructions about diabetes (21). As everyone knows, diabetes is a lifelong disease, hence diabetic patients have to deal with special problems every day, including how to plan their meals with various foods, do different kinds of exercises, wash their feet, choose special shoes and socks, seek doctor’s help, deal with hypoglycemic events, and so on. Usually the diabetologist just gives some general information to the patients on visiting them, while the nurse can make general information more and more detailed and concrete to fit the patient’s daily life. The diabetes nurse also works as a diabetes educator to give some lectures on diabetes for patients (17).

Diabetes educator

The need of a comprehensive plan for diabetic education has long been felt. Its relevance cannot be neglected when one recalls that diabetes is a disease for which no cure has so far been found. A person once diagnosed as a diabetic has to live his whole life with the disease. All the more, this disease affects several aspects of the victim’s life, such as diet, lifestyle, physical well-being, mental state, economic conditions, sexual and marital life, etc. (22). So, in any discussion regarding diabetes, not only the patient but also his family should take active part. Once a diabetic is started on treatment and in-between something goes
wrong, naturally his relatives will be worried and will question how and why it happened. Here arises the need for a diabetic education program (23,24).

The educational plan should go through three phases in parallel with the course of the disease (25). These phases are:

- primary or initial education
- secondary or indepth education
- tertiary or continuing education

**Dietitian**

The patient’s diet and the diet of his family should be analyzed. While prescribing the diet it is ensured that the diet is not very much different from that of the family. Every diabetic is given an individualized diet sheet using the charts, wax models and actual display of food items. Patient is educated about the type and quantity of food to be taken (26). Note that in India, some people take only vegetarian foods. So, balanced and required calorie diet and diet schedule are suggested to the patient (26).

**Physiotherapist**

**Yoga and diabetes**

The science of yoga is an ancient one. It has a rich heritage, it is part of Indian culture. It has become a subject of modern scientific evolution resulting in the recognition of some of its influences on the human body and metabolism. Several old books make a mention of the usefulness of yoga in the treatment of certain diseases such as hypertension, diabetes, obesity, asthma, etc. (27).

The practice of Pranayama produces significant fall in the fasting blood sugar and postprandial blood sugar. Yoga programs which train large muscle groups result in an increase in maximal oxygen uptake, decrement of submaximal heart rate, and augmentation of the stroke volume. They also result in metabolic changes such as reduction in blood lipid levels and decrease in blood lactate concentration during submaximal work. On the other hand, reports of the influence of yoga on body functions are very few and several of these have yielded only controversial observations. A favorable effect of yogic exercises on cardiovascular, endocrine, metabolic and respiratory functions have been observed. There are specific yogic practices for the control of diabetes: Pranayama, Dhanuraasana, Arthamatsendraasana, Pachimotanasana, Halasana, and Vajrasana. Dhanuraasana is individually most effective. These are practiced on an empty stomach for 30 min followed by Shavasana for 10-15 min (28).

**Intensive care unit (ICU)**

Diabetes health care centers have to be situated in rural areas where all critical cases can be managed successfully in health care center, as critical patients cannot reach regional hospitals within the required period of time (29,30). So, ICU has to be set up with all necessary equipment such as ventilator, cardiac monitor, pulse oxymeter, IV-fluids, IV-sets and cannulas, self-retaining urinary catheters, urobags, Ryle's tubes, etc. (29).

**Outpatient care**

After examining the patient, the physician has to refer him to laboratory for necessary investigations. By the time investigations are completed, the first phase of health education has to be given, e.g., teaching the patient on the technique of insulin injection if it is required. He should be taught the ways to monitor urine and blood glucose periodically, prediction of hypoglycemic symptoms and immediate care to be taken, sick-day rules, etc. (31). The patient comes back to the physician with laboratory reports as previously advised. The physician advises the necessary treatment and care that has to be taken.

**Inpatient care**

If the patient has been advised admission, the staff nurse has to take care of the patient and she has to play a role of diabetes educator as well. Patient should be taught about the medication, diet, foot care, etc. All diabetics should be taught how to identify acute complications of diabetes and to guard against longterm complications (32).

If the general condition is fair, he may be discharged. The patient can be advised for review and follow-up. An identity card along with o.p. card has to be provided (18).
Ambulant patients

As most patients in the rural area are illiterate, they have to be admitted as ambulant patients for a short stay which should serve a dual purpose of the control of diabetes and intensive diabetic education (22).

Diabetes education and treatment camps

These camps are conducted in periphery in different areas once or twice in a month with social organizations like Lions Club, Rotary Club, etc. to screen diabetic patients. Some days before the camps wide publicity and propaganda are organized in nearby villages. The local village heads, prominent people like school teachers, postal department, employees and voluntary organizers should be involved (31,32). Camps are usually conducted in a public place like a school. Sunday is a preferable day for such camps, so that most of the people can participate (33). Local newspapers, pamphlets, etc. can be used as a mode of publicity. It is a good teamwork with health care professionals such as diabetologist, educator, dietitian and laboratory technician and staff nurse. The camp has to be conducted in the morning so that fasting blood sugar and urine analysis can be done appropriately.

The diabetics in the camp should receive comprehensive treatment including education, diet modification, exercise, medications. Several lectures on diabetes are delivered on different aspects of diabetes, with displays of cooked foods and modules. A diet exhibition should also be organized (34). The patients requiring additional investigations or intensive care are admitted to the ward for detailed evaluation and treatment (35-37).

To deal with the great challenge of the global increase in the prevalence of diabetes, a governmental executive intervention is essential. A diabetic health care delivery system is potentially important and has to be shifted gradually into the community basis. Implementation of regular and nationwide education programs will make the public health care system more effective in developing countries (38,39).

FUTURE STRATEGIES

If we wish to approach the problem of diabetes with a view to prevent and control it, an appropriate diabetes health care program should be planned out (9,40,41). The following suggestions are worth considering:

Planning of health care for diabetics

Every state should plan out its own program giving consideration to local conditions, food habits and customs. Epidemiological studies related to the prevalence of diabetes, clinical features and complications should be carried out. This will give a baseline regarding total number of diabetics, requirements of drugs and insulin, presence of complications, and plans for rehabilitation and disability reduction. Depending on the results, further plans should be implemented (9,41).

Education

A countrywide patient education program should be started utilizing available resources in cooperation with social organizations, especially Diabetic Association of India through its various branches. This program should also stress other known risk factors such as smoking, alcohol, obesity and nutrition (9,42).

Training of medical staff

In this regard, the All India Institute of Diabetes has already started postgraduate course in diabetes for young doctors and refresher courses for general practitioners.

Supply of drugs

Fortunately oral antidiabetic drugs are available in India at an affordable rate. However, the government of India should make it a policy to include insulin as a life saving drug available to all at an affordable rate.

International cooperation

It should be developed amongst developing countries and also between developing and developed countries. This will encourage global exchange of thoughts and knowledge. The WHO should extend favorable attitude towards such an action in the world by facilitating the exchange of expertise, technology and information through promotion of technical cooperation amongst developing countries (43,44).
**Evaluation and supervision**

It is necessary to have periodical evaluation of any newly implemented health care program to rectify the mistakes and for execution of alternative steps (45). It is natural for such a huge populous country with numerous languages, scripts, ethnic groups and cultures to have socioeconomic and concurrently other health problems. However, this excuse can never pull us out of a vicious circle of poverty, population growth and health hazards. If we wish to achieve the goal of positive health we should plan out new strategies to fight on all fronts as far as health is concerned (46).

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