

Diabetic Foot Problems in India: An Overview and Potential Simple Approaches in a Developing Country

*Kshitij Shankhdhar, MBBS, Dip.Diab., PGDND, FAPWCA, FICN,
Lakshmi Kant Shankhdhar, MD, DMRE, MAMS, FICN,
Uma Shankhdhar, MBBS, DND, DDM,
and Smita Shankhdhar, MBBS, MUPMA, MICN*

Corresponding author

Kshitij Shankhdhar, MBBS, Dip.Diab., PGDND, FAPWCA, FICN
Lucknow Diabetic Foot Care Clinic and Research Centre, L.K.
Diabetes Centre, Indiranagar, Lucknow 226016, Uttar Pradesh, India.
E-mail: consultantdiabetologist@gmail.com

Current Diabetes Reports 2008, **8**:452–457
Current Medicine Group LLC ISSN 1534-4827
Copyright © 2008 by Current Medicine Group LLC

India has the highest number of people with diabetes in the world. Diabetic foot care is one of the most ignored aspects of diabetes care in India. Due to social, religious, and economic compulsions, many people walk barefoot. Poverty and illiteracy lead to usage of inappropriate foot wear and late presentation of foot lesions. Many nonphysicians are interfering in the treatment of diseases, including diabetes. Patients also try home remedies before visiting their physicians. We believe that rational improvisation is the key to success when working with diabetic foot patients in developing countries. We have developed several improvised techniques/approaches for diabetes care in general and specifically for foot care. Our techniques/approaches are based on four principles: 1) they are simple, 2) no special training is needed, 3) they are affordable, and 4) they are effective. Only simple and affordable methods are successful in the developing world.

Introduction

India has about 42 million people with diabetes, putting it first on the list of the 10 nations most affected by this disease [1,2]. The present projection indicates that India shall continue to hold the same position in 2025 [1]. A study of 18,000 people in India has revealed that up to 70% of people may have undiagnosed diabetes, which is much higher than expected [3]. Up to 25% of those with diabetes will develop a foot ulcer [4]. Worldwide, more

than 1 million amputations are performed each year as a consequence of diabetes, which means that a lower limb is lost (amputated) to diabetes somewhere in the world every 30 seconds [5]. Up to 85% of all amputations in people with diabetes are preceded by foot ulcers [6]. In 90% of foot ulcer cases with diabetes, sensory neuropathy is part of the problem. Significant reductions in amputations can be achieved by well-organized diabetic foot care teams, good diabetes control, and well-informed self-care.

Strong evidence indicates that foot care is best delivered by a multidisciplinary team [6]. Those at greatest risk for developing foot ulcers include patients who have a past history of foot ulcers and those who have already undergone an amputation [7]. Depending on the patient's risk category, control intervals should be defined and protective measures should be applied (eg, suitable protective insoles and footwear, regular foot and nail care, early treatment of nonulcerative pathologies, patient and caregiver education). Diabetic foot screening together with a systematic protection program averts amputations and is cost effective. A scientific approach to foot care includes the following: infection management, improving the distal vascularity of feet through antiplatelet and hemorheologic therapy and aggressive measures (eg, revascularization procedures, application of offloading principles, surgical débridement, local wound care), optimizing metabolic control, and treating relevant comorbidities.

Poor Infrastructure in India

Poor infrastructure in India for medicine in general and diabetes in particular should be a matter for concern. Most of the government-run hospitals are understaffed and ill equipped and render poor quality medical care characterized by insanitation, negligence, and unaccountability. Poor people usually tend to visit government hospitals. Little focus of the government exists on diabetes-related education of physicians and paramedics, and there is even



Figure 1. Lesions from walking barefoot.

less focus on podiatry. Very little provision exists for diabetes education in teaching institutions. No institution for regular structured podiatric education exists in India; thus, the number of podiatrists may be counted on one's finger tips. Most podiatrists have acquired experience in podiatry by visiting reputed podiatric centers around the world and attending sessions on foot care in international conferences. Even among these podiatrists, most are surgeons or orthopedists, with an inclination to perform surgical procedures early and ignore preventive podiatry, which may avert catastrophe in many cases. Ignorance and negligence go hand in hand because most physicians do not bother to examine the feet, which costs nothing and can do wonders in many cases. In the absence of specialized diabetes clinics, most cases of diabetes and foot lesions are treated by family physicians. Updating of physicians is virtually nonexistent because there is no legal compulsion (because there is no law such as the Good Medical Practice Act). To add fuel to the fire, utter confusion exists in the field of medicine because the government has recognized several systems of medicine, such as Ayurvedic, Homeopathic, Unani, and Naturopathy, so anyone is free to experiment on patients with diabetes and diabetes-related foot lesions, enhancing the potential risk for amputation.

An interesting point needs to be mentioned at this juncture. Most priests in India are more interested in treating patients than performing religious rituals; this has made the job of serious physicians more difficult because they receive patients quite late and in desperate condition. Early in the morning these individuals appear

on popular TV channels and recite indigenous methods of treatment including diseases from cancer, diabetes, hypertension, Parkinson's disease, paralysis, and AIDS (Fig.1) [8–12]. They uniformly criticize the allopathic approach and medicines while imparting a feeling that no ailment is too serious or difficult to treat by simpler measures, such as yoga and herbs, costing little. This temporarily alleviates anxiety for patients and their relatives, and draws massive television rating points for the channels with attendant commercial gains. However, the greatest cost is when patients face the consequences of laxity, which delays and/or deprives them of proper treatment initially. Recently, one very famous TV “saint” was issued a written warning by the central health ministry, which is headed by a medical school graduate, to refrain from claiming that AIDS can be cured by yoga [12]. Patients also have a very negligent attitude toward health care because all medical expenses are mostly borne by themselves—there is no credible health insurance system, and medical care provided by the government has virtually collapsed.

Here, we make only a passing mention of the magical treatments offered by witchcraft doctors, which are quite prevalent in this part of the world.

Barefoot Walking

Many people walk barefoot in India. In religious places such as temples, people need to remove their footwear at the entrance. Indian temple etiquette stipulates that one should take off shoes before entering the temple premises. The same also applies to certain churches in India. Usually, there are people stationed outside most temples and gurdwaras, who keep the shoes under their custody for a nominal sum [13]. The courtyards of the religious places often are made of concrete or marble. These surfaces become hot when exposed to sunlight. When people with diabetes walk barefoot on these surfaces, they may not feel the heat due to diabetic neuropathy and develop blisters, which later lead to plantar foot ulcers.

In the Muslim religion, there is a custom called “Aag ka matam” or walking on fire, organized during the Muharram celebration. The intention of this custom for the Shia Muslims is to share the pain of the family of the surviving members of Imam Hussain, who was chained, tortured, and made to walk barefoot from Karbala to Syria. Many people walk barefoot as a penitential offering. They often vow to walk barefoot and cover a distance of several kilometers to reach a particular temple, situated sometimes at hilltops, as an offering to the almighty or while a loved one is not getting well despite treatment. Many of them get burned or injured and develop blisters and ulcers on the soles.

Many devotees of the Indian God Hanuman not only walk barefoot but measure the distance up to an auspicious temple, located in the city of Lucknow, by lying almost naked on burning roads during sunny days as penance. Kapilash Temple Orissa, popularly known as the

Kailash temple in India, possesses the idol of Lord Shiva. The visitors who wish to pay homage to the deity have to climb a flight of 2000 steps. Many devotees walk barefoot even in sun [14].

The economic factor is another common reason for barefoot walking. More than 35% of the 1.3 billion Indian population lives below the poverty line [15]. The poor people genuinely cannot afford to purchase good footwear. They often purchase economical footwear made of rubber/plastic material. This footwear offers little support to the feet during day-to-day walking. After exposure to water and rough weather, the rubber/plastic footwear hardens and becomes cracked. Such cracks have rough edges that injure the wearer's foot, especially because such people do not wear socks and the foot skin is in direct contact with the shoe's inner surface. Such injuries initiate the foot lesions and lead to diabetic foot ulcers.

The socioeconomic factor is another reason for barefoot walking. In Indian villages, the farmers work barefoot in the fields. They cannot afford proper protective footwear and even those who can afford to buy it can be found working barefoot due to lack of awareness regarding foot care. This manner of working barefoot in the fields is passed on to future generations of farmers. Many people walk barefoot while indoors. In India, it is customary to remove footwear while entering the kitchen. Some people walk barefoot in gardens, at the suggestion of Ayurvedic physicians [16].

People with diabetic neuropathy often feel a burning sensation on the soles of their feet [17]. These patients find it difficult to wear footwear, especially leather footwear. They find it more comfortable to walk barefoot, and this leads to injuries on the plantar surface. Due to their neuropathy, these patients do not immediately feel the trauma of a burn or puncture injury to the feet during barefoot walking. Blisters and sores may appear on numb areas [18]. Patients may not notice them until many hours or even days have passed and the lesions start to bleed or become malodorous. Invariably, they first try home remedies, including homemade applications. Because the lesions are not painful, they continue walking and do not consult physicians until quite late.

Seventy-five percent of the Indian population lives in villages [19]. Due to illiteracy and lack of awareness, many people walk barefoot, and this leads to innumerable foot lesions (Fig. 1).

Inappropriate Footwear

Several successful fashion designers exist in India. The enthusiastic footwear fashion designers often focus more on looks than comfort. In the northern region in India, there is a fashionable footwear called "Nagra," which is characterized by a pointed toe, embroidered top, and thin leather sole with no shock-absorbing quality (view online at [http://preyansleather.ec51.com/images/bank/](http://preyansleather.ec51.com/images/bank/thumb_1149088529.jpg)

[thumb_1149088529.jpg](http://preyansleather.ec51.com/images/bank/thumb_1149088529.jpg)). Medically speaking, these shoes are poor quality and can lead to several lesions in the users. Similarly poor qualities are shared by another fashionable footwear called "Kohlapuri Chappals" (they are called this because they are manufactured in the city of Kohlapur, located in the central part of India), which are less embroidered than Nagras. Shoes made of synthetic material that does not breathe are very popular because they are inexpensive. Poor quality footwear made of tire rubber is quite popular among suburban populations and slum dwellers in the towns [20]. Many religious people use all-wooden footwear called "Kharaun" with no protective value [21].

Repaired Footwear

People often continue wearing the same pair of shoes indefinitely until they are lost or stolen. Thus, they wear dangerously repaired shoes with attendant hazards [22]. Such repaired footwear offers little support to the foot during walking. Poorly repaired shoes and socks could have rough edges and pressure points that damage the foot skin and initiate foot lesions.

Dangerous Herbal Applications

Many indigenous herbal applications, often used as household remedies to treat foot lesions, have caused more havoc than the lesion itself. Milk of several herbs has caused foot ulcerations by chemical burn in patients who tried such applications to treat plantar corns and calluses. One person had applied strong acid to treat dermatitis and developed a large nonhealing ulcer over the dorsum of the foot. Most local applications are used in heated form as a poultice and cause thermal burns in insensate feet due to peripheral neuropathy.

Several Improvisations Developed at Our Diabetes Clinic

Our team of physicians has focused on finding better solutions to common problems, ranging from health education to diet and management of diabetes and foot care. In this pursuit we have researched how to tackle day-to-day problems faced by Indian physicians engaged in diabetic care, including podiatry.

Innovative educational methods

We have developed an innovative method of patient education through "mobi-films"—health care education films made with the help of mobile phones. Education is the backbone of diabetes management. Conventionally, health education is rendered through lectures or handouts, which are often monotonous, time consuming, and ineffective in the long run because different diabetes patients need different education. We have produced different sets

of films—with patients involved in their production—at the L.K. Diabetes Centre and classified them based on type of diabetes and complications of diabetes. We display them in the waiting room of our diabetes clinic and during diabetes camps and other diabetes programs. We distribute them among doctors through diabetes associations. We make these educational films using mobile phones (thus, mobi-films) so that we may forward the films as MMS (Multimedia Messaging Service) from one mobile phone to another.

To make these films, one needs a basic mobile phone/digital camera to take pictures/videos/audio. These are then transferred to computer software—the “Windows Movie Maker” (available for free in all computers using Windows XP). The pictures/videos/audio can be aligned in the timeline of the software with basic editing and background music to add some spice, thus a health care film is made. The author (Kshitij Shankhdhar) represented India in a contest called “Mobile Film Makers-2006” organized by Discovery TV Channel and Nokia. His work (pictures and mobi-film on diabetic foot care) was selected in the top 14 from the Asia-Pacific region. One of his mobi-films has been put on the website of the International Diabetes Federation under the section of World Diabetes Day celebration in the city of Lucknow. His medical paper, “Health Education through Mobi Films,” was selected for presentation at the 1st International Conference on Advanced Technologies and Treatments for Diabetes (ATTD) in Prague, Czech Republic (February 27–March 1, 2008). This work was presented at the 3rd Congress of the World Union of Wound Healing Societies (June 4–8, 2008), hosted by the University of Toronto, Faculty of Medicine and Departments of Medicine and Public Health Sciences [23].

Our nutrition unit

Diet planning is another often-ignored aspect of diabetes care; most clinics in our part of the world lack a dietician. Under these circumstances, preprinted fixed exchange tables are used by some physicians but with poor compliance and results. We have a specialized nutrition unit equipped with software to plan specialized diets required by pregnant and lactating diabetic women and diabetic patients with obesity, hypertension, dyslipidemia, coronary artery disease, hyperuricemia, and nephropathy. The software can offer menus pertaining to any of the four regions of India—the North, the East, the West, and the South—and different menus can be obtained for 7 days of the week. We have devised a new diet (the DIAL diet [a Diet Including Acarbose Liberalizes the diet]) that is virtually a free diet, needing no diet card, and thus no need for a dietician. Along with some major dietary restrictions, such as sweets, a normal diet is prescribed and acarbose is added before large meals to prevent major flux of glucose during the postprandial phase [24].

New approach to insulin therapy

Meticulous glycemic control is an integral part of any aspect of diabetes care including podiatry. We researched an altogether new approach to insulin therapy, the most difficult part of antidiabetic therapy for family physicians. In this approach, crude control of glycemia is achieved with the most widely used 30/70 premix human insulin and fine-tuning should be done with the addition, withdrawal, reduction, or increment of different acarbose doses preceding the major meal, revealing a rise in blood glucose [25].

The Samadhan foot examination stand

Our approach to podiatry is equally innovative and we have developed many solutions to podiatric care, from examining gadget to offloading device. For instance, the Samadhan foot stand (our own design) has a flat wooden base and a quadrangular vertical top with a padded cut-out at the upper edge to accommodate the patient’s heel. In the middle of the vertical arm, two plastic containers are fixed to accommodate a handheld Doppler and some implements required for foot examination and podiatric care, including nail care.

The Samadhan System of offloading

Most of the Indian physician-turned podiatrists advocate inserting a foam insole (with a hole cut into the region of the plantar ulcer) into a new shoe (that is one size larger) for offloading. However, this approach has not done well because many patients are reluctant to purchase a new shoe, especially when the existing shoe is relatively new or in working condition or they feel pinched by the cost of a new shoe, in addition to the costs of podiatric care. Second, such insoles are often ill fitted and cause edge effect and even new ulcers. Some foot care experts are more interested in recommending custom-made sandals manufactured in their own clinic for offloading for commercial gain, even though good quality floaters from reputable shoe companies are available at half the rate they are charging.

At our foot clinic, we developed the “Samadhan System of offloading” [26••,27,28]. It is based on the following principles: 1) simplicity—easy to make, 2) no special training is required, 3) affordability, and 4) effective offloading. The Samadhan System has a removable (Samadhan-R) and an irremovable version (Samadhan-IR). The Samadhan System of offloading has been published on the website of the International Working Group for the Diabetic Foot and has been selected for presentation at international conferences organized by associations such as the International Diabetes Federation, American Diabetes Association, Canadian Diabetes Association, European Association for the Study of Diabetes, Diabetic Foot Study Group (Europe), Diabetic Foot Global Conference, Malvern Diabetic Foot Conference, and many others in different parts of the world. Our work in the offloading field of the diabetic foot has been selected for the R. Gary

Sibbald International Scholarship by the Canadian Association of Wound Care, Albert Renold Fellowship by the European Foundation for the Study of Diabetes, and First Robert Turner Clinical Research Training at the Oxford Centre for Diabetes by the European Association for the Study of Diabetes.

Impracticability of Multidisciplinary Approach

Diabetes is increasing faster in the world's developing economies than in the developed ones [29]. The World Health Organization predicts that approximately 80% of all new cases of diabetes are expected to occur in developing countries [29]. Currently, 246 million patients have diabetes, and the number is expected to rise to 380 million by the year 2025 [29].

A multidisciplinary approach to diabetes care, and podiatric care, in the developing world is neither available nor affordable by most diabetic patients. Most lengthy orations by established podiatrists from the developed world and by somewhat established Indian physicians fail to arouse interest among the audience (physicians) because they find podiatric medicine beyond their reach. To his audience, mere mention of a multidisciplinary approach virtually puts an end to any thought of opening a foot care unit in their clinics because most specialists mentioned in the team do not even exist in India. The government sector is too sluggish to make any decision, and most efforts to start any new activity get entangled in a jungle of rules and regulations. In India, hardly half a dozen doctors have focused on podiatry to a variable extent—among them are Sharad Pendsey from Nagpur, Arun Bal from Kochi, and Vijai Vishwanathan from Chennai—and most of them have not focused exclusively on podiatry. The author (Kshitij Shankhdhar) may be the only Indian physician to head an exclusively podiatric unit affiliated with an exclusively diabetes clinic (the L.K. Diabetes Centre, situated in Lucknow).

One-Man Team

A multidisciplinary approach, when rendered by multiple consultants, becomes a very costly affair. The United States is home to about 8% of the world's population living with diabetes and accounts for more than 50% of all global expenditure for diabetes care [30]. More than 80 million people in India go to bed hungry, and only 10% of the Indian population is covered by medical insurance [31]. It is practical, economical, and affordable for the physician/diabetologist to render multidisciplinary care as a one-man team. This means that besides managing diabetes, the physician also does the basic débridement and dressing, and takes measures for offloading the lesion if required. The physician/diabetologist can also educate the patient about basic foot care, diabetes care, and nutrition. We believe that the physician/diabetologist should be trained

in multiple disciplines rather than referring the patient to multiple consultants, except in serious diabetic foot conditions that need invasive surgery or amputation. For instance, the author (Kshitij Shankhdhar) has specialized in diabetology and nutrition and has gained experience in podiatry. He has been performing most of the operative work himself as a surgeon and even renders education to his patients using mobi-films. Our approach of the one-man team for foot care appears quite unconventional but seems logical in our country.

Conclusions

Improvisation is the key to success in the developing world. Diabetes is increasing faster in the world's developing economies than in the developed ones [29]. In the poorest countries, people with diabetes and their families bear almost the entire cost of whatever medical care they can afford [30]. In India, for example, the poorest people with diabetes spend an average of 25% of their income on diabetes care. Most of this money is used to stay alive by avoiding fatally high blood sugar levels [30]. The World Health Organization estimates that diabetes, heart disease, and stroke together will cost about \$333.6 billion in India [30]. One needs to be realistic and work within the available resources. The focus should be on basic research into simple methods. Strength lies in simplicity because it is only with simple things that we can reach and serve all the people.

Disclosures

No potential conflicts of interest relevant to this article were reported.

References and Recommended Reading

Papers of particular interest, published recently, have been highlighted as:

- Of importance
 - Of major importance
1. International Diabetes Federation: **Top 10 countries in number of people with diabetes**. Available at http://www.worlddiabetesday.org/files/docs/Top_10_countries.pdf. Accessed August 2008.
 2. World Health Organization: **Prevalence of diabetes in the WHO South-East Asia region**. Available at http://www.who.int/diabetes/facts/world_figures/en/index5.html. Accessed August 2008.
 3. Cure Research: **Medical news summary: 70% of people in India may have undiagnosed diabetes**. Available at http://www.cureresearch.com/news/70_of_people_in_india_may_have_undiagnosed_diabetes.htm. Accessed August 2008.
 4. Singh N, Armstrong DG, Lipsky BA: **Preventing foot ulcers in patients with diabetes**. *JAMA* 2005, 293:217–228.
 5. **Lancet (cover)**. Volume 366, Number 9498. November 12, 2005.
 6. International Diabetes Federation: **IDF position statement: the diabetic foot: amputations are preventable**. Available at <http://www.idf.org/home/index.cfm?node=1408>. Accessed August 2008.

7. Armstrong DG, Lavery LA: **Diabetic foot ulcers: prevention, diagnosis and classification.** *Am Fam Physician* 1998, 57:1325–1332.
8. Swami Ramdev Yoga: **New yoga VCD for cancer.** Available at <http://www.swamiramdevyoga.com/vcd-for-cancer/index.html>. Accessed August 2008.
9. Swami Ramdev Yoga: **New DVD for diabetes.** Available at <http://www.swamiramdevyoga.com/dvd-for-diabetes/index.html>. Accessed August 2008.
10. Swami Ramdev Yoga: **New DVD for high blood pressure.** Available at <http://www.swamiramdevyoga.com/dvd-for-high-blood-pressure/index.html>. Accessed August 2008.
11. Swami Ramdev Yoga: **New DVD for parkinson & paralysis.** Available at <http://www.swamiramdevyoga.com/dvd-for-parkinson/index.html>. Accessed August 2008.
12. Dance with Shadows: **Yoga for AIDS: Ramadoss-Ramdev fight it out.** Available at <http://www.dancewithshadows.com/society/ramdoss-ramdev-aids.asp>. Accessed August 2008.
13. **I Love India: Indian etiquettes.** Available at <http://www.iloveindia.com/indian-traditions/etiquettes.html>. Accessed August 2008.
14. **Maps of Indian: Kapilash Temple Orissa.** Available at <http://www.mapsofindia.com/orissa/tourism/kapilash-temple.html>. Accessed August 2008.
15. **India Together: A thin Indian line.** Available at <http://www.indiatogether.org/2006/mar/ddz-povline.htm>. Accessed August 2008.
16. **All Ayurveda: Dinacharya.** Available at <http://www.allayurveda.com/dinacharya.htm>. Accessed August 2008.
17. Al-Muhairi A, Phillips TJ: **Diagnostic dilemmas: burning feet due to diabetic neuropathy.** In *Wounds*, vol 15. Malvern, PA: HMP Communications LLC; 2003:272–276.
18. National Diabetes Information Clearing House: **Diabetic neuropathies: the nerve damage of diabetes.** Available at <http://diabetes.niddk.nih.gov/dm/pubs/neuropathies/>. Accessed August 2008.
19. Census of India: **Census of India, 1991a.** Available at <http://www.censusindia.gov.in/>. Accessed September 25, 2008.
20. Shankhdhar K, Shankhdhar LK, Shankhdhar U. **Diabetic foot care in the land of no podiatrists.** *Journal of the World Council of Enterostomal Therapists* 2008, 28:20–26.
21. **International working group on the diabetic foot.** Available at http://www.iwgdf.org/index.php?Itemid=38&id=11&option=com_content&task=view. Accessed August 2008.
22. **Travel in India Smart: Shoe repair on road.** Available at <http://www.travelindiasmart.com/shoerepair.JPG>. Accessed August 2008.
23. World Union of Wound Healing Societies: **Health education through Mobi Films.** Available at <http://www.wuwhs2008.ca/Abstracts-Poster-ByDay.pdf>. Accessed August 2008.
24. Lakshmi K, Shankhdhar K, Shankhdhar U: **DIAL diet = diet including acarbose liberalizes diet—a newer approach to diet therapy for early T2D patients combining acarbose to liberalize diet [abstract 1671-P].** *Presented at the American Diabetes Association 66th Annual Scientific Sessions.* Washington DC; June 9–13, 2006.
25. Lakshmi K, Shankhdhar K, Shankhdhar K, Shankhdhar U: **A Newer Approach to Insulin Therapy Using Acarbose as “Regulatory Switch” for Fine Tuning of Glycemic Control [abstract 453-P].** *Presented at the American Diabetes Association 65th Annual Scientific Sessions.* San Diego, CA; June 10–14, 2005.
- 26.●● Shankhdhar K: **Improvisation is the key to success: the Samadhan System.** *Adv Skin Wound Care* 2006, 19:379–383. This article describes the complete Samadhan System of offloading manufacturing of Samadhan device, technique of its application, and benefits.
27. Diabetic Foot Study Group: **The Samadhan System—IR a new, economical, effective and irremovable offloading approach for type 2 diabetes patients with neuropathic forefoot plantar ulcers.** Available at <http://www.dfs.org/dfs2005/abstracts2005/Oral/O12.doc>. Accessed August 2008.
28. Shankhdhar K, Shankhdhar LK, Shankhdhar U: **The Samadhan System: a new, economical and effective approach for offloading bodyweight in diabetic patients with neuropathic forefoot plantar ulcers.** *Presented at the American Diabetes Association 65th Annual Meeting & Scientific Sessions,* San Diego, CA; June 9–11, 2005.
29. International Diabetes Federation: **Diabetes prevalence.** Available at <http://www.idf.org/home/index.cfm?node=264>. Accessed August 2008.
30. International Diabetes Federation: **The human, social and economic impact of diabetes.** Available at <http://www.idf.org/home/index.cfm?node=41>. Accessed August 2008.
31. World Resource Institute: **Micro health insurance working for India.** Available at <http://www.nextbillion.net/newsroom/2006/11/09/micro-health-insurance-working-for-india/>. Accessed August 2008.