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Emerging Diabetes Pandemic in India: A Case Study for an Integrative Approach

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Abstract

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MA, Delhi University, India, 1988

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Every day, India sees the addition of 5,000 new cases of diabetes to its current diabetic population of 65 million people. This number is projected to cross the 100 million mark in 15 years. The emerging pandemic scale of diabetes growth is straining India's already-overburdened public healthcare resources. India is home to several well-established native and adapted foreign traditions of medicine that are widely practiced. These traditions include Ayurveda, yoga and naturopathy, unani, siddha, and homeopathy. The modern and traditional medicine approaches are extensively used as independent systems. The purpose of this qualitative research case study was to evaluate the use of an integrative approach to address the multiple challenges posed by diabetes in India. The research design for the case study was based on the theoretical framework of participatory action research. The research questions evaluated how the modern and traditional medicine systems can be jointly used to contain the spread, scale, and immensity of diabetes in India and examined the barriers and challenges in combining various systems of medicine. Data were collected from interviews with 30 modern and traditional medical practitioners and 6 policy makers identified through a stratified purposeful sampling process. The transcribed data were coded thematically and objectively analyzed. The trustworthiness of interpretations was bolstered with triangulation through records from notes and observations. In evaluating the feasibility of a synergistic and integrative approach, the study filled a gap in scholarly literature. The study contributes to social change by adding to the existing body of knowledge available to physicians and patients in preventing and containing the diabetes pandemic.

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Dedication

I dedicate this dissertation to the living and bygone community of research scholars whose passion for knowledge keeps the flame of awareness growing and glowing in order to make a positive social change in the lives of people and communities to help them improve quality of life and promote wellbeing.

Acknowledgments

With deep gratitude, I would like to acknowledge the help, guidance, and support I have received from my chair, Dr. Shirley Gerrior; my methodology expert, Dr. Jeanne L. Connors; my URR, Dr. Vibha Kumar; and my KAM mentor, Dr. Raymond Thron, in designing and completing this dissertation.

I would also like to acknowledge the support and guidance I received from the faculty and staff of Walden University at various residencies and other milestone developments during the progression of my doctoral studies. I would like to thank my translator and back translator, who helped me perform these two very important tasks for communicating with and obtaining informed consent from the participants. I would also like to thank the IRB of Walden University for guiding me through the ethical sensitivities of the process of data collection and interviews.

I owe a special thanks to my family, whose invaluable support made it possible for me to take time out of my professional and family commitments to complete my research program and dissertation.

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Chapter 1: Introduction to the Study

Introduction

The emerging pandemic growth rate of people with diabetes in India is causing major concern (Sierra, 2009). This study evaluated the feasibility and desirability of an integrative approach combining modern and traditional systems of medicine in India to address the enormous challenge posed by the emerging pandemic growth rate of diabetes. According to the International Diabetes Federation (IDF; 2013), "Diabetes requires culturally appropriate intervention in order to reduce the enormous personal suffering and economic burden that grows with this epidemic" (p. 2).

In keeping with the cultural ethos of India, this participatory case study was an attempt to add to the body of knowledge by addressing the public health challenge of diabetes in India. Being a chronic disease, diabetes has lifelong consequences not just for the patient and patient's family but also for the entire healthcare system of a nation (Cameron, Zimmet, Shaw, & Alberti, 2009). Specific to India's health care system and its ability to treat current and projected Type 2 diabetics, using the case study approach, I evaluated the rationale for an integrative approach combining modern and traditional systems of medicine. In this chapter, I provide the background of the study, followed by an explanation of the traditional schools of medicine practiced in India. That is followed by statement of the problem, purpose of the study, research questions, nature of the study, research methodology, definitions, assumptions, scope and delimitations, and significance of the study, ending with a summary of the chapter.

Background

IDF (2011) describes diabetes as not only a health crisis, but also a global societal catastrophe. IDF estimates that the global population of people with diabetes is now approaching 382 million. Diabetes, in the assessment of IDF, is at a crisis levels and escalating. "Every seven seconds someone somewhere dies from diabetes, accounting for 4.8 million deaths globally each year" (IDF, 2013, p. 1). The number of people with diabetes continues to grow and is on its way to crossing the half billion-population mark. IDF projects that by 2035, the number of people with diabetes in India will increase to 101 million, accounting for about 20% of world's burden of this disease (IDF, 2013, p. 12). Ramachandran and Snehlata (1999) described diabetes as the epidemic of the 21st century.

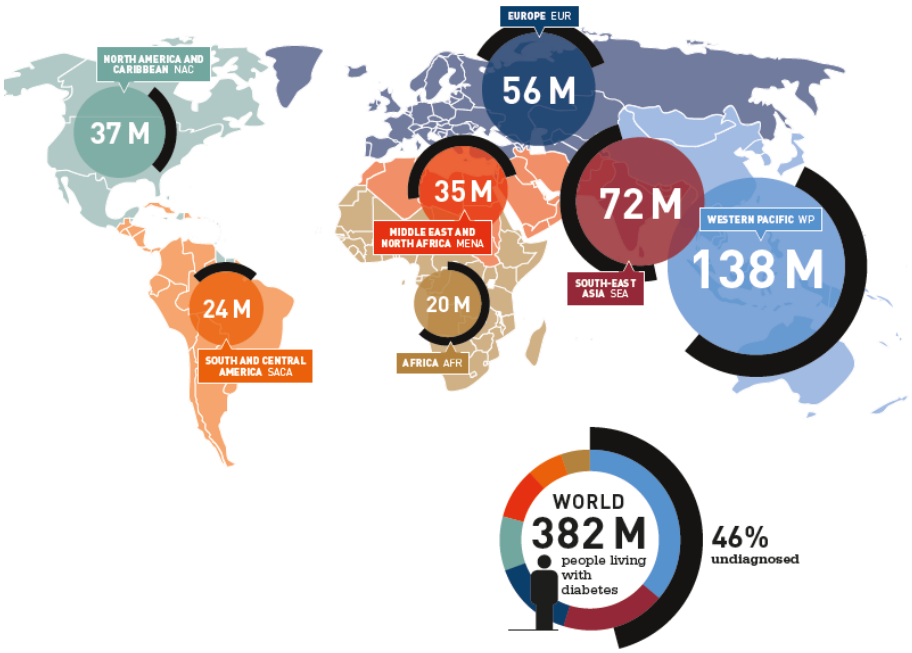

Figure 1. Global incidence of diabetes. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites/default /files/ The_Global_Burden.pdf

The global health expenditure on account of diabetes is slated to increase from $548 billion in U.S. dollars (USD) to $627 billion in 2035 (IDF, 2013).

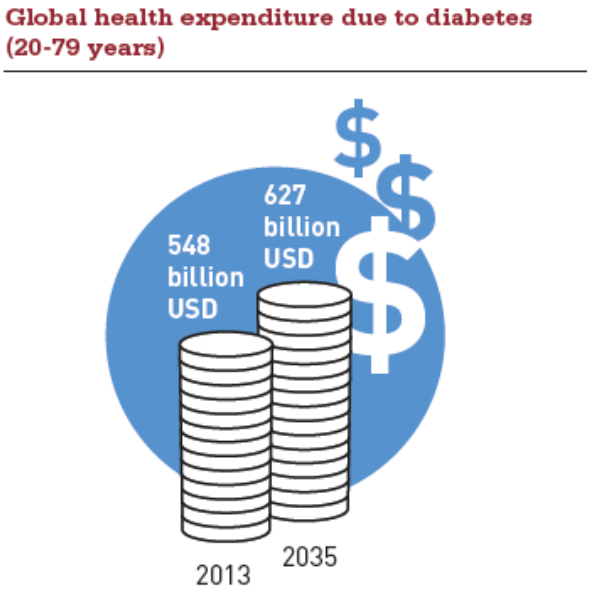

Figure 2. Global expenditure on diabetes. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites/default /files/ The_Global_Burden.pdf

Deaths due to diabetes far exceed deaths due to HIV/AIDS, malaria, and tuberculosis combined (IDF, 2012). The enormity of the challenge posed by diabetes and its escalating treatment and management costs has led many governments to collaborate with nongovernmental and private voluntary organizations (NGOs/PVOs). The collective efforts of various agencies have been focused on measures to arrest the growth rate of diabetes in their respective countries and areas of influence. These measures include public awareness campaigns on diet and lifestyle with encouragement of a preventative lifestyle (Das & Mukhopadhyay, 2011). IDF (2011) summarized the gravity of diabetes

in the following statement: “this disease is one of the century’s greatest health challenges and remains on a relentlessly upward trajectory” (p. 1). Resource-challenged developing economies like India can ill afford to carry such a large magnitude of chronic disease burden (Sierra, 2009). Diabetes is the single most important health challenge in the category of noncommunicable diseases globally (Ramachandran, 1992).

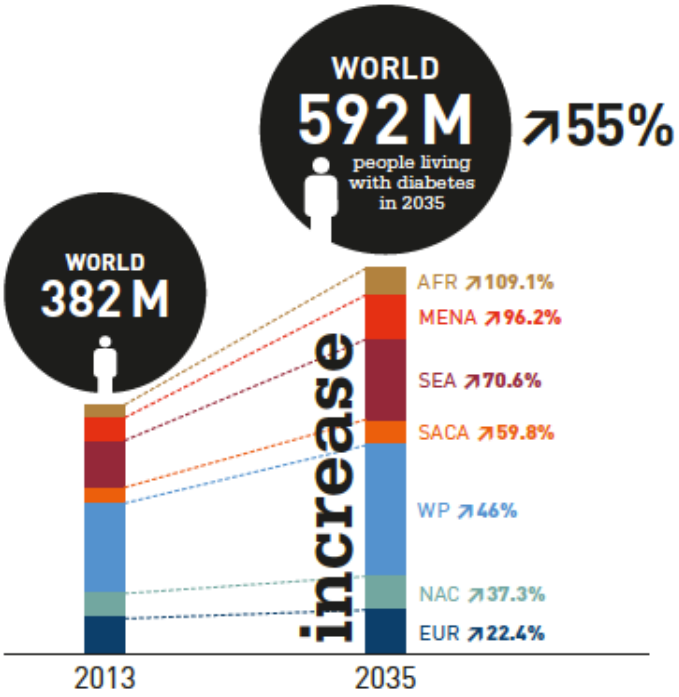

Figure 3. Projected increase in global diabetic population. AFR = Africa, MENA = Middle East North Africa, SEA = South East Asia, SACA = South & Central Africa, WP = Western Pacific, NAC = North America & Caribbean, EUR = Europe. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites/default/files/The_Global_Burden.pdf

Magnitude of Diabetes in India

Shetty (2012) described the enormity of the challenge in India in the article title “Public Health, India’s Diabetes Time Bomb” (p. S14). India adds 5,000 people every

day to its population of diabetics (Diamond, 2011). It is imperative for India to do everything possible to contain the alarming increase in the incidence of diabetes, which has attained emerging pandemic proportions (Sierra, 2009). India is just behind China both in population and in the number of people with diabetes, as shown in Figure 6 on page 29.

Many initiatives have been launched both by the Indian government and by a large number of national and international voluntary health groups and NGOs operating in India. These include the Indian task force on diabetes (http://www.diabetes.india.com/diabetes) and The National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS; the program aims to screen 200 million Indians for diabetes) and several other public and community health initiatives. The global NGO Project HOPE, Indian NGO, and Diabetes Care India are examples of the many agencies working in this area. Large global philanthropic institutions have also come forward to find a solution for the enormity of India's diabetes challenge (Kinra et al., 2011).

Case study involves in-depth examination of people and groups of people. Using the case study approach, I evaluated the emerging pandemic of diabetes in India. Diabetes has posed a major public health challenge for the Indian population within India and the worldwide Indian diaspora (Shetty, 2012). There is strong scientific evidence that Indians have a greater degree of insulin resistance and a stronger genetic predisposition to diabetes (Mohan, 2004). In the 1970s, the Indian Council of Medical Research (ICMR) reported the incidence of non-insulin-dependent diabetes mellitus (NIDDM) in India to

be 2.3% in urban and 1.5% in rural areas (Ramachandran, 1992). Researchers of recent studies both among Indians living in India and Indians living overseas have shown much higher incidence of diabetes (Kinra et al., 2011). Balagopal, Kamalamma, Patel, and Misra (2008) showed that the ratio of new diabetics to known diabetics was 1:2 in urban and 3:1 in rural areas and that the incidence of diabetes in Indian males was significantly higher than in females. IDF estimates that the incidence of nondiagnosis of diabetes in India is as high as 51% (IDF, 2013).

The continued pace of urban migration, sedentary lifestyles, and changes in dietary habits of Indians have added to the gravity of the problem. Diabetes, being a chronic health condition, has serious and severe lifelong implications for the patient and requires lifelong management. The onset of diabetes is preceded by a phase described as *prediabetes*, also referred to as impaired glucose tolerance (IGT) condition (IDF, 2011). It is estimated that over 32 million Indians are presently in the prediabetic stage (IDF, 2013). People with prediabetes should be prevented from getting diabetes (IDF, 2013). NGOs in India are focused on campaigns to create awareness among people with pre-diabetes so that they may avoid becoming diabetic. An NGO called Diabetes Care India is running a campaign called KADAM (Knowledge Based Actions for Diabetes Awareness Movement, Venkatraman & Mehta, 2011). In their study, Venkatraman and Mehta (2011) noted the beneficial impact of these efforts.

Traditional Schools of Medicine in India

The World Health Organization (WHO) is cognizant of the importance and potential of traditional systems of medicine in community life. WHO defines *traditional medicine* as

> medical knowledge systems that developed over generations within various societies before the era of modern medicine, including the health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral-based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being. (WHO, 2000, para. 1)

India is home to many native, and adapted, widely practiced heritage traditions of medicine. The alternative traditions are of two types. Those of the first type originated in India, such as Ayurveda, siddha and yoga. Those of the second type originated outside India but are very widely accepted in India as indigenous. Examples of these are unani (originated in Greece), homeopathy (originated in Germany), and sowa rigpa (originated in Tibet). The alternative traditions have been practiced in India for thousands of years. The Government of India recognizes six of these traditions as part of India's mainstream healthcare delivery process. These traditions are referred to in an acronym AYUSH—Ayurveda, yoga and naturopathy, Unani, Siddha (a variant of Ayurveda), and homeopathy and sowa rigpa. Due to the size and population of India, modern medical facilities are not available in all parts of the country.

In the remote regions of India where modern healthcare facilities are unavailable, people seek out and use traditional systems of medicine for all health conditions. India does not have the requisite manpower and medical professionals to address a problem of this scale and magnitude. Even where modern healthcare facilities exist, only 600,000 active practitioners of modern medicine cannot attend to all health needs of the people and also give special attention to diabetes (Indian Medical Council Press Release, 2013, enclosed as Appendix E).

The Ministry of Health & Family Welfare of the Indian government has a full-fledged wing called the Department of AYUSH to regulate and promote the working of these systems (http://indianmedicine.nic.in). In addition to the five main alternative health traditions, there are others, such as Tibetan medicine and other herbal schools of medicine, which are practiced in different parts of the country. In 2013, the Indian Government added Sowa-Rigpa (also called Amchi) system of medicine under the ambit of recognized traditional systems of medicine, AYUSH. With the addition of Sowa-Rigpa, AYUSH now has six traditional systems of medicine. Despite the presence of an impressive array of alternative health traditions, there has been little effort in India to make the various schools of medicine work collectively and/or in unison to help contain India's diabetes emerging pandemic. This strategic gap was well confirmed in the search and review of the scholarly literature on the subject. The available scholarly work alludes to the potential of modern and traditional systems such as Ayurveda working together with modern medicine (Rastogi, 2010).

There has been insufficient effort to enlist the support of traditional systems for combating or addressing the public health challenge posed by emerging pandemics such as diabetes, despite wide practice and penetration of traditional medical systems in India. While there is no scientific study to establish the extent of penetration of AYUSH services in India, the media estimates that 70% of Indians use AYUSH products and solutions for their primary health needs (Public Broadcasting Service, 2011). Detailed scrutiny of scientific literature has brought out that the potential benefits of such a collaborative and complementary approach have been neither evaluated nor tried in any significant structured manner. This study has attempted to fill a crucial gap in the scholarly literature by investigating the desirability, feasibility, and potentiality of a collaborative approach in addressing the challenge of diabetes in India.

Statement of the Problem

Epigenetics and lifestyle are conspiring to inflict a massive epidemic of Type 2 diabetes in the subcontinent (Shetty, 2012). The Indian government and public health officials acknowledge the scale of diabetes problem in the country but have been slow in implementing measures and initiatives to remedy the situation. In July 2010, the Indian government launched a USD 230 million program for mass screening of Indians for noncommunicable diseases such as diabetes. At the launch event, the Indian Federal Minister of Health announced that 200 million Indians over the age of 30 would be screened for diabetes in the first year. Soon after the launch event, the announced target was promptly reduced to 70 million. The actual number of people screened as per Indian

news-press was estimated to be less than 20% of the reduced target (Ministry of Health and Family Welfare, 2012).

The crux of the problem is that many of the medical professionals needed to execute a program of this scale are not there. As per government records, only 693 medical officers out of a targeted 32,000 were trained in the rapid diabetes-screening program. While the availability of medical professionals in urban India is a lesser challenge, the problem in rural areas is nearly impossible to overcome (Ministry of Health and Family Welfare, 2012). A review of the program revealed that ordinary citizens were trained to implement the program. The initiatives are being well supported by private voluntary groups. Sucre Blue, a Bangalore-based nongovernmental organization, started a self-empowerment campaign and trained ordinary residents in two villages outside the city of Bangalore to screen other villagers. Sucre Blue volunteers were shocked to find prevalence rates of diabetes approaching a third of all adults (Bergen, 2013).

The current methodology and resources deployed to contain the diabetes emerging pandemic in India are inadequate and have not delivered the desired results. These results are well beyond the capability and reach of the 600,000 active practitioners of modern medicine (Indian Medical Council Press Release, 2013, enclosed as Appendix E), as diabetes is just one among the many diseases they seek to remedy in the large number of patients they see every day. Emergency, trauma, and acute conditions get precedence over chronic conditions in allocating medical manpower (Bergen, 2013). The patient-physician ratio of 1 doctor for 2,000 patients admitted by the Indian Government

is deficient for providing acceptable-quality healthcare. The modern medicine healthcare system in India does not have the requisite manpower and medical professionals to address a problem of this scale and magnitude.

India also has a matching number of practitioners of AYUSH. I have researched the premise that if traditional and modern systems of medicine joined forces to address the emerging diabetes pandemic, there could be a significant improvement in health outcomes. According to the Department of AYUSH, there are 750,000 practitioners of AYUSH in the country (Appendix D). With the support of traditional medical professionals of AYUSH, the manpower available to tackle the problem of diabetes more than doubles, and the goal becomes more achievable. Presently, both the modern and traditional schools of medicine work independently of each other, but with their joint and collaborative skills, the patient community could greatly benefit.

The challenge posed by diabetes in India needs synergistic effort and a compassionate and cohesive integrative approach. With 600,000 practitioners of modern medicine and a matching, if not larger, number of practitioners of traditional medicine who serve a population of 1.2 billion people, India is ill equipped to provide adequate and basic healthcare to its people (Appendices D & E). India needs a composite and integrated healthcare approach. Through this case study, I explored the possibility and feasibility of a unified and integrative strategy that combines the skills and outreach of traditional and modern medicine to address the emerging diabetes pandemic in India.

Purpose of the Study

The purpose of this study was to assess the practicability of using an integrative

approach as a potential solution for India's emerging diabetes pandemic. The case for the study was the emerging pandemic of diabetes in India and the possibility of using an integrative approach to meet the challenge posed by the emerging pandemic of diabetes. The scale and enormity of the task posed by diabetes in India possibly warrants an integrative and complementary role for modern and traditional systems of medicine like AYUSH. The case study approach was most appropriate for the study of the emerging diabetes pandemic in India. Yin (2009) describes case study as "an empirical enquiry about a contemporary phenomenon set within its real-world context—especially when the boundaries between phenomenon and context are not clearly evident" (p. 18).

The proposed solution investigated in the case study involved a collaborative and integrative role for the modern and traditional systems of medicine in addressing the challenge of diabetes in India. The traditional systems of medicine are widely accessed in India and offer both an economical and an alternative solution (Public Broadcasting Service, 2011). Through this study, I investigated the rationale and desirability of using an integrative approach to address the emerging diabetes pandemic in India. The study was an effort to fill a significant existing gap in scholarly literature on the subject of using an integrative approach to address diabetes. The findings of the study could potentially add value and significance to knowledge for the containment of diabetes in India.

Research Questions

The two research questions addressed in this dissertation were the following:

1. How can the modern and traditional medicine approaches be jointly deployed

to contain the spread, scale, and immensity of the emerging diabetes pandemic in India?

2. What are the challenges and barriers of combining the methodologies propounded by traditional systems (AYUSH) with those of modern medicine in containing diabetes?

The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic. With this purpose, I also used interviews to obtain information on strategies for containment of diabetes from all major traditions of medicine practiced in India. The interview process included both the modern medicine and traditional medicine streams. The objective, as stated above, was to combine the researched findings of interviews with traditional and modern systems to explore the possibility of a unified, complementary, and integrative approach to the containment and management of diabetes. The explanatory questions of *what* and *how* are best answered using the case study approach.

Nature of Study

Theoretical Framework

The above-stated research questions were studied using the qualitative research methodology. The qualitative research design was the most appropriate for answering the research questions of this nature because an understanding of community psyche was essential to explore the subject of study in the dissertation. Quantitative and mixed methods would not have been as appropriate because this study was not just about cold numbers and trends analysis but was an in-depth analysis of the new possibilities to arrest

the emerging pandemic growth of diabetes in India.

As this research was conducted in an attempt to generate an action agenda, the involvement of healthcare providers and policy makers as key stakeholders was essential. The most appropriate theoretical framework selected to address the phenomenon of diabetes was participatory action research, as the research involved the participation of all stakeholders. McCutcheon and Jurg (1990) posited that action research is systematic inquiry that is collective, collaborative, self-reflective, and critical and that is undertaken by the participants (McCutcheon & Jurg, 1990). The research involved intensive interaction with practitioners of modern medicine and practitioners of traditional systems AYUSH to obtain the requisite information; thus, the nature of the study made it appropriate for the participatory action research framework. In this study, I investigated whether collaboration and interaction between practitioners of different systems will enhance and improve the knowledge of all involved as well as lead to actions of change and provide concrete solutions to the prevention and treatment of diabetes.

Diabetes is both a social and a medical phenomenon (Oregon Strategic Plan, 2008). To understand the issue of diabetes in India, I used the case study research approach. “Case study research involves the study of an issue explored through one or more cases within a bounded system,” (Creswell, 2007, p. 73). A unique situation exists in India, as it is home to several indigenous and indigenized foreign systems of medicine. It is necessary to address and arrest the growing incidence of diabetes in this country. All case study research starts with the same compelling feature: the desire to derive an in-depth understanding of a single or small number of “cases,” set in their real-world

contexts (Bromley, 1986, p. 1). The solution of the case examined in this study was the feasibility and challenges of deploying an integrative approach to address the challenge posed by India's emerging diabetes pandemic. The constituent systems of AYUSH and modern medicine were the key components of the participatory action research design.

The tools for data collection in this study were observation, interviews, and review of available research and policy documents. Observation and interview form the basis of qualitative research (Creswell, 2007). Detailed interaction with medical practitioners of different traditions helped in generating the requisite information and data for analysis of the research questions. The process of interviews constitutes the core of qualitative methodology (Creswell, 2007). This research involved analysis of information and data from medical practitioners (both modern medicine and traditional AYUSH practitioners). An in-depth investigation into guidance of process, diet, and lifestyle for averting chronic noncommunicable diseases such as diabetes was best addressed using qualitative methods of investigation. I conducted interviews with a select group of medical practitioners from different schools and traditions of medicine, as well as policy experts. The collaborative efforts, skills, and experiences of the medical practitioners enriched the body of information regarding the possible role of an integrative approach to managing diabetes. It also emerged that collaborative and innovative integrative processes could be effectively used for the detection, prevention, and management of diabetes. The collaborative and inclusive approach emerging out of the process of participatory action research helped to establish a case for usage of an integrative

approach combining modern medicine methods and traditional Indian medicine methods to prevent and contain diabetes.

Research Methodology

The qualitative data for this study came from three sources.

1. A search of scholarly literature and policy documents on diabetes in modern medicine and in traditional medical systems (AYUSH).
2. Structured interviews with 30 medical practitioners: five physicians from modern medicine and five medical practitioners from each of the AYUSH traditions: Ayurveda, yoga and naturopathy, unani, siddha, and homeopathy.
3. Structured interviews with six public health policy planners and health administrators.

The 36 interview responses provided the data saturation necessary to obtain answers to the research questions. The interviews were conducted after obtaining all required permissions and approvals. Interviews were recorded when so allowed and transcribed using appropriate tools and software to create a comprehensive information base. The qualitative data collected from observations and interviews were analyzed to find answers to all the research questions. The analyzed data were also used to create a summary of methods for containment of diabetes propounded by the modern and traditional schools of medicine.

Definitions

The definitions of various terms used in this dissertation are provided below. *AYUSH* is the acronym used by the Government of India to refer collectively to the major

streams of traditional medicine practiced in India. The acronym AYUSH expands into Ayurveda, yoga-naturopathy, unani, siddha, and homeopathy. Very recently, Sowa-Rigpa was added to the purview of AYUSH.

Ayurveda: Literally means "the art and science of living." Life in Ayurveda is conceived as the union of body, senses, mind and soul. The living man is a conglomeration of three humors (*Vata, Pitta,* and *Kapha*—air, fire, and water); seven basic tissues (*Rasa*—juice, *Rakta*—blood, *Mansa*—flesh, *Meda*—plasma, *Asthi*—bone, *Majja*—tissue, and *Shukra*—semen); and the waste products of the body such as feces, urine, and sweat. Thus, the total body matrix consists of the humors, the tissues, and the waste products of the body. The growth and decay of this body matrix and its constituents revolve around food, which gets processed into humors, tissues, and wastes. Ingestion, digestion, absorption, assimilation, and metabolism of food have interplay in health and disease, which is significantly affected by psychological mechanisms as well as by bio-fire (*Agni)*; (Ministry of Health and Family Welfare, India, 2011).

Gestational diabetes mellitus (GDM): Glucose intolerance with onset or first recognition during pregnancy. GDM affects at least 1 in 25 pregnancies globally. Undiagnosed or inadequately treated GDM can lead to larger than normal babies and higher rates of maternal and infant deaths and fetal abnormalities. Women with GDM and the offspring of GDM pregnancies are at increased risk of developing Type 2 diabetes (IDF, 2011). The three types of diabetes are depicted in the figure on the next page, which also highlights the fact that nearly 46% of people with Type 2 diabetes remain unaware of the reality of their medical condition.

HbA1c: Refers to the *glycated* or *glycosylated hemoglobin test*, which is an accepted gold standard pathological measure of average levels of blood sugar over a 90-day period. Glucose in the bloodstream sticks to the red cells hemoglobin to make a "glycosylated hemoglobin" molecule, called *hemoglobin A1c* or *HbA1c*. The more glucose in the blood, the more hemoglobin A1c or HbA1c will be present in the blood. Red cells live for 8-12 weeks before they are replaced. Measuring the HbA1c reveals the increase in blood glucose levels over a period of 8-12 weeks. A normal nondiabetic HbA1c is 3.5-5.7%. This is used as a confirmatory test to establish the presence or absence of diabetes in patients (ADA, 2012). The pathology and physiology of HbA1c are explained in the IDF diagram below, whereby the measure is able to capture the average blood glucose content for the 90-day period.

Homeopathy: The word *homoeopathy* is derived from two Greek words, *homois* meaning "similar" and *pathos* meaning "suffering." Homoeopathy simply means treating diseases with remedies, prescribed in minute doses, which are capable of producing symptoms similar to the disease when taken by healthy people. It is based on the natural law of healing—*Similia Similibus Curantur*, which means "likes are cured by likes." It was given a scientific basis by Dr. Samuel Hahnemann (1755-1843) in the early 19th century (Ministry of Health and Family Welfare, India, 2011).

Integrative: Refers to a medical approach that combines best practices and learnings from multiple medical traditions. In the context of this study, *integrative approach* refers to an approach that seeks to combine modern medicine with traditional schools of medicine (AYUSH).

Naturopathy: A system of living in harmony with the constructive principles of nature on physical, mental, moral, and spiritual planes of living. It has great health-promoting, disease-preventive, curative, and restorative potential. According to the manifesto of the British Naturopathic Association, "Naturopathy is a system of treatment which recognizes the existence of the vital curative force within the body." It therefore advocates aiding the human system to remove the cause of disease (i.e., toxins) by expelling the unwanted and unused matters from human body for curing diseases (Ministry of Health and Family Welfare, India, 2011).

Siddha: Describes the human body as a replica of the universe, as are food and drugs, irrespective of their origin. Like Ayurveda, this system involves the belief that all objects in the universe, including the human body, are composed of five basic elements: earth, water, fire, air, and sky. The food that the human body takes and the drugs it uses are all made of these five elements. The proportions of the elements present in the drugs vary, and their preponderance or otherwise is responsible for certain actions and therapeutic results (Ministry of Health and Family Welfare, India, 2011).

Sowa-Rigpa: This system of medicine is based on the principles of *Jung-wa-nga* (five elements) and *Ngepa-Sum* (three flaws of the body). Bodies of all the living beings and nonliving objects of the universe are composed of Jung-wa-nga; Sa, Chu, Me, Lung, and Nam-kha (earth, water, fire, wind and ether). The physiology, pathology, pharmacology, and metria-medica of this system are established on these theories. The human body is composed of these five cosmo physical elements of Jung-wa-nga; when the proportion of these elements is in imbalance in the body, disorder results. The

medicine and diet used for the treatment of disorders are also composed of the same five basic elements. In the body, these elements are present in the form of *Ngepa-Sum (Tri-dosa) Lus-sung-dun (Sapta Dhatu)*, and *Dri-ma-Sum* (Ministry of Health and Family Welfare, India, 2011). Sowa-Rigpa equates good health with a high level of energy and recognizes diet, behavior, and forms of medicine and external intervention as its pillars. This approach is consistent with the philosophy of other AYUSH traditions.

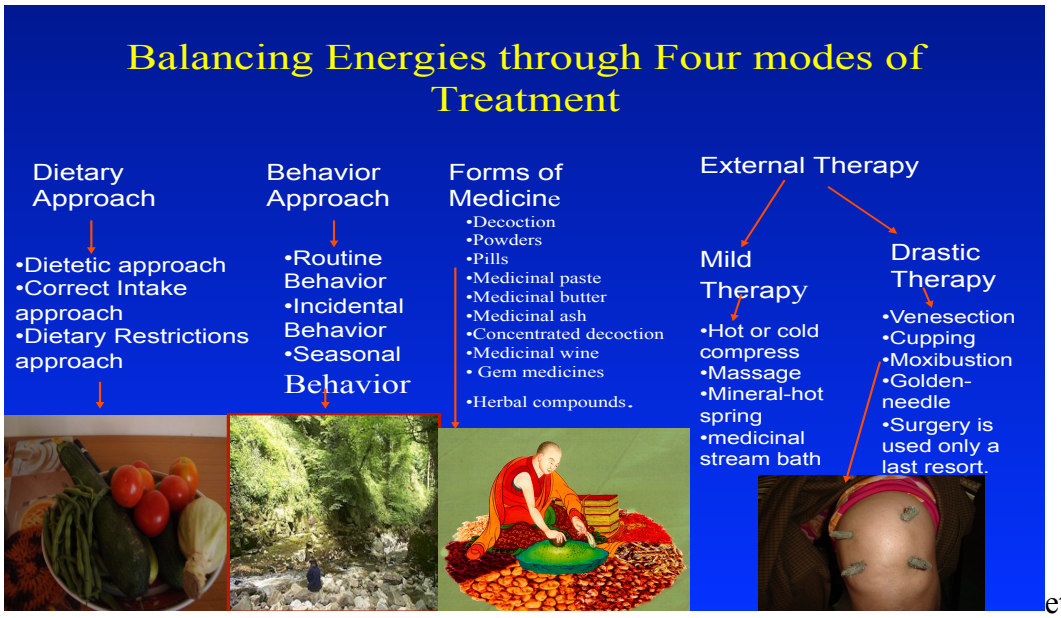

Figure 4. Tibetan health system. From presentation at the Congress of Traditional Asian Medicine, by T. Kalsang, 2013, Dharamsala, India.

Type 1 diabetes: An autoimmune disease that destroys the insulin-producing cells of the pancreas. It accounts for 3-5% of all diabetes globally. It most commonly develops in children and young adults but can occur at any age. People with Type 1 diabetes are always dependent on insulin injections or pumps for survival. There is as yet no proven widely available therapy to prevent or cure Type 1 diabetes (IDF, 2011).

Type 2 diabetes: Occurs due to a combination of insulin resistance and insulin deficiency. It accounts for 95% or more of all diabetes globally. It most commonly occurs in middle-aged and older people but increasingly affects overweight children, adolescents, and young adults. It is particularly affecting people in the productive years of the life cycle. People with Type 2 diabetes are usually treated with oral medication. Many also require insulin injections, depending upon the extent of disease in the body. It can be prevented or significantly delayed by simple and cost-effective interventions. There is no known permanent cure for Type 2 diabetes as of now (IDF, 2011).

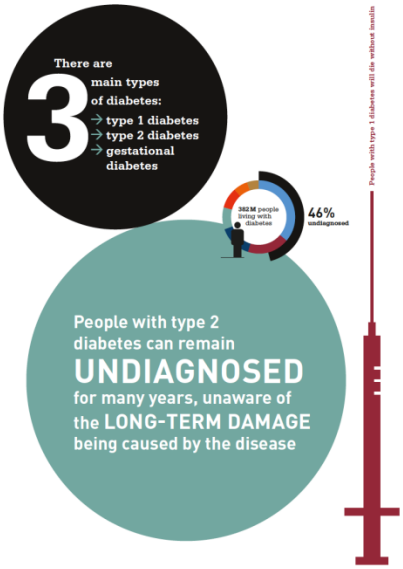

Figure 5. Three types of diabetes. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites/default /files/ The_Global_Burden.pdf

Unani: A system of medicine based on the underlying science of *Tibb*. This system describes the various states of body, in health and when not in health, and the means by which health is likely to be lost and, when lost, is likely to be restored. The Unani system

is based upon the four-humor theory of Hippocrates. This presupposes the presence of four humors in the body: blood, phlegm, yellow bile, and black bile. The Unani system considers the human body to be made up of the following seven components: *Arkan* (elements), *Mizaj* (temperament), *Akhlat* (humors), *Aaza* (organs), *Arwah* (spirits), *Quwa* (faculties), and *Afaal* (functions). (Ministry of Health and Family Welfare, India, 2011).

Yoga: A discipline to improve or develop one's inherent power in a balanced manner. It offers the means to attain complete self-realization. The literal meaning of the Sanskrit word *yoga* is "yoke." Yoga can therefore be defined as a means of uniting the individual spirit with the universal spirit of God. According to Sage Patanjali (believed to be the first proponent of yoga), yoga is the harnessing of modifications of the mind to create a harmony and union of body, mind, and spirit. Yoga and yogic processes have been used as an effective medium for prevention of disease and treatment of certain kinds of diseases.

Assumptions

In this study, I made three principal assumptions. The first assumption was that the urgency to address the emerging diabetes pandemic in India was widely shared by policy planners and medical professionals. The second assumption was that among the key stakeholders, there was a desire and openness to look at new and different approaches to successfully addressing the challenge posed by the emerging diabetes pandemic. The third assumption was that there was candidness on part of practitioners of both streams of medicine, modern and traditional, to consider the hypothesis that it may be possible to work together for the larger good of the community and that an integrative

approach might be feasible and practical to achieve certain predefined results or expectations. During the course of interviews and analysis of data, all three assumptions were fully validated.

Limitations

The primary limitation of this study was that the conclusions were drawn from interaction and interviews with a relatively small participant pool of 30 medical professionals and six policy planners. Small sample size is an inherent limitation of the qualitative research methodology. As the sole interviewer and data analyst, my bias could have been, in theory, a limiting factor. The third limitation of the study was that it excluded the newest member of AYUSH, Sowa-Rigpa, as enough information on this stream of AYUSH was not yet available. During the process of literature review, I also found that guiding principles of Sowa-Rigpa were similar to Ayurveda, and I have brought this out in later chapters of this study. To the best of my knowledge and belief, none of the three limitations impacted the robustness of the process of research and analysis and/or conclusions of the study.

Scope and Delimitations

In the study, I focused on the key influencers of diabetes—namely, medical professionals and the policy planners. Though the sample size was small, the key perceptions of the participants were convincingly captured through interviews and observation to generate rich data to draw appropriate conclusions. The key delimitation strategy was to vigilantly abstain from any form of bias. To enlist participation of physicians and policy planners, I sought their informed consent prior to conducting the

interviews. The case study approach helped to create the building blocks for a larger consensus on the benefits of this approach.

Significance of the Study

The significance of this study lay in proposing a case for using an integrative approach to address the phenomenon of diabetes in present-day India. The case study became an inquiry to understand the phenomenon and challenges of the emerging diabetes pandemic in India. The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic.

The findings from this research study have the potential to make meaningful contributions both to the body of knowledge and to its application. Research should contain an action agenda for reform and change (Creswell, 2007). The significance of this study was in its potential to initiate action and change. During the course of research, I realized that the proposed joint participation of healthcare practitioners and policy makers had resulted in a useful dialog between and among the key stakeholders. By evaluating the feasibility and practicability of co-engagement of the modern and traditional streams of medicine, this study created the potential to initiate a synergistic approach between and among various schools and traditions of medicine for the greater wellbeing of the patient population. This study resulted in enrichment of knowledge in the area of collaborative and integrative medicine. The literature search during the period of this study did not bring out any scholarly papers whose authors had studied or recommended an integrative approach as a possible solution for the containment of diabetes in India or the world.

In its 10-year Global Diabetes Plan for the period 2011-2021, IDF opened the discussion on improving health outcomes of people with diabetes with the following statement: “Diabetes causes immeasurable personal suffering and costs to society and slows human and economic development. Complications are not inevitable. We know what to do—the time to act is now” (IDF, 2011, p. 10). In the same document, IDF identified three outcomes that could be used to measure the success of any diabetes-related initiatives. Per IDF (2011), the first desirable outcome of any such initiative should be that people with diabetes should have greater access to essential medicines, technologies, and help. The second desirable outcome is that the initiative should benefit people with impaired glucose intolerance who run the risk of becoming diabetic.

The third desirable outcome identified by IDF is that all comorbidities in people with diabetes are properly diagnosed and treated. The conclusions of this study have successfully contributed to all the three identified outcomes. The first contribution was that it successfully added to the body of knowledge regarding control and management of diabetes by drawing attention to tips and solutions from other medical traditions. The proposed collaborative framework of modern and traditional streams of medicine championed by this study may lead to the availability of a larger pool of medical resources to diagnose and treat the patient population. The increased access to the joint medical pool might eventually help all three types of people—people with prediabetes symptoms, people with diabetes, and people with comorbidities of diabetes.

The conclusions of the study sow the seeds for initiating positive social change. First, the study created a body of information, which, if implemented, can increase

medical touch points for patients. Medical practitioners of different traditions, according to the interviews and findings, may be able to communicate key preventative measures regarding diabetes to the patients they see. Second, the study created the potential to successfully draw the attention of policy administrators to align and fine-tune policy initiatives that may result in wider and beneficial implications for a society that is battling the scourge of diabetes. Third, the study may help stakeholders to suggest integrative, wholesome and affordable approaches to preventing the incidence of diabetes and possibly other forms of noncommunicable disease in the future.

The social change factors of this study will arise from the acceptance of traditional medicine by people, practitioners, policy makers, and society at large. The more inclusive medical engagement of various traditions might receive wider support both from the state and the society. This study compiles basic information on prevention and management of diabetes from both streams of physicians (modern and traditional medicine) and public health policy administrators. The study adds to the body of knowledge and initiates the process of further research. The study may lead to positive social change, both in the public health scenario and in the lives of individuals and communities. Collaborative efforts in the future might lead to joint clinical trials to validate the efficacy of traditional methods and medicines, which, in turn, may inspire greater confidence in their usage and ensure better quality of products and services that will benefit the patient community in India and the world.

This research has the potential of causing positive social change in the lives of people by highlighting well-researched modes of diet and lifestyle changes as

championed by various medical traditions (Hu, Wallace, & Tesh, 2010). Innovative ways of prevention and containment of diabetes will save valuable socioeconomic resources in the large developing economy of India (Shetty, 2012). IDF (2011) is of the view that diabetes is not only a health crisis, but also a global societal catastrophe. Governments worldwide are struggling to meet the cost of diabetes care. Costs to employers and national economies are escalating, and every day, low-income families are being driven into poverty by loss of earnings due to diabetes and the lifelong costs of healthcare (IDF, 2011).

Summary

The findings of this study may lead the medical research councils of all traditions of medicine to issue an advisory that medical practitioners should take a few moments to talk about the risk factors of diabetes to all patients. This is a powerful recommendation that arose from the interview process. WHO (2010) has reported that India has 15% of the world's population and carries 20% of the global burden of diseases. Diabetes forms a significant component of this burden. Diabetes also leads to other degenerative health conditions. India's pool of 600,000 practicing doctors from the modern medicine stream is inadequate to meet the health needs of 1.2 billion people. A large number of Indians access health services provided by a similar number (750,000) of AYUSH practitioners in the country. The two work independently of each other. India's annual spending on management of diabetes is less than USD 5 billion (Ministry of Health and Family Welfare, 2011). The projection of diabetes as a ticking time bomb is a grim but true description (Shetty, 2012).

In this study, the possibility of combining the outreach of both the modern and traditional streams of medicine to contain an emerging pandemic of diabetes was explored. The qualitative research of this study established the feasibility of this proposition and looked at challenges as well as solutions that could make this process work for the larger good of the country and its health needs. The joint efforts of medical practitioners of various streams and policy makers, as inspired by this study, may lead to the action of change as suggested in the framework of participatory action research.

By maximizing the possibilities of timely detection and treatment of diabetes, the findings of this study may also help many people with diabetes avoid the comorbidities and health complications that follow untreated diabetes in tow.

Chapter 2: Literature Review

Introduction

The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic. Diabetes is acknowledged as a formidable public health challenge both in India and the rest of the world. The increased prevalence and the current methods of prevention are unable to contain the rate of growth among the large numbers of people with impaired glucose intolerance (prediabetics). The impact of diabetes is felt globally. Both developing and developed countries are struggling to come to terms with the many dimensions of this disease. The top 10 countries with diabetic populations include both developing and developed nations, as can be seen in the figure below. Three of world's richest countries—namely, the United States, Japan, and Germany—also appear in the list of the top 10 nations with diabetic people, together with highly populated countries such as China, India, and Indonesia.

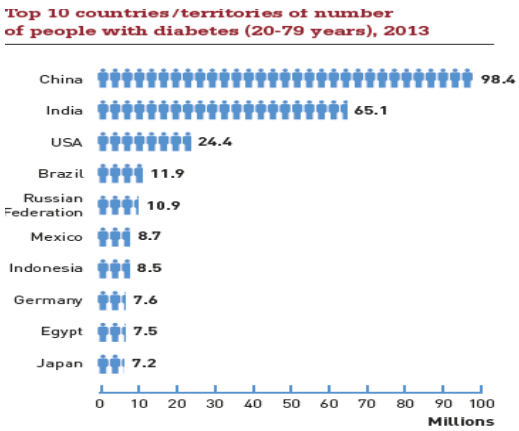

Figure 6. People with diabetes: Top 10 countries. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites/default /files/ The_Global_Burden.pdf

The literature reviewed revealed the magnitude of the problem created by the continuing rapid growth of diabetes. Diabetes has been described as a pandemic or a ticking time bomb by researchers, authors, and scholars. The stated position of IDF (2011) is that 95% of the total incidence of diabetes is both preventable and avoidable. The purpose of this study was to examine the feasibility, desirability, and challenges of combining the methods and outreach of modern medicine and traditional medicine to address the emerging pandemic of diabetes in India. Diabetes is a challenge not just for India, but also for the entire world.

Data provided by the American Diabetes Association (ADA; 2013) and the World Health Organization (WHO, 2010) reveal that approximately 24.4 million or 11.3% of the U.S. population over the age of 20 years has diabetes—diagnosed or undiagnosed. The economic cost of managing diabetes in the United States in the year 2013 was USD 245 billion (ADA, 2013). While this might be less than 10% of U.S. annual health spending, it sets a context for the magnitude of the challenge in developing countries such as India. India's total healthcare spending is USD 65 billion, and its diabetic population is 2.5 times larger than that of the United States (IDF, 2013). The IDF (2011) has categorically stated, "Diabetes is at crisis levels. We cannot afford to delay action any longer; the human misery and suffering caused by diabetes is unacceptable and unsustainable" (p. 1).

The IDF (2011) has reported that there is compelling evidence in both developed and developing countries to suggest that both diabetes and complications of diabetes can be successfully addressed with timely and proper screening, diagnosis, and treatment

(IDF, 2011). The evidence in the reviewed scholarly literature reinforces the importance of timely medical intervention and guidance. In countries or situations where this possibility is delayed or denied to all or a section of people, the situation has resulted in an increasing number of people with diabetes. Alam, Speed, and Beaver (2012) examined the status of diabetic British nationals of Bangladeshi descent living in the United Kingdom and found that the Bangladeshi community possibly experienced some of the weakest diabetes-related health outcomes in the United Kingdom.

Alam et al. (2012) found that not much was known about the experiences and preferences of British Bangladeshi settlers in accessing locally available diabetes healthcare information and services. The group of people studied by Alam et al. did not benefit from the available services or even have awareness of the existence of those services in the United Kingdom. The conclusions reached by Alam et al. related to four popular domains of health access: availability of health services, use of health services, outcomes of health services, and perception of equity by the patient population. All of these domains are important to make a visible difference to verify the success of remedies to beneficially influence the pace of growth of diabetes.

The literature search strategy used for reviewing scholarly literature is discussed in detail later in this chapter. This is followed by explanation of theoretical foundations used in the dissertation. The theoretical foundation dovetails into a review of the conceptual framework that was used in my research. This is followed by a review of scholarly literature related to key variables and concepts before the chapter concludes with a summary of key points.

Literature Review Strategy

The literature search was done on major medical and health search engines including PubMed, EBSCO, High Wire Press, ProQuest Health, Sage, MEDLINE and Cumulative Index to Nursing and Allied Health (CINAHL). The strings that were searched were *diabetes*, *diabetes pandemic*, *diabetes research*, *diabetes lifecycle*, *diabetes challenges*, *diabetes in India*, *diabetes in developing world*, *alternative ways of addressing diabetes*, *traditional medicine and diabetes*, *Ayurveda and diabetes*, *yoga and diabetes*, *Siddha and diabetes*, *Unani and diabetes*, *homeopathy and diabetes*, *naturopathy and diabetes*, *Rigpa and diabetes*, *modern and traditional medicine and diabetes*, *phenomenological approach in medicine/health research*, and *participatory action research in medicine/health*. The 108 research papers that were selected after the search process were carefully reviewed. A wide cross-section of the reviewed papers has been presented in terms of their points of connection and differences with the theme of this dissertation.

The reviewed literature was from all parts of the world and covered a wide gamut of issues related to the disease and its medical, preventive, and educational dimensions. It was found that while the research community had studied a large number of problems related to diabetes globally, it had not yet studied or commented upon the possibility of combining the outreach and capacity of modern and traditional systems of medicine to combat diabetes. The possibilities of using an integrative approach combining modern and traditional medicines had not yet been addressed in the literature available in print and electronically. That made the subject of research of this dissertation of topical interest

and relevant, given the gravity of the challenge posed by diabetes in India and the rest of the world.

Theoretical Foundation

Health and medical researchers explore a wide range of scholarly pursuits and use various types of theoretical frameworks for research design. The success of research lies in using the most appropriate theoretical framework relevant to the problem and scope of research. Depending upon the problem being researched, researchers may seek to derive their concepts from Maslow's humanism and social hierarchy, Durkheim's functionalism, Weber's empiricism, Lewin's participatory action, Merton's goal-means gap theory, Kuhn's symbolic interactionism, Bandura's social cognitive research, or Garfinkel's ethnomethodology (Franzoi, 2006).

The theoretical foundation selected for this study was participatory action research. Participatory action research (PAR) is the theory of choice for research that involves community residents, key influencers, clients, and other constituents in research plans that are intended to lead to social change (Kemmis, 1980). It is used when participants work with an anchor or a research facilitator to identify a common problem, develop research methodology, collect data, and analyze findings. In participatory action research, the data collected provide valuable cues to the researchers, and the data are often used to design recommendations as to how the problem should be addressed, analyzed, and resolved. In many situations involving participatory research, the participants lobby for or support a case for funding, legislation, or government action to adopt and publicize the findings. Participatory action research maximizes the likelihood

that the resulting program or intervention will meet the broader needs of key stakeholders and be appropriate for the prevailing conditions and environment, leading to action and change.

The rationale for participatory action research finds support in the powerful concept of paradigm introduced by Kuhn (1996). Kuhn defined paradigm as a combination of two characteristics— the phenomenon (a) is attractive enough to engage peer attention and (b) is open enough to "assimilate enrichments and improvements" (Kuhn, 1996, e-location 285 of 3697). Referring to the development of science, Kuhn said that transitions from one paradigm to another via revolution lead to mature science. Kuhn conceded that reaching or attaining consensus in science can be difficult or even illusive. He also contended that no scientific concept can possibly answer all questions or explain all facts. Kuhn saw an interactive integrative process at work in science. A single problem or scientific theme is viewed and addressed differently by different branches of science (Kuhn, 1996). Kuhn further elaborated on the distinction between the process at work while solving problems and the process at work in creating something completely new.

Kuhn argued that discovery starts with awareness of an anomaly. He defined an *anomaly* as a situation in which a paradigm-induced expectation has been violated (Kuhn, 1996). Kuhn (1996) also reminded the reader that scientific discoveries and inventions are often greeted with suspicion and skepticism. He cited the example of the discovery of X-rays, which was treated by fellow scientists as a "hoax" (Kuhn, 1996, e-location 983 of 3697). Kuhn said that, in science, innovation emerges only with much effort and against

stiff resistance (Kuhn, 1996). Kuhn considered all scientific discoveries to be the result of a "paradigm change" (Kuhn, 1996, e-location 1057 of 3697). Crisis, said Kuhn, is a necessary precursor to innovative theories and development, which need to be useful for the society and community. In this study, I used the participatory action research theory to draw attention to the crisis of diabetes to initiate action for change in the healthcare system.

Lewin, who coined the term *action research*, stated,

> The research needed for social practice can best be characterized as research for social management or social engineering. It is a type of action research, a comparative research on the conditions and the effects of various forms of social action, and research leading to social action. Research that produces nothing but books will not survive. (Lewin, 1946, reproduced in Lewin 1948, pp. 202-203, Laureate Tutorial)

Jane Addams, the first female Nobel Prize winner, used her data collection methodology regarding social conditions to bring about social change. Her writings revealed the true usage of action research that leads to social change (Laureate Tutorial). In this study, I used participatory action research to explore the possibility of adapting an integrative approach combining modern and traditional methods of medicine to address the phenomenon of diabetes.

The use of the participatory action research framework helped me initiate active involvement and discussion within the community of medical practitioners and policymakers to find innovative ways of preventing and containing diabetes. The process

of interviews and discussions with medical practitioners brought out the need for medical consultations and intervention to become more patient oriented. Theorist Stringer, in explaining participatory action research, referred to the acquisition/production of knowledge as a collective process. This process, posited Stringer (2007), engages people who have previously been the subjects of research in the process of defining and redefining the study and the corpus of understanding. Stringer also stated that the stakes of participants are high if the subject of research relates to participants' community or organizational life. As people collectively analyze and investigate their own situation, stakeholders end up building a consensual vision of their life-world. "Community-based action research results not only in a collective vision but also in a sense of community. It operates at the intellectual level as well as at social, cultural, political, and emotional levels" (Stringer, 2007, p. 11).

Lewin is often considered the harbinger of the idea of participatory action research (PAR). In the book *Strategies of Qualitative Inquiry* and in a paper presented to the Annual Meeting of the Australian Association for Research in Education (Sydney, Australia, November 6-9, 1980), Kemmis described participatory action research as a theory that began with an "idea" attributed to social psychologist Lewin (1980). Lewin introduced this idea in the Tavistock Institute of Human Relations in the United Kingdom in 1933 and again in 1936. Lewin used the term to describe a form of research that could marry the experimental approach of social science with programs of social action in response to major social problems of the day. Through action research, Lewin argued, advances in theory and needed social change might simultaneously be achieved (Kemmis

& McTaggart, 1988).

Authors who have cited Lewin consider action research as consisting of analysis, fact-finding, conceptualization, planning, execution, and more fact-finding or evaluation (Kemmis & McTaggart, 1988). Kemmis & McTaggart (1988) restated that PAR, according to Lewin, entails planning a change, acting and observing the process and consequences of the change, reflecting on these processes and consequences, replanning, acting and observing again, and reflecting again. Collaboration is the key in PAR. The subjects of participatory action research undertake their research as a social practice. The object of participatory action research is social. Participatory action research is directed toward studying, reframing, and reconstructing social practices. Practices are constituted by social interaction between people.

Changing practices is a social process and has long-term consequences. Social change is initiated when one person changes so that others are obliged to react or respond differently to that individual's changed behavior. The willing and committed involvement of other segments of society is necessary to secure and legitimize the change. Participatory action research offers an opportunity to create forums in which people can join one another as coparticipants in the struggle to remake the practices in which they interact—forums in which rationality and democracy can be pursued together without an artificial separation (Kemmis & McTaggart, 1988).

Habermas (1984) described this process in terms of opening communicative space in his book *Theory of Communicative Action*. Participatory action research is a social process of collaborative learning realized by groups of people who join together in

changing the practices through which they interact in a shared social world in which they are impacted and influenced by each other's actions. Participatory action research involves the investigation of actual practices and not abstract practices. It involves learning about the real, material, concrete, and particular practices of particular people in particular places. Participatory action research differs from other forms of research in being more determined on changing practitioners' particular practices. Participatory action researchers may be interested in practices in general or in the abstract, but their principal concern is in changing practices (Denzin & Lincoln, 2007).

Senge and Scharmer (2006), in their essay on participative research, also praised the many benefits of using this approach in social science research where the desire is for wider community agreement. Senge separately also alluded to the benefits of participative research in situations where intense subject engagement is involved in his well-known book *The Fifth Discipline* (1990). The design for this study essentially sought to serve the larger good of the community through optimal use of scarce medical resources available in India. There are three weaknesses in the current medical system of India for optimal treatment of diabetes. First, there are insufficient medical professionals from the modern medicine domain to address the emerging pandemic of diabetes. Second, the available medical resources are not deployed optimally in a strategic manner for the management of disease. Third, no efforts have been made to combine the outreach of modern medicine stream with the traditional medicine stream to address the health problems of the India (Shetty, 2012).

Participatory action research is the method of choice when there is active and

interactive involvement of community residents and stakeholders in research oriented for social change. In participatory action research, the data are often used, as stated earlier, to make recommendations and policy corrections as to how the problem should be addressed and resolved. In the PAR mode of research, participants are also known to lobby for funding, legislation, or government action to adopt the findings. Participatory action research maximizes the likelihood that a resulting program or intervention will meet the needs of stakeholders and be culturally appropriate, using the four-step cycle created by Lewin (plan, act, observe, and reflect). Participatory action research is an ongoing process where stages of observing, planning, taking action, and evaluating the process that is taking place through reflection are recurring to bring about social change. The underlying objective of participatory action research is to bring social change through stakeholder engagement.

Participatory Action Research in Health Sciences

PAR has been used in health sciences research as a forerunner for social change. Researchers Carey and Smith, in their 1992 study, used a combination of qualitative and participative methods to design a research program to understand the phenomenon of HIV in their community. Carey and Smith (1992) evaluated a number of alternatives before selecting the participative method. Carey & Smith (1992) concluded that the participatory action research methods were of value in designing the program that would make the HIV research in their community more meaningful and impactful.

In the study by Brown et al., (2008) on urban health disparities participatory action research, the authors demonstrated the benefit of involving stakeholders in the

development of the hypothesis and its explanation. Khan, Vinayagam, Sekar, Palanivelu & Panchanandham (2012) used the participatory action research premise to demonstrate the antidiabetic and antioxidant effect of Semecarpus anacardium (nut milk extract) in a rat model. In another study, Gardner et al. (2011) used the participatory action research as the methodology to establish the beneficial effects of an innovative quality improvement process in remote parts of Australia and South Pacific.

Conceptual Framework

The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic. Diabetes is a phenomenon of grave consequences both for an individual and the community and a gigantic public health challenge. The intent of this study was to connect all the available medical professionals, modern and traditional, in the country's mainstream health system to enhance the outreach of medical services to people and improve health outcomes of diabetes. The underlying assumption was that the enhanced medical outreach would lead to more timely detection of diabetes and will either prevent its occurrence or help people manage the consequences of disease in a better manner. As a researcher, I explored the research questions using the participatory action research principles. I conducted intensive qualitative interviews with major stakeholders who had the influence and ability to initiate change in methods to address the challenge of diabetes.

The participatory action research ought to have a conceptual framework. (Coghlan, & Brannick, 2005). The conceptual framework used in this study is explained

below in a diagrammatic form. The diagram depicts the dynamic interplay of the forces and influences at work.

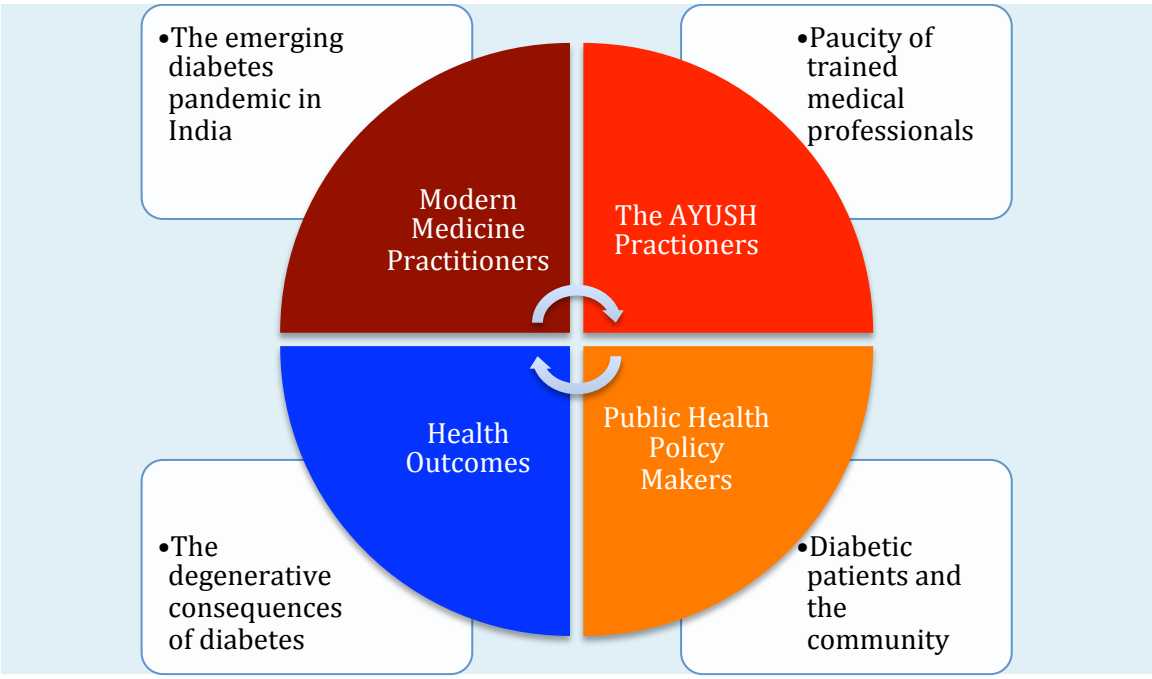

Figure 7. Anticipated outcomes of participatory engagement.

The outer squares represent the various dimensions of the problems and the inner circles represent the available potentially collaborative resources and outcomes.

Literature Review

In developing the framework and variables for this research study, a total of 108 scholarly research papers were reviewed. These research articles were from all parts of the world and addressed many dimensions of the challenge posed by diabetes in the contemporary world. While reviewing literature, I considered the following factors specifically: First, the resonating theme of the research alongside key learning's and messages; Second, the research methodology and theoretical framework chosen by the researchers; Third, the key connect points of the reviewed literature with the proposed

subject of this study; and lastly, the insights offered by the research in terms of challenges that were relevant to my study.

Five broad resonating themes from the literature reviewed were identified. The first theme was that diabetes is a complex multifactorial disease and much remains to be done in medical and scientific terms to explain its causation and find a permanent cure for the condition of various types of diabetes. The second theme was that the incidence of this disease is much larger than estimated because of extensive non-diagnosis in all parts of the world and non-inclusion of high-risk prediabetics in the count. The third theme was that diabetes is a life-changing phenomenon for the patient and the family and also the nation's healthcare system and therefore the educational and support needs of the patient and community need to be well provided. The fourth theme was that innovative solutions like the one proposed in this dissertation are well worth exploring to tackle the emerging pandemic of diabetes in India. The fifth theme was the potential benefits of using complementary systems of medicine to address diabetes. Literature supported the continued quest for breakthrough or disruptive methods and innovations to help tackle the challenge of emerging diabetes pandemic in India and the world.

The five themes from the reviewed literature are discussed in detail below and again in the later part of this study to relate the themes to the findings of my research.

Complex Multifactorial Disease, a Challenge Unmet to Date

Mannino and Sesti (2012) used individualized therapy for Type 2 diabetes mellitus (T2DM) and tried to summarize the current level of understanding of genetic polymorphisms of anti-diabetic treatment that tend to affect the responses of diabetes

patients and study subjects in the context of their own diabetic health condition. Mannino and Sesti opined that commonly used therapies in the management of T2DM include anti-hyperglycemic agents soon after the disease is diagnosed. The other commonly used lines of treatment include metformin, sulfonylureas/glinides, dipeptidyl peptidase-4 (DPP-IV) inhibitors, GLP1 mimetics, and thiazolidinediones. Mannino and Sesti (2012) argued that over time it has become abundantly clear that most diabetic patients do well to have more than one anti-diabetic drug. Mannino and Sesti (2012) also found and reported that there is considerable variation among individual responses to the administered pharmacologic line of treatment for diabetes. Mannino and Sesti (2012) built their argument by stating that proven and well-established lines of treatment produced different impact on different people because of genomic variations among patient population. Mannino and Sesti (2012) posited that the quest to discover genetic components that are capable of improving the effectiveness of treatment response continued to be a key objective of medical and scientific community.

The twofold objectives of drug development listed by Mannino and Sesti (2012) were treatment of the medical condition and avoidance of side effects and related complications. After an exhaustive review of literature, Mannino and Sesti (2012) concluded that relatively small number of genes and polymorphisms had been associated with changes in drug response and disposition and ingestion, or interaction with the target genes and peptides that are known to impact the diabetes in human body. Mannino and Sesti also found and reported that only few of the results were positive and in many cases the variability was high.

Researchers Cakan, Kizilbash, and Kamat in their seminal study published in 2012 in the *Journal of Clinical Pediatrics* brought out a very important trend that is challenging the commonly held view that Type 2 diabetes is an adult phenomena and Type 1 diabetes is a juvenile phenomenon that impacts only small children. Cakan et al. (2012) showed that the conventional history of diabetes among children is changing. The symptoms and characteristics that once were a hallmark of Type 1 diabetes were being increasingly seen in Type 2 diabetes and other forms of diabetes. Cakan et al. also showed the challenges of diagnosis and classification of diabetes faced even by experienced endocrinologists (2012). The Cakan et al. (2012) theme was that the classification of symptoms among various types of diabetes has become more complex and needs further scientific attention and support (2012).

Cakan et al. (2012) posited that the classification of diabetes was no longer a straightforward process and that the patient symptoms witnessed in insulin-dependent juvenile diabetes and insulin-independent adult diabetes were not as simple and straightforward any more. Cakan et al. (2012) argued that the initial classification of diabetes among children was based on the classical paradigm that sick patients with higher levels of glycated hemoglobin HbA1c and diabetes ketoacidosis represented Type 1 diabetes. Cakan et al. (2012) submitted that this paradigm does not stand the scrutiny of changing character of diabetes as applying old standards had started leading to growing incidence of misclassification. Cakan et al. (2012) also held that patients who are at the greatest risk of misclassification were those with Type 2 diabetes and high values of HbA1c and ketoacidosis. Cakan et al. (2012) showed that about 10% of the studied

patients were misclassified and concluded that the primary classification of diabetes may not necessarily be accurate and the clinical diagnostic data may not be a reliable determinant of the class or category of diabetes. This research may have far reaching consequences on detection and diagnostic process currently deployed for determining existence and classification of diabetes and thus its treatment.

Cakan et al. (2012) have added a new layer of complexity to the debate on diabetes. Cakan et al. posited that the popular distinction between Type 1 and Type 2 diabetes had developed complex overlaps and healthcare professionals did not see it as a straightforward distinction as it was in the past, any longer. The increased number of people with diabetes in India and the added complexity as revealed by Cakan et al. (2012), suggest that there is an urgent need to address overlapping complexity of Type 1 diabetes and Type 2 diabetes and adds to the Indian phenomenon of emerging diabetes pandemic. The integrative combination of the modern and traditional approaches to diabetes might have to factor in the concerns raised in the Cakan et al. (2012) research study. The distinction is critical to decide the line of treatment for the patient and to ensure targeted outcomes.

In their long duration diabetes study in The Netherlands, researchers Riet, et al. (2012) aimed at creating a research superstructure to gain deeper insights into risk factors of diabetes including the genomic determinants and biomarkers associated with diabetes. The Riet et al. (2012) study was based on a cohort of 7,000 Type 2 diabetes patients studied between the years 2009 and 2012. The study was very comprehensive as it covered all the medical centers attached to all eight universities in The Netherlands. The

study was a part of the string of pearl initiatives that was based on combining the strength and resources of all the universities and their medical facilities in the country. The methodology used in this study was an observational cohort study. The data collected for all participants included demographics, clinical parameters and health assessment topics including genome information for future research (2012).

As was seen in the longitudinal study of Donald et al. (2012) in Australia, the Riet et al. (2012) narration of the efforts made in The Netherlands reinforced the strength of argument that much remained to be done in understanding the entirety of the life cycle of diabetes. Long-term studies, such as the ones reported by Donald et al. (2012) and Riet et al. (2012) promised to bring more clarity to the lifecycle of diabetes and to map the progression of disease in the lives of patients. The outcomes of these long-term studies will be valuable for all countries including India that are continuously developing and fine-tuning their public health strategy to address the complex and multiple challenges posed by diabetes. Maull et al. (2012) in their review article based on conference proceedings of 2012 examined the views and research presentations of a large number of researchers and scholars to study possible correlation between diabetes and heavy metals in general and arsenic specifically. They reviewed the evidence both from human and animal studies. Of specific interest to Maull et al. (2012) were the data from countries where arsenic content in water is generally found to be present either in moderate or excessive quantities. The data reported in the study came from Bangladesh, Taiwan, Pakistan, Mexico, Turkey, Spain and United States (Maull et al. 2012).

Maull et al. (2012) found that there is credible though not conclusive evidence to suggest that there is some correlation between presence of arsenic in the body and onset of diabetes. Maull et al. (2012) suggested that the available evidence is adequate to inspire researchers from proceeding further to investigate the linkage between heavy metals and diabetes. The researchers posited that heavy metals could come in to human body either through water and food or through a host of other environmental factors including the air that we breathe. The authors also tried to distinguish between organic and inorganic arsenal. Maull et al. (2012) noted that marine life and thus marine food intake may be an important source for arsenic to find its way into human body. Maull et al. (2012) provided a detailed analysis of data generated from the large cohort study in Bangladesh where correlation arsenic and diabetes also factored in the water and food consumed by the cohort with possible arsenic content (2012).

There are many areas in the Indian subcontinent where water is reported to have arsenic content (Majumdar & Guha, 2012). In addition, the populations living along the several thousand miles coastline of Indian peninsula have fish and other marine foods as a staple for people residing in coastal areas (2012). If the hypothesis of linkage between intake of arsenic and onset of diabetes were validated (Maull et al., 2012), this factor would have significant implication on what India might need to do come to terms with the magnitude of challenge posed by the emerging diabetes pandemic. Separately, Kyizom, Singh, Singh, Tandon, & Kumar (2012) shared the research findings on role of diabetes in adversely impacting the central nervous system. Thus arsenic contaminated

water may cause diabetes (Maull, 2012) and a chronic diabetic condition runs the risk of damaging a patient's central nervous system (Kyizom et al., 2012).

Incidence of Diabetes, Larger Than Ever Estimated

In the study of British citizens of Bangladeshi descent, Alam et al.'s (2012) comments resonate very well with the subject of my research. The South Asian diaspora is genetically more prone to diabetes and therefore more vulnerable to the consequences of disease (2012). This combined with scarcity of resources makes a formidable challenge to meet in the entire developing world including India where diabetes has assumed the scale of an emerging pandemic. In a study protocol, published in the *Biomed Central Public Health* in 2012, Donald et al. declared the immensity and magnitude of the scourge of diabetes. Donald et al. (2012) described this as a major global challenge of public health in Australia and the rest of the world. Donald et al. also stated that diabetes presents a very significant disease burden and cost even in a developed country like Australia (2012). It was revealing to see that no part of the globe had escaped the incidence of diabetes. Jayawardena et al. (2012) in their meta-analysis on the incidence of diabetes in South Asia also concluded that the incidence of diabetes in the Indian subcontinent is significantly larger than estimated by public health authorities.

Researchers Skoro-Kondza et al. (2009) made similar assessment of diabetes in the United Kingdom. Skoro-Kondza et al. (2009) posited that Type 2 diabetes in the United Kingdom had reached epidemic proportions and both the cost and incidence are on continuous ascent. Bogner et al. (2012) in a study on the U.S. diabetic population reported the beneficial results of combining medication with educational inputs. The

patient group in this study had symptoms of depression, which was a much-observed co-morbidity for diabetics (2012). The patients who received educational guidance in the form of diet, lifestyle and motivation alongside medication showed much better compliance in going through the treatment at their homes. The role of education, motivation and counseling were very well proven and established in the study reported by Bogner, Morales, de Vries, & Cappola (2012).

Life-Changing Phenomena Seeking Support and Guidance

Donald et al. (2012) studied the overall picture of diabetes on a cohort of about 4,000 Australians in the Queensland region over a period of five years. The focus of the study designed by Donald et al. was on how people live and cope with the challenges posed by the disease. The first round of data collection on parameters listed below was done in 2008 with an annual round of data collected every year thereafter. The parameters measured by the researchers included demographics, lifestyle factors and health characteristics, and disease incidence, quality of life indicators, the emotional wellbeing of the patients, and the efforts made towards self-management of the disease. Donald et al. (2012) also measured the utilization of the healthcare resources provided in the region and the assessment of the patients towards quality of care. Donald et al. (2012) invited over 15,000 diabetes patients in Queensland that were enrolled with the National Diabetes Service Scheme to join this five-year study. The study invite was accepted by 29% of the invited patients. Though only a third of the patients participated in the study, the study provided high quality data to understand trends and patient

responses to this chronic disease. The authors (2012) validated the fact that 4.4% of the Australian population was diabetic.

Namak and Cremer in their 2012 review of four meta analyses collated the results of a number of studies that had sought to analyze the impact on diabetic health of patients who use self managed blood glucose (SMBG) devices at their homes. The authors concluded that patients who regularly use SMBG devices at home showed marginal improvement in their glycated hemoglobin levels versus the control group that did not use any self-monitoring devices (2012). Namak and Cremer (2012) also found that these benefits did not extend over a 12-month period though gains were seen in the 6 months horizon. The limitation of this meta-analysis was that data size was small and the research had to rely on tardy compliance in data reporting by the patient population.

The authors of the meta-analysis (2012) also showed that more frequent use of SMBG devices did not necessarily result in better results. So as not to contradict the guidelines established by the ADA, Namak and Crater (2012) summarized the current state of advisory.

The American Diabetes Association advocates SMBG as a guide for patients who use oral or medical nutrition therapies for diabetes. Patients should receive initial instruction in SMBG and routine follow-up evaluation of their technique and ability to use data to adjust therapy. The American Association of Clinical Endocrinologists (AACE) advises that SMBG can be initiated at the same time as medical therapy, lifestyle modification, specific diabetes education, or dietary consultation. If HbAlc levels are above target, the AACE recommends more frequent SMBG: preprandially, 2

hours postprandially, occasionally between 2 am and 3 am, during illness, or anytime a low glucose level is suspected (ADA, 2012).

Kosti and Kanakari in their 2012 study done in Greece evaluated the status and role of education in diabetic patients testing the hypothesis if levels of education about the disease impacted the health outcomes of the patients. Kosti and Kanakari (2012) posited that if patients are better informed of the causes, consequences, and preventative aspects of a health condition, they possibly have greater confidence and ability to manage that health condition. Kosti and Kanakari (2012) opined that diabetes is a multifactorial disease that impacted both "physical and psycho-social dimension of each patient". They reviewed published literature for the period of 1999-2012 using the PubMed database and searching on terms "diabetes mellitus", "self management" and "education".

Kosti and Kanakari (2012) made a pertinent observation that diabetes was not a disease of modern society as mistakenly believed but a very old health condition that was referred to as early as 2nd century BC by Greek physician Aretaeus. Physician Aretaeus had described symptoms of a disease that fully matched the symptoms of diabetes as are known now. This was separately confirmed in the traditional Indian Ayurveda system, the origin of which is pegged between 5,000 and 10,000 years ago where the disease *madhu-meh (diabetes)* had been discussed in detail. The key point emerging from this analysis is that diabetes is possibly as old as human civilization and has always afflicted humans in all parts of the world. A significant percentage of mankind has always been impacted by diabetes. The current levels and scales though are unmanageably large.

Kosti and Kanakari (2012) posited that despite such an ancient heritage and existence, diabetes as a disease, its causes, treatment, and consequences have still not been fully mapped. Kosti and Kanakari (2012) concluded that patients who received education and information about the management and care of disease reported better health outcomes than those who did not receive the benefit of any such education. They recommended the best time to start patient diabetes education is when HbA1c scores are high to best manage the early symptoms and prevent it from becoming a chronic condition (Kosti & Kanakari, 2012). They also found that close involvement of patients and care providers played a critical role in self-education and self-management of diabetes. The authors (2012) submitted that effective and efficient communication had been demonstrated to show favorable influence of patient decisions about the health behaviors and practices associated with the desired and eventual health outcomes in case of diabetes. Kosti and Kanakari (2012) summarized their conclusions in saying that education was a very worthwhile investment for the patients as also the health professionals in order to promote and improve the quality of life of people with diabetes.

The conclusions reported in the Kosti and Kanakari (2012) study merit support. Education regarding management and living with diabetes is critical for every patient upon diagnosis. (2012). In a country like India, where literacy levels are still low and people tend to rely on hearsay rather than authentic facts (Shetty, 2012). Improved patient education could become a very significant outcome of combining the benefits of traditional and modern systems of medicine in containing the emerging pandemic of diabetes. Merkel and Wright in their 2012 article about the lives of parents with children

that are born with type 1 diabetes examined the importance of support systems required to help the families live with the reality of life long condition for their children. They used an evidence based model to demonstrate the beneficial impact of a web based tool that would help parents access 'how-to' and 'what to' knowledge in an easy and friendly manner. Merkel and Wright (2012) showed that there is a significant knowledge gap on diabetes for all stakeholders, whether they are for adults who become diabetic or parents of children who are born with diabetes.

Chew et al. (2012) focused on the incidence of concomitant hypertension among the Malaysian diabetes patients. Chew et al. (2012) reported that there were 70,889 new patients of diabetes in Malaysia in the year 2009. Over half of these patients were hypertensive with the women of Malay ethnicity forming the majority of both of the diabetics and those that also had hypertension. Chew et al. (2012) concluded that a possible reason for high concomitant hypertension might be delayed diagnosis and obesity among the ethnic Malay patients.

The Chew et al. (2012) thesis was indicative of two clear challenges for India that has significant well-reported incidence of under-diagnosis. The longer the delay in diagnosis of diabetes, the greater is the likelihood of co-morbidities setting in (Shetty, 2012). This also indicates a significant danger for the economic burden of the disease. The scenario in Malaysia is thus very similar to India. Both Malaysia and Indonesia also have widely prevalent native medical traditions that do not work in tandem with the public health agenda or priorities of these countries. The native traditions in Malaysia and Indonesia work independently of the modern medical processes, as in India. Wung & Lin

in their 2012 study on gestational diabetes mellitus reported that over 135,000 pregnant women in the United States faced the health condition of glucose intolerance during their pregnancy with the incidence higher among Asian Indian women versus the Whites, Blacks and Hispanics (2012). Wung and Lin (2012) also reported that the incidence of gestational diabetes has increased worldwide and is now considered as one of the major complications of pregnancy, impacting both the mother and the child, both during and after pregnancy. Wung and Lin (2012) observed that higher levels of body mass index greatly increased the risk of complications and captured in their study the work done on genes that might be behind this phenomenon.

The reviewed genes were classified into three groups: genes that affect insulin secretion, genes impacting insulin resistance, and genes that influence mitochondria functionality. Wung and Lin (2012) also found that zinc played an important role in regulating production and storage of insulin in the body and recommended continued research to help understand the causes of gestational diabetes, which in turn would help find cure for the condition.

The Wung and Lin (2012) study is relevant for India as the incidence of malnutrition and micro-nutrient deficiency delayed diagnosis in India with attendant co-morbidities is very high (Mohan et al., 2007). In the Wung and Lin (2012) study as well, the incidence of gestational diabetes was highest among the Asian-Indian origin women in the United States and the ethnic Asian-Indians form the highest risk group. This suggests that incidence of gestational diabetes in India could possibly be high and needs to be mapped in order to help both the mother and the child (Mohan et al., 2007).

Norris et al. (2012) reported that many normal growth parameters like height, weight, and head-circumference are severely impacted in the down lineage of the diabetic populations (2012). Patel et al. (2011) highlighted that progressive introduction of universal health insurance in India will help in multiple ways. Universal health coverage, Patel et al. (2012) argued will lead to better and timely diagnosis, and treatment of diabetes. Penn et al. (2009) reported similar conclusion in Europe that timely intervention could prevent impaired glucose intolerance from degenerating into diabetes. Unattended, undiagnosed, untreated or undertreated diabetes can result in serious health consequences. This has been graphically captured by IDF and explains the possible consequences of diabetes on various organs and systems of human body.

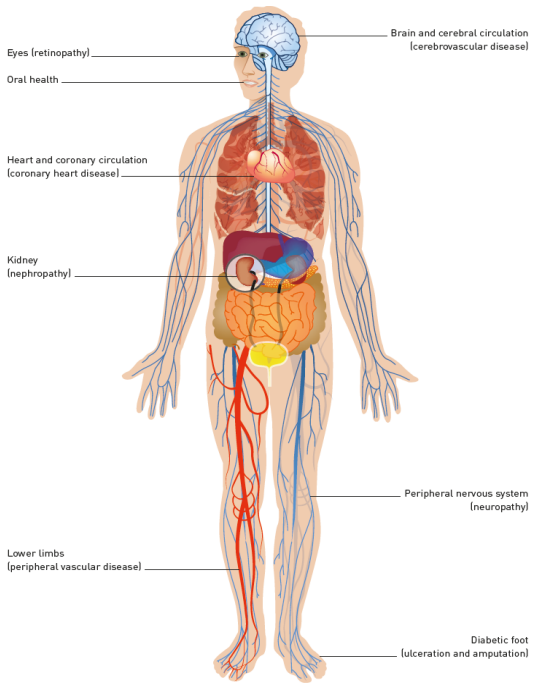

Figure 8. Consequences of diabetes for human body. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites/default /files/ The_Global_Burden.pdf

Definitive Role for Innovative Solution

Donald et al. (2012) in their study in Queensland, Australia were confident that their 'living with diabetes study' would bring out a very comprehensive picture that would be valuable for the policy planners to help them design public health solutions and strategy. Donald et al. (2012) examined longitudinal data (2008-2013) on diabetic parameters like HbA1C (glycated hemoglobin), to present a fair and accurate picture of reality. The researchers were of the firm conviction that the completed conclusions of the study would be very valuable. It is important to have longitudinal studies like the Donald, et al., study (2012) to understand how people cope with this chronic health condition and what kind of complications it may lead to with the advancement of patient's age. Mannino and Sesti (2012) also recommended that continued gene profiling was required to ensure successful pharmacogenomics conclusions on need for more individualized treatment for diabetic patients. The researchers also held that more work was needed to establish the impact of ethnic variations in pharmacogenomics response to the treatment.

Researchers Mannino and Sesti (2012) were successful in drawing attention to the fact that diabetic patients respond very differently to established therapies and lines of treatment and in the lifetime of a diabetic multiple lines of treatment were tried. This supports the assertion of my research that it might be more prudent and effective to combine the modern and traditional systems of medicine to help the diabetic population both from the point of view of outreach as also efficacy of treatment. Namak and Cremer (2012) challenged a commonly held belief that diabetic's health would improve if they use self -monitoring devices at home.

While the self -monitoring devices help in providing rapid measurement of level of blood sugar, they do not necessarily lead to changes in longer-term measures, as established by the HbA1C test, which is a measure of blood glucose levels over a running period of 90 days (Namak & Cremer, 2012). Namak and Cremer (2012) have done well to highlight the importance of continuous monitoring of diabetes by more authentic processes. The do it yourself devices can be used, as stated in the ADA advisory (2012) as an indicative tool, at best. The sales of glucometers and other similar devices in India have been rising and the health authorities should not draw any comfort from this fact, as these devices, as observed by Namak and Cremer (2012) may not lead to mitigation of the disease. While SMBG devices may be of some value to the patients, these have no significant implications for policy planners as stated in the research findings of Namak and Cremer (2012).

Keating (2012), in his review of Insulin Detemir, as the primary treatment therapy where insulin fortification is required by the body, presented experience and evidence of Insulin Detemir emerging as a favored line of treatment compared to the other alternatives. Keating (2012) presented a number of health conditions and sub conditions of diabetes where Insulin Detemir had been used as the experimental therapy and some other offerings (oral medications) as the control. Keating reported that in most if not all the conditions, Insulin Detemir came out as the choice medical treatment for basal application of insulin on account of superior glycemic control capability (2012). Keating expressed his satisfaction that Insulin Detemir as the slow acting insulin treatment created favorable results across applications and line of treatment and recommended it as the

preferred method of insulin supplementation in patients of Type 1 diabetes and sometimes in Type 2 diabetes patients as well (2012).

Keating (2012) acknowledged that while the global battle against diabetes was not close to being won, there are treatments and solutions available for diabetics that need insulin support for living, that safe methods are available to manage their health condition. In the context of India, use of Insulin Detemir has to be examined for economic considerations and affordability by the patient population. Insulin dependency is a serious health condition and the cost of treatment would make it a serious challenge for the underprivileged people to come to terms with. Vajen, Holt, Marx, Schwartz & Shubrook in their 2012 study carried out in Ohio, United States with 245 patient-residents in extended care facilities, compared standards of home care for the diabetics with the ambulatory standards prescribed for their care. Vajen et al. (2012) concluded that while some gaps between home care and formal care environment were to be expected, the gap could have serious consequences for the affected patients. Vajen et al. (2012) recommended that the American Diabetes Association should develop new standards and guidelines for patients undergoing extended homecare in nursing homes or similar quasi-medical institutions.

The observations made by Vajen et al. (2012) confirm that there is considerable scope for improving patient care practices for diabetic patients in the extended care system (2012). The institution of nursing homes in India is very prevalent (Mohan, 2007) and the data from Ohio and West Virginia captured by Vajen et al. (2012) might be applied to the conditions in India as well. Tandon, Ali and Narayan (2012) in their study

published in the *Journal of Cardiovascular Drugs* presented their findings on the linkage between high levels of HbA1c and cardiovascular risk. Tandon et al. (2012) confirmed that controlled levels of blood sugar lowered the attendant risk of heart disease but it was difficult to say at what level this occurred. Tandon et al. (2012) agreed with the observational data and analyses emanating from the United Kingdom Prospective Diabetes Study (UKDS). Tandon et al. (2012) also referred to three clinical trials done in recent times that tallied with the observational data presented by the researchers.

The highlight of the Tandon et al. (2012) study was that it is important to control levels of blood sugar to lower the risk of heart disease. Avoiding diabetes wherever possible and managing diabetes where avoidance was not possible could only ensure this. This would have to be achieved through a comprehensive national diabetes management program in India that is more inclusive than all the existing initiatives. Munt and Hutton (2012) from Australia conducted research on self-management of type 1 diabetes. They (2012) argued that while patients with type 2 diabetes were able to successfully manage their health condition with self-care, they wanted to examine if it was possible to do likewise for Type 1 diabetes patients inside or outside a professional health care environment (2012). Munt and Hutton (2012) concluded that there was a subtle but important difference between professional and expert care and a Type 1diabetes patient can be at best an expert but not a professional. In addition, Munt and Hutton (2012) concluded that while it was good for a Type 1 diabetes patient to have expertise for self-care, the Type 1 diabetes patients must not try to replace the professional care in a hospital environment with self-help.

The implication of Munt and Hutton's (2012) research demonstrated that for management of diabetes the professional support super structure is critical and must be adequately provided for by the Indian healthcare system. Diabetes is a serious health condition, particularly Type 1 and must be handled with utmost care.

Gong et al., (2011) in their six year lifestyle intervention study in China found that the incidence of comorbidities like retinopathy among patients that had IGT was 47% lower than those that did not make any lifestyle changes to manage prediabetes or diabetes health conditions. Even simple innovative solutions like guidance on lifestyle intervention made a significant difference in the outcomes (Gong et al., 2011). Rani et al. (2009) highlighted the much-observed phenomenon of retinopathy in rural India tracing its origin from under treated or untreated diabetes (2009).

A similar finding was reported in the Mayor (2012) study where Mayor summarized the potential beneficial impact of following IDF recommendations in the management of diabetes (2012). Mayor (2012) rated IDF as a significant positive influence in drawing the attention of global policy makers on the incidence and steps required to control the growth rate of diabetes. The IDF (2013) has explained the physiology and anatomic process that lead to risk of comorbidities in diabetes in the figure below.

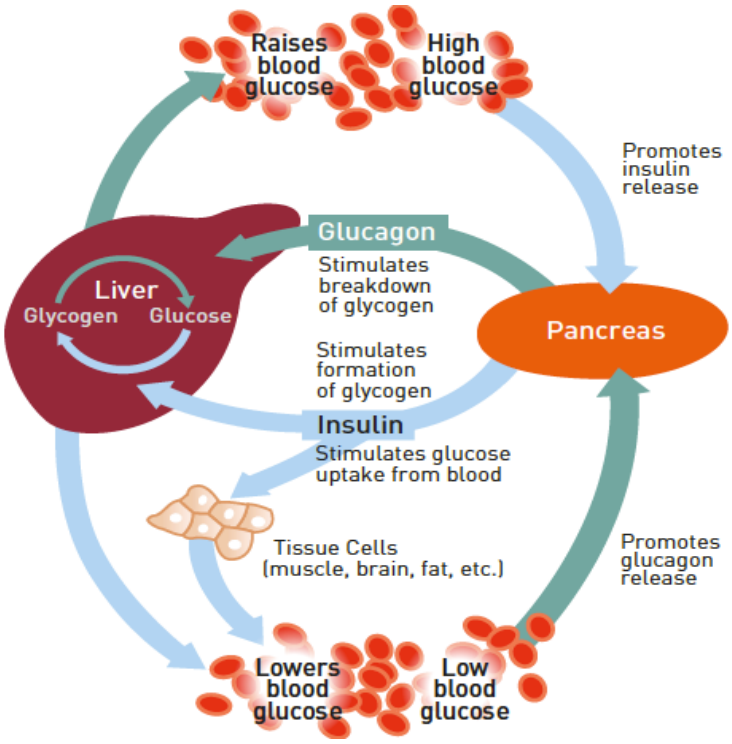

Figure 9. Pathology and physiology of diabetes. From *Global Diabetes Atlas* (6th ed.), by the International Diabetes Federation, 2013. Retrieved from http://www.idf.org/sites /default/files/ The_Global_Burden.pdf

Complementary Health Traditions

Researchers Skoro-Kondza, Tai, Gadelrab, Drincevic, and Greenhalgh (2009) in a study conducted in United Kingdom attempted to estimate the impact of yoga on reducing the glycated hemoglobin levels of diabetic patients. The starting hypothesis of their research was that there was evidence to suggest that regular practice of yoga might lead to lower levels of HbA1c. The experience reported by Skoro-Kondza et al. (2009) was that as yoga was not a native school of medicine in United Kingdom, the number of participants recruited in the study was sub-optimal and most of the recruited patients did not continue with the prescribed yoga practices at their homes. Skoro-Kondza et al.

(2009) noted decline in HbA1c values among the group of patients that practiced yoga more diligently. Though the value was not significant statistically speaking, it provided a glimmer of hope that alternative therapies and complementary methods like Yoga, if practiced seriously may help change the health outcomes of diabetes patients (2009).

The redeeming feature of this study in the Indian context is that yoga is native to India and is viewed respectfully as a method for regulating and obtaining good health outcomes. Yoga costs very little to practice other than the fee that a patient might pay to a yoga instructor. The Skoro-Kondza et al. (2009) study offers a positive hope for India for deploying yoga as an active intervention strategy, both to prevent incidence of diabetes and to manage the diabetic condition. The exploratory randomized control study of Skoro-Kondza et al. (2009) was a step in the right direction to support the case for alternative methods and complementary health traditions. The authors reported a positive directional effect of yoga and yogic breathing on the cognitive health function of diabetic patients. They concluded that patients that were included in the yoga and breathing group plus medication versus the group that was on medication alone, showed improvements in their cognitive health parameters (2010).

Type 2 diabetes is known to impact cognitive health as a co-morbidity parameter, as reported earlier in the literature review and it was good to see that it is possible to achieve improved management of diabetes, if patients started including yoga exercises and yogic breathing in their daily regime of treatment. Kyizom et al. (2010) also found that yoga combined with yogic breathing had favorable impact on the levels of glucose in the blood stream. The findings of this study (2010) augured well both for prevention and

management of diabetes. A similar conclusion was reported by Gordon et al. (2008) for a study carried out in Jamaica on 77 patients of type 2 diabetes.

Gordon et al. (2008) compared the benefits of yoga with a group on normal physical training and a group only on medication with no training in their study. The authors used a large number of parameters including fasting blood sugar and measures of oxidative stress and showed improvement in the group that was following the yoga exercises. Considering the economical dimension of practicing yoga there is a compelling case for India, in my study, to consider a role for drafting yoga practitioners and teachers into the containment strategy for managing the problem of diabetes. In a commentary on the Kyizom et al. study (2010), neurophysiologists Kutty and Raju (2010) showed appreciation for the findings and the promise it held for managing diabetes in India and the world, particularly in managing the mental co-morbidities and the possibilities of preventing the occurrence of diabetes itself. Khan et al. in their 2012 study on the health benefits of Semecarpus anacardium (a popular fruit used in Siddha treatment) reported results from a rat study.

The authors fed rats a high fat diet using the milk extract of Semecarpus anacardium for 30 days against the popular diabetes drug metformin and showed that extracts of Semecarpus anacardium outperformed the popular metformin in relieving symptoms associated with diabetes. The evidence provided showed the potential of commonly found medicinal plants in India and other countries that could be used gainfully to prevent occurrence or for management of diabetes.

Ahmed, Sharma, Mukerjee, Ramteke, and Kumar (2013) in a similar study on a popular Unani (AYUSH) formulation " Qurs Tabasheer" reported in a controlled rat study that rats that were placed on Qurs Tabasheer performed better than the rats that were fed metformin. This traditional Unani formulation comprises of five herbs Tukhme Khurfa (Portulaca oleracea seed), Gule Surkh (Rosa damascena flower), Gulnar (Punica granatum flower) Tabasheer (Bambusa arundinasia dried exudate on node) TukhmeKahu (Lactuca sativa Linn seed). It is interesting to note that while traditional formulations have been successfully used for treatment of health conditions for thousands of years, they have not been subjected to the efficacy and safety standards of modern medicine.

Researchers are now filling a gap that will enhance wider application of traditional medicines in mainstream domain of public health. Li, Qi, Huang, Yamahara, and Roufogalis (2008) in their study validated the known health benefits of pomegranate flowers, widely used in Ayurveda and Unani traditions as a cure for diabetes. While the pomegranate flower has been used for millennia, the pathways of its beneficial results were never studied or known. The study by Li et al. (2008) helped shed light on what the beneficial pathways might be. Li et al. (2008) reported that pomegranate flower had demonstrated ability to activate the receptors that regulate fatty acid uptake and oxidation in human body and this activation may be beneficial for treatment and management of diabetes.

Thakur et al. (2009) analyzed the benefits of Chlorophytum borivilianum Santapau and Fernandes (Liliaceae) also known as Safed Musli, which is a very significant ingredient in all-major AYUSH systems. The root of this plant contains

steroidal and saponins that act as therapeutic agents. Thakur et al. (2009) compared and shared evidence on this ingredient across traditional and modern systems of medicine. Thakur et al. (2009) also stated that there is a trend towards using natural ingredients in new age medicines and lines of treatment. Reporting their research in *Pediatric Diabetes*, Dannemann et al. (2008) stated that while use of complementary and alternative medicine was well established among adults, even children with Type 1 diabetes were found to use complementary medicine under parental guidance with better than expected results. Dannemann et al. (2008) reported that 70% women and 54% men in Germany accepted trying complementary medicine for their respective health condition.

Dannemann et al. (2008) found that parents had little or no hesitation trying complementary medicines on pediatric patients with chronic conditions like diabetes. Dannemann et al. (2008) made a subtle distinction between complementary and alternative therapies. While the parental resistance to complementary therapies was minimal, the acceptance of alternative therapies varied depending upon the experience of usage. Nahin, Byrd-Clark, Stussman, and Kalyanaraman (2012) studied the use of complementary medication by Type 1 and Type 2 diabetes patients on a patient pool of 3,978 adults in the United States. Nahin et al. (2012) concluded that patients with more complex conditions were more likely to try usage of complementary medication in the hope that the complementary therapy might help mitigate their problem. Li's (2010) study the on effect of Neuragen, a combination of five main homeopathic ingredients as a treatment for neuropathic pains was reported in *BMC Journal of Complementary Alternative Medicines*.

The study was done on 60 patients with foot sole pain, a condition caused by diabetes. The patients that were administered Neuragen were found to have much higher degree of relief from pain. Li conceded that while homeopathic agents were traditionally administered singly, there was a move towards combination of agents to achieve better and faster results. The Snee et al. (2011) study reported the nutritional experiments of using bitter melon in diet to manage and treat the health condition of diabetes. Snee et al. (2011) reported the potential role of simple ingredients and home remedies that could be used by the people with diabetes to improve the quality of their lives. Westman and Vernon (2008) examined the potential role of reduced carbohydrate intake as a line of dietary intervention to manage the incidence of diabetes. The Westman and Vernon (2008) study reinforced the findings of Snee (2011) study that dietary changes and modifications have an important role in managing diabetes. The dietary tools are very well stated in the AYUSH tradition and the complementarity of modern and traditional approaches would thus have many benefits to offer.

Summary and Conclusions

The five key themes identified in the literature set the context for this research study. The key takeaway from the first theme was that diabetes is a complex multifactorial disease. Considering the pace of growth of the disease, it is important to understand more about the disease and the best available methods to prevent its occurrence and to manage its consequences. The second strong theme was that estimates of incidence of diabetes and pre-diabetes might be on the lower side and the emerging pandemic scale of disease is a real cause for concern. The scale of the disease is large and

the number of people who have not been confirmed by diagnosis is possibly very large. The third striking theme was that diabetes is a life-changing phenomenon and both the patients and their families and the community at large need continuous guidance and support. There is considerable evidence in the literature to suggest the benefits of this approach.

The genetic predisposition (Ramachandran, 1992) of diabetes also brings in a societal context of anxiety dictated by the fact that a certain geographic category of people share the genetic traits that place them in a fairly similar risk profile of disease (Grant et al., 2011). Therefore, the social and economic impact of diabetes on the caregivers and the community at large warrant urgent and immediate attention so as to ensure that caregivers can focus on providing their professional services.

Diabetes is one of the greatest ever public health challenges and it needs many innovative solutions to address the multiple levels and scales of the problem (IDF, 2011). The Reese (2011) study demonstrated the possibilities and experience of innovative experiments undertaken for managing the diabetes program with lower costs. Reese (2011) brought out that the scope of innovation is not just limited to science and technology related to diabetes but also the steps involved in rolling out successful programs and their pragmatic execution.

The need for constant and sustained innovation in solutions for chronic health conditions like diabetes was evident in the reviewed literature. All the reviewed research studies expressed the need for more research to address the many dimensions of the diabetes challenge. The role of traditional, complementary, and alternative medicines is

much larger than what was believed or expected in modern society (Reese, 2011). The choice of research methodology and design of study ensure that the theme and subject of research are analyzed and examined rigorously. The rationale for qualitative research design, the case study method and participatory action research approach used in this study are discussed in the next chapter.

Chapter 3: Research Method

Introduction

The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic. Qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them (Denzin & Lincoln, 2011). The number of people with diabetes in India is far outside the reach of the medical and economic resources available in the country. Diabetes, as a case with many ramifications, has to be addressed jointly by physicians, caregivers, policy makers, and people with diabetes. Understanding the views and perceptions of all stakeholders will help better address diabetes.

The literature review has established diabetes as a complex and multifaceted case. The design needs of this qualitative study were best served by the case study research approach. The main case of this study was the challenge posed by diabetes, and the proposed solution was to examine the practicability and challenges of using an integrative approach to address the emerging diabetes pandemic in India.

This chapter includes the rationale for the chosen case study research design; the role of the researcher; the methodology followed; the choice of instrumentation; the schematic design and steps involved in the study; the process and procedure for recruitment, selection, and participation for data collection; and the data analysis plan. The chapter ends with a review of trustworthiness and ethical procedures that were followed in this study, as well as a summary and conclusions.

Research Design and Rationale

A robust research design paves the way for sound rationale and methodology for scholarly research. Any weakness in the design or rationale makes the study and its conclusions and findings vulnerable. The research questions identified for this study to understand the rationale for the research design plan were as follows:

1. How can the modern and traditional medicine approaches be jointly deployed to contain the spread, scale, and immensity of the emerging diabetes pandemic in India?
2. What are the challenges and barriers of combining the methodologies propounded by traditional systems (AYUSH) with those of modern medicine in containing diabetes?

The research questions chosen for this study were evaluated using the qualitative research methodology. The qualitative method provided the framework to understand the specific needs of this project. The qualitative design was the most appropriate for answering the research questions of this dissertation. The above research questions were investigated through in-depth participative engagement with important stakeholders. Quantitative and mixed methods were not as appropriate for this study because the goal of this study was not numerical analysis but an insightful analysis of how modern and complementary health traditions could be deployed in an integrative manner for addressing the health priorities and needs arising out of the emerging diabetes pandemic. The study aimed to evaluate subjective views on the quality of human experiences. Qualitative procedures rely on text and image data (Creswell, 2003), which are more

relevant than mere numerical data. A qualitative approach helps researchers understand the human and behavioral factors for health conditions and seek views of the community to initiate action for change (Creswell, 2003).

After evaluating all five major approaches to qualitative research—namely, case studies, narrative research, phenomenology, grounded theory, and ethnography—I chose case study as most appropriate approach for my qualitative research. Case study involves exploring an issue through "in depth data collection using multiple sources of information" (Creswell, 2007, p. 73). The study was an intrinsic case study design evaluating the case for using an integrative approach to address the challenges posed by the emerging diabetes pandemic in India.

Role of the Researcher

Maxwell (2005) summarized the role of the researcher as follows:

> Qualitative researchers typically study a relatively small number of individuals or situations and preserve the individuality of each of these in their analyses, rather than collecting data from large samples and aggregating the data across individuals or situations. Thus, they are able to understand how events, actions, and meanings are shaped by the unique circumstances in which these occur. (p. 221)

In my role as a researcher, to understand and explore the case for diabetes and for a new approach to addressing the rising incidence and growth of diabetes, I observed and interviewed the participants of the study in an objective manner. The participants were invited to be a part of this study after their due acceptance. They did so consensually and

in the place and time of their own choice. As the participants were selected through an objective process and were not related to me in any way, I did not experience any situation of conflict of interest. I ensured that the process of interviewing was unbiased to the best of my ability. The study was conducted and analyzed without any prejudgment or preconception. I analyzed and stored the collected data and identified patterns and themes using the coding method.

Methodology

Qualitative research involves intense personal interaction between the researcher and participants. The choice of sample size was crucial. Theorists assert that the success of qualitative research depends upon the choice of method and criteria used in determining the type and size of sample. There are many different approaches and criteria used by researchers to select a purposeful and information-rich sample and to determine the size of the sample in qualitative research (Patton, 2002). Quantitative research methodology uses the statistical theory of random probability sampling for sample size to be seen as representative of the chosen population. A scientifically designed sampling approach is possibly the most distinctive point of differentiation between quantitative and qualitative research. Sampling is equally critical in the qualitative and quantitative methods. The rationale for my choice of sampling methodology is reviewed in this portion of the study. Referring to qualitative sampling, Patton (2002) used the expression *purposeful sampling*. The choice of sample has to be purposeful and information rich (Patton, 2002).

The case study approach uses six common sources of evidence (Yin, 2009): (a)

direct observations of the researcher; (b) data from interviews or open-ended conversations with key participants; (c) relevant archival records; (d) published documents such as newspapers, articles, letters, blogs, emails, and reports; (e) indirect observations of the participants; and (f) physical artifacts and objects related to the theme of the research (Yin, 2009). For the subject of my research, I used observations, interviews, archival records, and other published documents.

The research problem in this dissertation was addressed by using the combination or mixed purposeful sampling approach. The two key components of this approach are a stratified purposeful sampling approach and a snowball or chain sampling approach. The rationale for stratified sampling was that there was a need to interview practitioners of both modern and traditional medicines and policy planners to get meaningful answers to the research questions. To get the most insightful views from the physicians in the respective fields, I purposefully identified appropriate representative stakeholders from each identified stream of medicine using the databases of the regulatory agencies (explained later in this chapter). Against the chosen framework of purposeful sampling, the more commonly used random sample framework was not appropriate for this study. The snowball or chain sampling approach was relevant, as the interviewed participants kept referring discussions to their peer practitioners, who might provide additional perspective. The sampling process used is depicted diagrammatically in Figure 10.

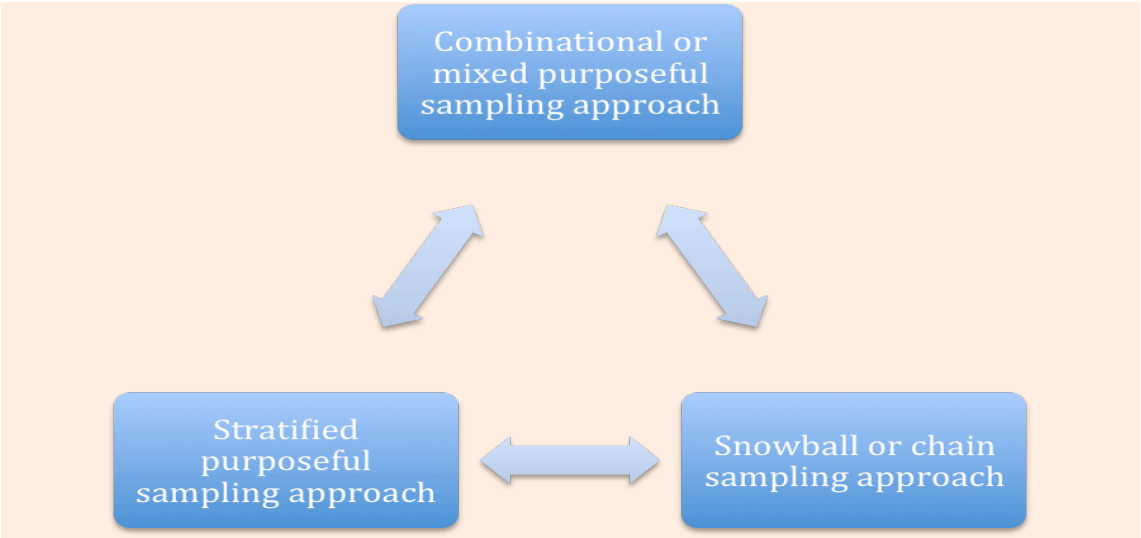

Figure 10. Sampling process.

Procedures for Recruitment and Data Collection

The sampling process was a combination of the stratified purposeful and snowballing processes. I interviewed 36 experts to seek answers to the research questions: five from modern medicine, five practitioners from the Ayurveda school of traditional medicine, five practitioners from the Unani school of traditional medicine, five practitioners from the Siddha school of traditional medicine, five practitioners from yoga and naturopathy, five from homeopathy, and six public health policy planners and health administrators.

The desired sample of participants was randomly selected from the database of the nodal research agencies of modern and traditional medicine in India. The accessed databases were from the records of the Indian Council of Medical Research (www.icmr.nic.in), the Central Council for Research in Ayurvedic Sciences (www.ccras.nic.in), the Central Research Council of Siddha (crisiddha.tn.nic.in), the

Central Research Council of Unani Medicine (http://www.ccrum.net), the Central Council for Research in Homeopathy (www.ccrhindia.org), and the Central Council for Research in Yoga and Naturopathy (http://www.ccryn.org). I explained the objective of this research and the research questions and asked the respective Councils for approval to access their public access database for random selection of 15 names of physicians and/or practitioners from each stream of medicine. Of the 15 chosen names from each stream of medicine, letters of invitation to participate were sent to a random five. The process resulted in the selection of the names of 30 participants from the medical community.

There were five each from modern medicine, Ayurveda, Siddha, Unani, yoga and naturopathy, and homeopathy. Purposeful sampling is a strategy in which particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices. Purposeful sampling is used to capture the heterogeneity in a population (Maxwell, 2005). The 36 participants interviewed in this study were medical professionals and public health policy planners of good standing and reputation. I had no professional or personal relationship with any of the experts. I did not influence the beliefs or responses of any participant in any way. The process was objective and ethical in all respects.

The research process was fair and objective, and there were no issues or ethical concerns arising out of it. My work environment and personal contacts had no role to play in the selection process of the participants. Collecting information and data from a diverse range of individuals and settings using a variety of methods and diligent documentation reduced the risk of bias. Through detailed interviews, I collected the data

that helped in understanding the views of all participants. Recording the interviews and/or taking detailed notes and then transcribing the interviews verbatim ensured the validity of the study.

Using the database of the nodal research councils provided me with the targeted 15 physicians and practitioners for this study. For recruiting public health policy planners, I reached out to the Health Secretary of the Indian Government to access names of officials and planners who were in positions of responsibility to contribute to this study as participants. Against the minimum planned number of five policy administrators/ planners, I interviewed six to ensure compliance with the saturation norm of data. The sixth name came up as a result of a snowballing process.

After the names were obtained from the nodal research councils and other indicated authorities, the potential participants were contacted by phone and mail. They were then provided with the entire background of the research, and the objectives of the interviews were explained in detail. The potential participants were requested to confirm their acceptance to participate. I met with the willing participants to obtain their signatures on the consent form (as per WHO template and guidelines and as approved by Walden University IRB, attached as Appendix I). Each interview was conducted at a place and time convenient to the participant. All 36 interviews were conducted individually and not in a group. The interviews were audio recorded whenever approved by the participants. In other cases, detailed notes were taken during the interviewing process. A letter of thanks and gratitude was given following the interview. All transcribed data were securely stored for confidential research use. All transcripts and

recordings were carefully reviewed in their entirety, and data were coded using Microsoft Word software. The composition of the 36 participants is depicted in Figure 11. The figure includes sub classifications of participants in the fields of modern medicine, yoga and naturopathy, and policy.

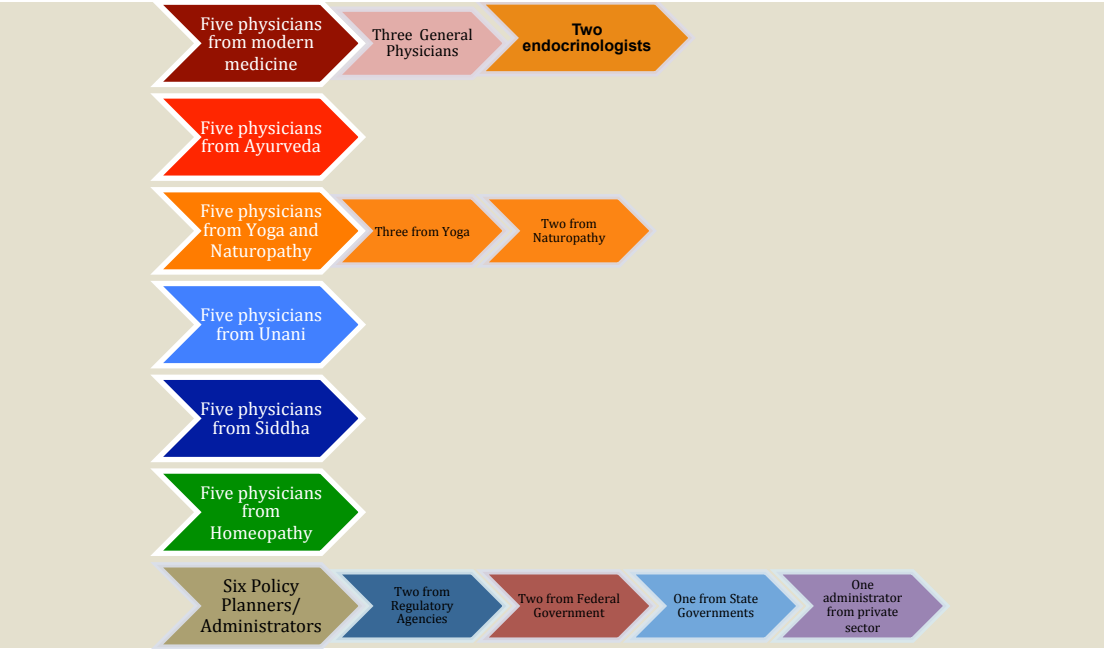

Figure 11. Composition of participants.

The process flow chart used for the qualitative research of this study is shown in Figure 12. The process of research started with detailed interviews with chosen constituents. As the sole researcher conducting these interviews, I also observed the workplace of all practitioners and made notes on other observed attributes.

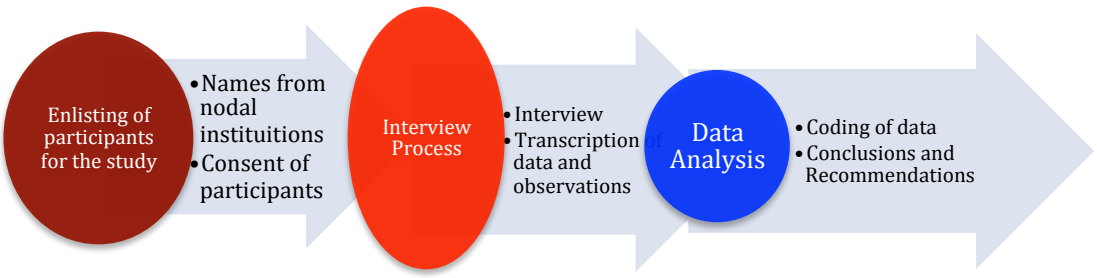

Figure 12. Flow chart of process.

The questionnaire that was used for the interviews is attached in Appendix 1. Though Hindi translation of the questionnaire (attached as Appendix B) was available in accordance with the IRB approval process, it was not used, as all participants were proficient in English. Interviews lasted between 45 and 60 minutes. Where permitted, these were audio-recorded with the consent of the practitioner/participant; with others, detailed notes were taken to ensure that the views of participants were fully captured. Details of observation were also documented to correlate and triangulate with the interviews during the analysis of data.

The instruments that were used in this study are detailed below. As I was the sole interviewer and data analyst for all 36 participants, the study did not require any training for field researchers or data analysts. I used the three primary instruments in the interview process. First, I used the interview sheet to record the answers and comments of the participants; second, I used an observation sheet to record my impressions of the interview locale and elements such as body language and visual cues from the

participants. Finally, the audio recording of the interview, where available, was transcribed verbatim. The interview process had three phases. The first phase was the request letter to the nodal agencies to access the database shown in the above diagram. The second phase involved communication with the people whose names came up in the random selection process from the databases. Third, I communicated with the participants in order to set up times for the interviews and to seek continued engagement in the spirit of participatory action research.

Snowballing Suggestion of Participant Names

During the interview process, one or more participants suggested inclusion of another point of view related to the research. As snowballing was an anticipated possibility, a letter to add snowballing participants, its Hindi translation and back translation was placed in Appendices L, M, and N.

Data Analysis Plans

Interviews and observations resulted in high volume of data. The analysis of data, evaluation and interpretation revealed insightful lessons. The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic. The interview responses were fully transcribed. As in most qualitative research, data collection and data analysis were done simultaneously. Transcribing the interviews helped me to acquire a deeper understanding of the views of participants. Qualitative data from interviews and observations were sorted as per themes to derive the substantive content. The themes were then coded and analyzed.

Qualitative analysis of text is often supplemented with other sources of

information to satisfy the principle of triangulation. Triangulation strengthens study by combining methods (Patton, 2002). Triangulation increases trust in the validity of the study's conclusions. Triangulation was used to analyze the transcribed interviews, observational field notes and documents authored by the respondents themselves. The purpose of multiple sources of data is corroboration, converging evidence and to enhance the validity and credibility of the study.

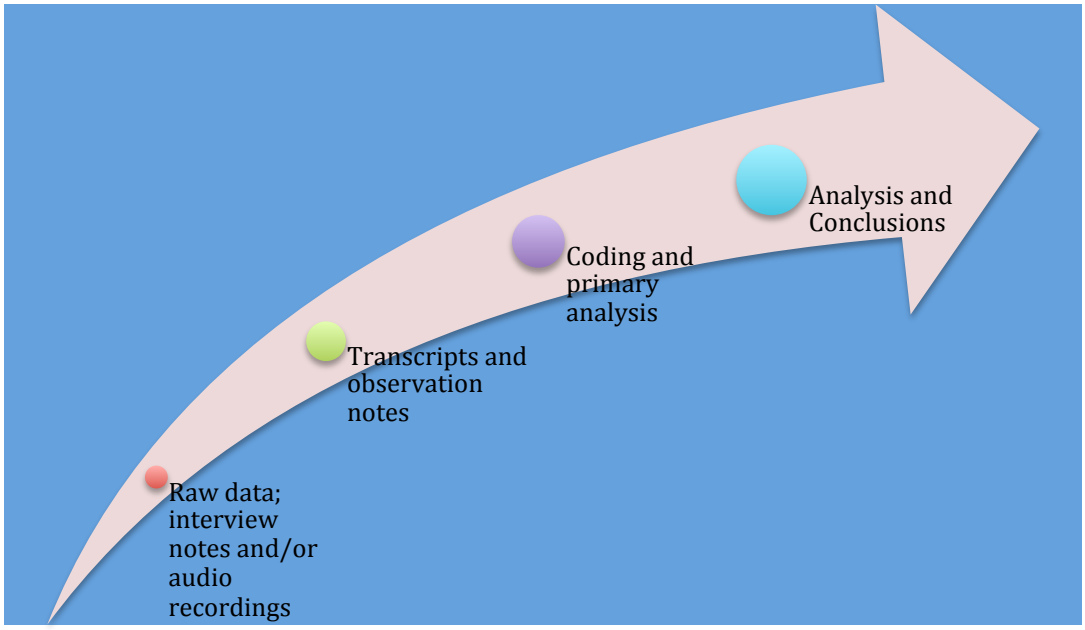

Figure 13. Data analysis plan.

Issues of Trustworthiness

Any research process has threats to internal and external validity and these must be addressed to increase the trustworthiness of the research process. Interviews and observations generated data that was interpreted after insightful evaluation and coding to derive meaning and essence hidden in the data. The case study of management and prevention of diabetes was looked at from a new perspective and the findings of the study

provided meaningful insights only because the trustworthiness was assured.

Credibility

Credibility of qualitative research substantially depends on the researcher, who is the primary instrument of research (Patton, 2002). I identified three possible threats to internal validity. The first was the possibility of my being over-passionate about the cause and harboring a sense of urgency and my disappointment with the state apparatus, which has the responsibility of delivering the national public health objectives. The second was the possibility that the proposed research questions would not evoke warmth and the kind of response that is required to reach meaningful conclusions. The third was that as sole researcher and data analyzer, my personal biases and prejudices may get transferred to the study. I was fortunate that none of these three or any other threats impacted the quality or speed of my work.

To ensure credibility of the study, being aware of the possible threats, helped me to avoid and circumvent the pitfalls. Observing the participants diligently and conducting the interviews dispassionately ensured reliability of the study. Observation, interview, and frequent visits to appropriate settings helped me gather detailed and descriptive data. The transcribed data were shared with the participants for clarification and to confirm accuracy of transcription and fortify credibility of the research and transcription process. No external threats were encountered. The external threats potentially could have come from the regulatory side of policy administrators who may have discouraged any form of collaboration between the modern and traditional systems of medicine. There are some people who may look down upon the other medical systems because of their own

misgivings and misapprehensions and may have the ability to influence the quality of data by their pronouncements and diktats. In my experience, I did not come across any such external resistance in conducting this research.

Transferability

The transferability of the study and its findings to related contexts and research situations was important and reflected the strength of design, assumptions and the process. Transferability was made possible by providing exhaustive details and specifics of the assumptions, sampling strategy and the thought process followed to determine the research design of the study. The study had clearly spelt out the constraints and limitations met during the process of collection and analysis of data. Providing these details will make it easier for any researcher or reviewer to seek transferability of this study. The phenomenon of diabetes is global and the scale and enormity of challenge merits wide collaborations and corroboration between and among researchers. A sound transferability framework will help this cause.

Dependability

The scale and magnitude of challenge posed by diabetes in India and the world is engaging global attention from the policy planners, global and national institutions, academic researchers and solution providers. Dependability of the study was ensured by diligent conformance to the defined protocol and accurate transcription of the collected data. I made conscious efforts not to allow any preconceived views, notions or prejudices from impacting the process of study and/or its eventual findings. Along with audio recordings of the interview and observation, I also kept detailed notes to elaborate in the

study process. Clear focus on the research questions and observance of research process as laid out in the design was significantly reinforced to ensure the dependability factor of the study.

Confirmability

The interviews were audio recorded wherever possible so that all transcripts accurately captured the responses from the participants. Triangulation, a time tested tool, was also used to establish confirmability. Triangulation was done by collected data during the observation process and cross-referencing with the transcripts of interviews and comments from the peer group during the process of coding and analysis. The triangulation process also included the data generated during the literature review process. The collected data from diverse individuals and settings supported the confirmability factor of the study.

Ethical Procedures

All agreements, approvals and consents were obtained before I approached the participants to ensure implementation of required ethical procedures. Participants in this study took part in the interviews on a voluntary and willing basis. Prior consent was obtained to interview using the WHO consent forms for qualitative studies as enclosed in Appendix I. The consent forms in Hindi language were also available in Appendix J (reverse translation in Appendix K) but were not used, as all participants were proficient in English. The participants were assured of the confidentiality of their responses. The contents of the interviews were not disclosed to anyone else and the data were used for research purposes only. In seeking the support of the participants all appropriate

approvals and consents were obtained from the people involved.

Protection of Human Participants

The study was undertaken after due approval by the Institutional Review Board of the Walden University (IRB approval # 04-21-14-0191600). Only publically available documents were used and included in this study. No confidential documents, patient records or private health information were accessed, used or analyzed in this study.

Summary and Conclusions

In this chapter, the research methodology of the study and the process that was followed has been reviewed. The rationale of the choices made for the theoretical constructs; framework, and sampling methodology have been reviewed in detail. The choices of instrumentation, process of data analyses, and the ethical framework used for the study have also been reviewed. The steps that were followed were: enlisting the participants; approaching them for interviews; conducting the interviews, and analyzing the data to find answers to the research questions outlined for this study. The choice of participants for the study also included policy administrators. The results of research have been detailed in the next chapter.

Chapter 4: Results

Introduction

All participants in the study endorsed an integrative approach as a practical and feasible solution to the emerging pandemic of diabetes in India. Exhaustive analysis of data generated in interviews and observations revealed that both the medical practitioners and the policy administrators supported the research proposition of an integrative approach as a possible solution for managing diabetes. The detailed process of data collection used in this research and the process followed for analyses of results and the research findings have been explained in this chapter.

The purpose of this study was to assess the practicability of using an integrative approach as a potential solution to India's emerging diabetes pandemic. The research questions for which answers were sought using the five-question questionnaire were as follows:

1. How can the modern and traditional medicine approaches be combined to contain the proliferation and immensity of the emerging diabetes pandemic in India?
2. What are the challenges and barriers of combining the methodologies articulated in the traditional systems (AYUSH) and the modern system of medicine in containing diabetes?

Before interviewing the participants, I researched peer-reviewed journals to understand the key aspects of all the traditional forms of medicine followed in India and the current policy framework on practice norms of AYUSH in different states of India. I

read over 108 journal articles and looked through several books to understand the major challenges posed by diabetes and the significant themes that literature had covered. This prepared me well for conducting interviews and collecting data to answer my research questions.

The answers to the two research questions were sought through 36 in-depth and structured interviews. The following five questions were asked to each of the 36 participants:

Q1. What are the main guidelines in your medical tradition that might help prevent occurrence of diabetes among Indians in the age group of 25-45 years?

Q2. Please list five important preventive actions, as stated in your system of medicine, by practicing which a person can minimize the risk of becoming diabetic?

Q3. What are your views on the coexistence and concurrent usage of your medical tradition with other medical traditions in India, that may help address the emerging epidemic-scale challenge of diabetes in India?

Q4. What, in your assessment, will be the main challenges of combining the modern and traditional schools of medicine to tackle the rapidly growing incidence of diabetes in India?

Q5. What are the policy changes that would be required to check the incidence of diabetes in India?

The 36 interviews were carried out between 24 April 2014 and 6 July 2014 over a period of 74 days. The later part of this chapter describes the setting, the demographics of participants, the data collection process, and the instruments used, the data analysis, and the process used to derive codes and themes. The chapter closes with evidence of trustworthiness of the data collection and the steps and process followed for the analysis of data.

Setting

All interviews were conducted after due consent of participants and at times and places convenient to the participants. The interviews were all conducted at the clinics of medical practitioners and offices of policy planners/administrators. Visiting the practitioners' clinics gave me the chance to observe their settings closely and understand the dynamics of patient-physician interaction and how typical patients spent their time while waiting for their turn to see the physician. I noted what I observed, and these data were used as a source of triangulation to validate the findings. I also made note of the posters, public health messages, and medical materials displayed or kept as leaflets at the clinics and the offices of policy planners/administrators.

Demographics of Participants

The names of 30 out of the 36 participants were obtained from the database of registered practitioners maintained by the Central Research Councils of Modern Medicine, Ayurveda, Unani, Siddha, and Yoga and Homeopathy, as envisaged in the design of the study. Five names of policy planners were obtained from the database of policy planners and administrators maintained by the federal and state governments. In

the design of the study detailed in Chapter 3, the plan was to obtain 15 names from all databases to provide cushion for nonavailability of people or disinclination of shortlisted participants to join and/or participate in the study. While I had list of 15 randomly chosen names from each medical tradition and policy planners/administrators, the first five randomly chosen participants in each category agreed to join this study and signed consent forms prior to interviews.

In the case of policy planners and administrators, I had to go beyond the minimum planned number of five participants, as data saturation was not fully achieved after conducting interviews with five policy planners/administrators. The sixth name from the category of policy planners came out of the snowballing process. The policy administrators in the government sector reminded me that nearly 75% of India's healthcare delivery takes place in the private sector and that it would be important to have views and inputs from a health administrator in the private sector. The sixth administrator interviewed as a result of the snowballing process was an administrator from the private sector. The additional interview also helped to reaffirm and meet the data saturation test.

In accordance with the approval of Walden University IRB, I had prepared Hindi language versions and back translations of the interview questionnaires and forms for informed consent and other important communications to be ready for a situation where any participant showed a preference to use the Indian national language, Hindi, over English. It turned out that all 36 participants were proficient in the English language, and as a result, the Hindi-language versions of questionnaires and consent forms were not used. The availability of Hindi language materials was conveyed to all participants. The

translated versions in Hindi and back-translated versions of the questionnaire, form for informed consent, and letter of invitation for snowballed participation have been placed as appendices at the end of this dissertation. The contribution of two professionals who helped with the translations and back translations was duly acknowledged.

Data Collection

The data collection was done through interview sheets and audio recordings. Of 36 participants, 10 agreed to allow audio recording of interviews. The other participants declined approval for audio recording and asked me to make elaborate notes to capture their answers. The voice files of interviews that were audio recorded were transferred from the voice recorder of my iPhone to the hard disk of my computer with password protection. Detailed interview notes were tallied and confirmed with responses to all questions at the conclusion of the interview to ensure that all information was correctly captured. The handwritten interview notes and observation comments were transcribed on the computer using Microsoft Word for Mac software. The observation notes in all cases corroborated the answers given by the participants.

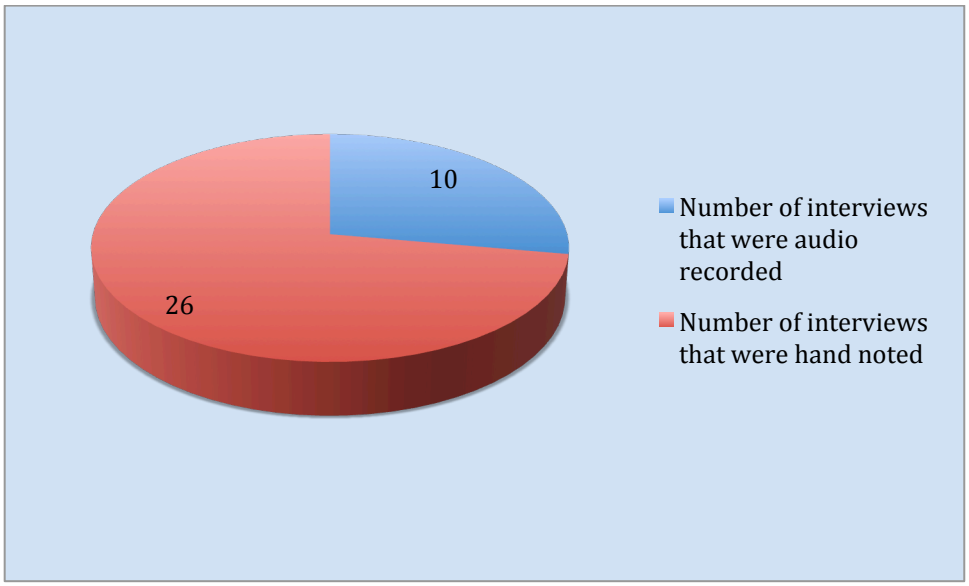

Figure 14. Number of interviews, audio recorded and hand noted.

Number of Participants

Thirty-six participants were interviewed for this study. Of the 36 participants, 30 were medical professionals (five each from modern medicine and the five branches of AYUSH). In the case of modern medicine, yoga and naturopathy and policy planners/administrators, there were further subdivisions. The modern medicine stream had three general/family physicians and two endocrinologists, as diabetes falls in the endocrinology subspecialty. The yoga and naturopathy stream had three yoga practitioners and two naturopaths. Of the six participants from the category of policy planners/administrators, there were three federal policy planners/administrators, two from the states and one from the private sector. The composition of the 36 participants is captured in Figure 15.

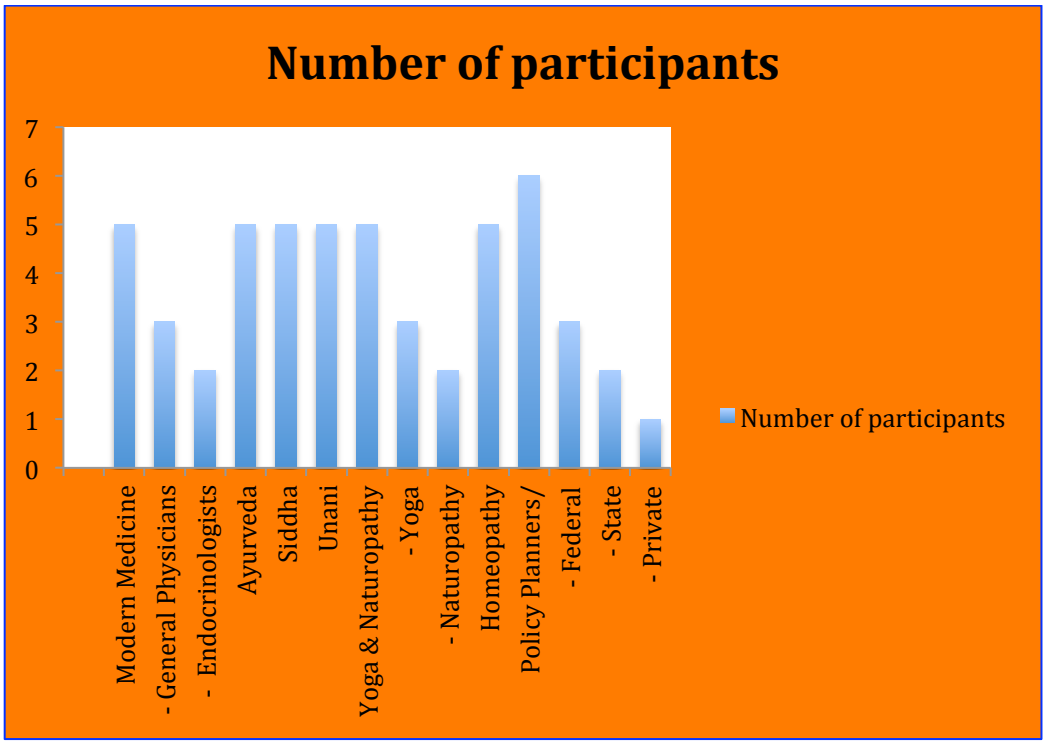

Figure 15. Composition of 36 participants.

Data Analysis

Data from all 36 interviews were transcribed using Microsoft Word software on a MacBook Pro laptop computer. The data files were backed up on a separate hard drive. Both the original and backup files were password protected to ensure data security as stated in the design of the study. The data were analyzed in a five-step process to move inductively from raw data to codes and from codes to larger representations of categories and themes. The five-step data analysis process started with careful first reading of raw transcribed data from all 36 interviews. In the second stage, the key words, expressions, and statements from all interviews were hand coded. In the third stage, the data were machine coded to derive key words, themes, statements, and expressions. In the fourth stage, the hand-coded and machine-coded data sets were compared to derive the themes

and categories induced from the two processes. At this stage, the data were also reviewed to analyze differences and dissents to identify discrepant notes. In the final stage of data analysis, the conclusions were derived alongside recommendations and leads for further research.

The above five-stage process is explained in Figure 16 on page 92. The actions associated with each step of data analyses have also been depicted in Figure 16 on page 92.

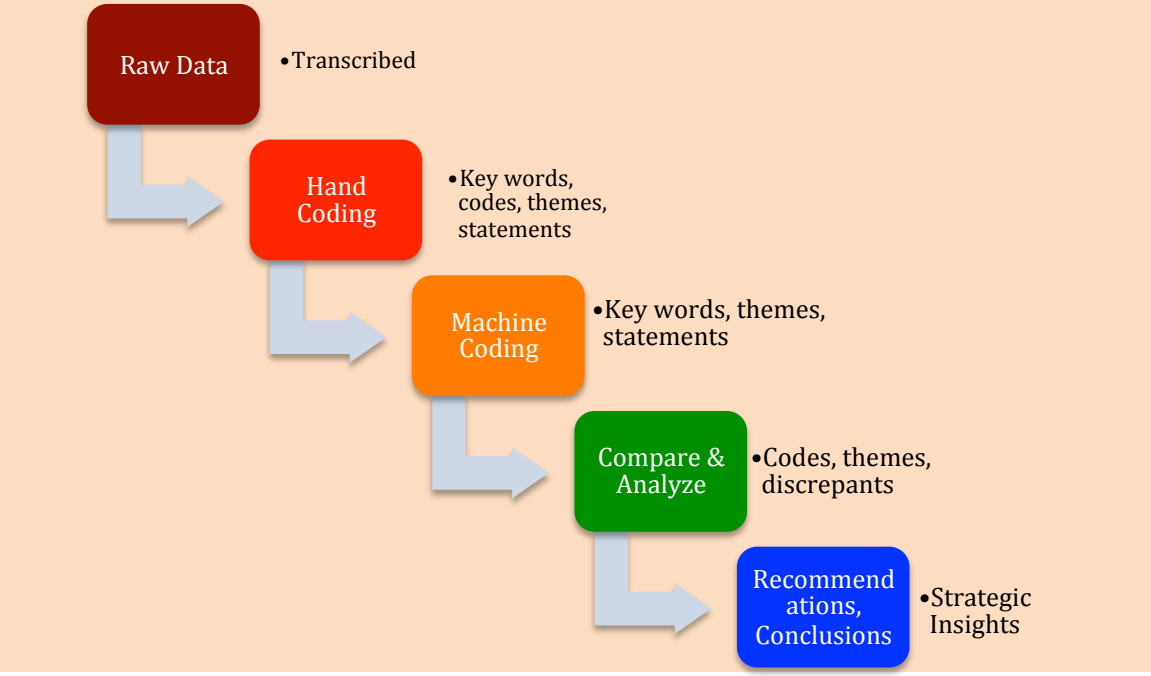

Figure 16. Five-stage process of data analysis.

Codes and Categories

A number of important themes and concepts emerged from the process of data analysis and inductive coding. Both open and axial coding processes were used for data analysis. These codes and themes were first summarized under each question and later clustered into themes and thematic conclusions in response to the two research questions.

The views on two research questions were taken using the five-question questionnaire, which was common to all categories of respondents. The codes that emerged from the analysis of data are summarized below in tabular form. The induction of themes and categories that emerged from these codes is also summarized in Table 1. The codes are listed in the left column, and the corresponding themes are in the right column in Table 1.

Table 1

Codes and Themes Derived From Data

Theme	Codes
Desirable	Desirable
	Possible
	Feasible
	Great idea
	Worthy of evaluation
	Timely
	Much needed
Preventative	Diet
	Fitness
	Health monitoring
	Moderation
	Balance
	Avoidance of stress
	Prevention
	Prophylactic
	Exercise
	Regularity
	Discipline
	Detox
	Raw foods
	Modification
	Regular yoga
	Breathing
	Relaxation
	Five elements
	Prophylactic herbs
	Plants
	Herbs
	Minerals
	Coexistence
	Regular testing
	Stimulate pancreas
	Fat metabolism
	Magnesium
	Vitamin B6
Policy concerns/challenges	No regulatory focus
	Attention
	Prudence
	Patient-centric approach
	Worthy of evaluation
	Common acceptable protocol

Theme	Codes
	Absence of prior experience
	Skilled AYUSH practitioners
	Quackery
	Pharmacological risks
	Consequences beyond diabetes into other disease areas
	Health as a state subject
	Enforcement issues
	Limited experience
	Enabling
	Medicines
Education-awareness	Comorbidities
	Obesity
	Foot examination
	Mass education
	Awareness
	Mass media
	Mass media deployment
	Mobile telephony
	Text messaging
Future of integrative approach	Pharmacological commonalities
	Pathway studies
	Clinical trials
	Yoga coexistence
	Better absorption
	Meeting point of diagnostics
	Adjunct therapy
	Complementary therapy
Implementation	Robust oversight mechanism
	Potential misuse
	Mandatory Screening
	Mandatory screening
	Patient-centric approach
Path forward	Doctors to discuss diabetes with all patients
	Educational materials
	Greater recognition for AYUSH
	Stricter quality standards
	Complementary traditional medicines
	Medical protocol
	Insurance reimbursements for AYUSH
	Yoga on national television
	Funding for clinical research
	Validation studies
	National school of integrative health
	Leverage key learnings from all traditions
	Comparable weightage to modern medicine and AYUSH
	Synchronous priorities of research—both modern medicine and AYUSH
	Standard operating procedures
	Alternatives for treatments
	Model institutions
	Pilot centers
	Complementary therapy
	Incentives
Discrepant codes/themes	Naturopathy's non acceptance of chemicals
	Self-trained homeopathy
	Large regulatory scale
	Resistance from practitioners of modern medicine
	Non compatibilities

Key Themes

Seven key themes emerged from detailed review and analysis of data and the coding process. The seven themes captured the essence of codes and themes summarized in table 1. These themes were:

- Integrative approach is a desirable solution for managing the challenge of diabetes.
- Every medical tradition has preventative tools and suggestions for avoidance and management of diabetes. These can be widely publicized and deployed to contain the proliferation of diabetes.
- There are policy concerns and challenges for implementing integrative approach that would need to be addressed for rolling out the integrative approach.
- Public education and greater awareness of integrative approach can help improve preparedness to meet the challenge of emerging diabetes pandemic.
- Integrative approach has the potential to open up avenues and possibilities for further research to meet the challenge of diabetes.
- Specific steps and guidelines will be needed to help effective implementation of integrative approach.
- Lastly the path forward for implementing integrative approach in terms of suggestions and actions required institutionalizing integrative approach.

The process of transition from research questions to the interview questions and the emergence of themes from the codes are explained in figure 16 on page 97. Figure 16

on page 97 maps the movement from two research questions to five interview questions and the seven themes from analyses of data, relating them back to the two research questions.

Figure 17. Transition from research questions to interview questions and from questions to the themes clustered from codes.

A commentary on the seven themes listed above along with a few vignettes follows:

Theme 1: Integrative approach—Desirable. The first theme was that the proposed integrative approach of combining modern medicine with AYUSH traditions to address the challenge of emerging diabetes pandemic was feasible, desirable, and much needed. The participants commented on the subject of dissertation as both being "desirable and opportune in terms of timing," given the "scale of proliferation of disease." The comment from one participant was very pertinent. "By doubling the available medical pool by combining doctors from modern medicine and AYUSH, India will be much better equipped to face the challenge of diabetes. "This is not just desirable but an absolute necessity." One participant remarked, "If our existing method and strategy were effective, we will not be seeing such high growth numbers of people with diabetes."

Vignette 1

Gita was six months pregnant and lived in a remote village. She had to change two buses and then walk for three kilometers to access the nearest hospital. She arrived at the hospital thirsty and tired and had to patiently wait for her turn to see the specialist. Since she had to be empty stomach for the blood tests, she had to control her pangs of hunger till she completed the diagnostic investigation. The Ayurveda doctor Gita consulted in the village suspected Gita had diabetes but wanted a confirmatory test that was unavailable in the remote village.

Theme 2: Integrative approach—Preventative tools. The second theme was that an integrative model that combines modern and traditional medicines would make it possible to have many more preventative tools that could be popularized. By using these preventative tools, people can avert onset of diabetes and also have access to tools and

methods for better management of disease where a patient had already developed diabetes. The interviews provided useful data and information on preventative methods in different medical traditions to prevent and/or contain diabetes. Two pertinent comments from participants brought out the importance of preventative tools. “As doctors, we know that diabetes is preventable. All it needs is an active lifestyle and prudent diet. The guidelines in modern medicine and traditional systems will offer a wide choice of preventative tips that can be used both by high-risk individuals.” The second comment related to importance of prevention. “Prevention is better than cure is well known and is worth every effort to avert a chronic health condition like diabetes. The wider choice of preventative tools will improve chances of prevention for many families.”

Vignette 2
Living alone, Sajid had to manage both his work and home. Since he worked at a call center, his diet and schedule could never get streamlined. He had to work at odd hours, eat whatever and whenever he could grab. He had no time to organize a fresh healthy meal. His pre-diabetes unfortunately degenerated into diabetes because of his own negligence.

Theme 3: Integrative approach—Challenges. The integrative approach of combining modern medicine and AYUSH had a few important challenges that needed to be addressed. The integrative approach also had potential for some areas of misuse and abuse. The challenges arose from some inherent contradictions among various medical traditions as to how the disease could be treated. One of the participants stated, “AYUSH traditions give significant role to diet and lifestyle and some of the constituent systems of AYUSH like naturopathy do not accept a role for chemically prepared medicines.” Participants, particularly the policy planners were also concerned that some of the self-

anointed non-qualified AYUSH practitioners could use this as an opportunity to enter mainstream of healthcare delivery. The specific comment was very pertinent. “It is therefore important that integrative model of modern medicine and AYUSH should be restricted only for those medical professionals who are trained, qualified and licensed to practice.” Another comment was by way of a suggestion. “The research councils of modern medicine and AYUSH could synergize efforts for joint research and validation.” One participant also commented on challenge of “availability of modern and traditional medicines in pharmacy outlets.”

Vignette 3
Rajni rarely used any medicines and was quite particular and disciplined about her diet and fitness. Whenever she was unwell she went to her neighbor who practiced homeopathy as a hobby. Her prescriptions worked well to settle Rajni’s seasonal ailments. This summer however when Rajni experienced tedium and sudden weight loss she returned to her neighbor for advice. The self-trained homeopath gave her some pills. Unfortunately, the prescribed medicine caused severe rashes all over Rajni’s body.

Theme 4: Integrative approach—Awareness/education. The theme that emerged was that the integrative approach of modern medicine and AYUSH would help add to the body of knowledge and materials for enhancing public education and awareness. For the integrative model to be successful, participants favored using mass media for creating greater awareness. A comment from one of the participants on this was, “ it should be mandatory for all sporting telecasts and soaps to carry public health messages on importance of preventing diabetes.” Some of the participants commented on the possibility of using 900 million mobile telephones in India for sending public health text messages on diabetes and the integrative model. One of the specific comments

was, “nearly every adult in India has a mobile phone. The telecom regulators ought to be persuaded to allow free of cost public health text messages to build greater awareness of prevention.” One participant stated that “electronic media has huge influence on all age groups of people and themes of prevention based on integrative approach could be used for creating content for all age groups of people including the teenagers and young adults.”

Vignette 4
David moved form his village to the city to earn more money. He had to stand for long hours at the factory floor working as a supervisor. His feet would often pain by the end of the day. One day the pain was more than normal. David noticed an injury on the big toe of his left foot. He did some self-medication and forgot about it. He had excruciating pain the next week and he could not manage to walk about on the factory floor. When he finally saw a doctor it was already too late. His toe had to be amputated. David was sadly unaware of his advanced stage of diabetes.

Theme 5: Integrative approach—Future. The next theme was that an integrative approach seeking to combine modern and traditional medicine may open up new frontiers of research on diabetes and other health conditions where best practices and learning’s from modern medicine and AYUSH could be synergistically used. The participants commented that the experiment of diabetes could be extended and expanded to other non-communicable disease as well. The specific comments were: “The non-communicable diseases (NCDs) like diabetes account for 63% of deaths in India. NCDs are man-made and can be so redressed. The integrative approach may open new pathways for joint clinical research to leverage what is best in both the modern and traditional medicine.” “Continued research is backbone of medical sciences. The useful experiment of combining modern and traditional medical sciences should encourage Indian

Government to fund join research studies." One of the medical practitioners commented, "it would help for practitioners to understand salient features of other medical traditions to offer the best possible solutions to the patients."

Vignette 5
As a medical oncologist, Dr. Dewan was deeply concerned to see his patients suffer. He was always looking for complementary and alternative ways of healing to soften the pain of chemotherapy. He was taking a course in herbal nutrition to understand the mechanics of food and naturopathy in helping with problems of malignancy. He just wanted his patients to feel better.

Theme 6: Integrative approach—Implementation. It emerged from analysis of data that a few important policy and regulatory changes would be required to create an enabling regulatory environment in order to ensure enduring long-term success of integrative approach. The regulatory framework, participants observed, would have to be suitably modified to provide parity for modern medicine and AYUSH for insurance reimbursement and many other steps. Three specific comments emphasized this theme. One comment was: " The modern medicine and traditional medicine systems are so used to working independently of each other that it would need an enabling regulatory environment and framework to make the integrative model work." Another comment was: "The health insurance in India does not reach many people but even where it reaches, it excludes AUSH treatments from its ambit. The insurance framework would need to be amended to provide parity for modern and traditional systems of medicine." A participant added: "Integrative model of modern and traditional medicine would be useful to meet the challenge of diabetes but would need support of the regulatory and policy framework."

Vignette 6
A siddha doctor was preparing for his talk on the principles of siddha medicine. He was the guest speaker at the world congress of physicians. Everyone was eager to listen to his success story in successfully treating autoimmune disease. He had worked jointly with physicians from other streams of medicine to validate his studies. Joint clinical trials were done on all the formulations he had used to test their efficacy. Diabetes was the next chronic condition this practitioner is working on.

Theme 7: Integrative approach—Path forward. The next theme related to specific steps that would be required to ensure success of integrative approach. "The integrative approach could encourage doctors of both modern medicine and AYUSH stream to initiate a dialog on diabetes every time a patient saw them." The suggestion from the participants was that "regulatory authorities could develop standard operating procedures that could make discussion on diabetes with all patients mandatory." It was felt that this "would increase levels of detection of diabetes in India and also prevent disease burden of many potential or confirmed prediabetics."

The participants commented that "integrative model of modern medicine and AYUSH should encourage mandatory screening of all patients for diabetes with appropriate guidance on lifestyle corrections, exercise and fitness." A comment offered by a policy administrator participant was very relevant: " even a good idea can be destroyed by poor planning and execution. It is therefore equally important, if not more, to plan well and execute correctly." A few other participants sounded this note of caution as well.

Vignette 7
The newly designed integrative health center inaugurated by the minister was a front-runner towards implementation of integrative approach of healthcare. At the center, all physicians were appropriately skilled in their respective fields. The patients had a choice to seek treatment in the medical tradition of their choice. All doctors, both modern and traditional at the center get together every evening to jointly discuss the health conditions, medical needs of patients and treatment protocols. The approach at the center was patient centric so that the patients would get the best possible integrative treatment.

Discrepant Cases

The data collection process generated 180 detailed answers. Each of the 36 participants answered five questions from the interview questionnaire. Of the 180 responses, there were three discrepant comments that were worthy of notice and analysis. The first comment was that "homeopathy is practiced in India by a large number of people, many who are trained and qualified and others who are self-trained but not qualified. There was an inherent risk of some quackery creeping its way into an integrative model by participation of self trained but not qualified practitioners."

The second discrepant case was a comment by a naturopathy physician that their "branch of medicine had no role for chemically synthesized medicines and therefore had some intrinsic limitations on compatibility with modern medicine in an integrative model." This in turn could mean that the "patients calling on a naturopathy practitioner may not receive truly integrative guidance." The third discrepant comment was from a policy planner who was apprehensive about the "scale of management and regulatory apparatus required for ensuring success and preventing misuse of an integrative model." The concern of this participant was that the "regulatory and coordination responsibility

would have to be well conceived and well managed.” The participant said, “ managing and coordination multiple streams will be an arduous task. Also because of multiplicity of agencies involved in administration of modern medicine and AYUSH systems of medicine who will take the final responsibility of the health and well being of the patient.”

Commentary on Discrepant Cases/Comments

Only 1.66 % of the total responses had discrepant notes/comments. However, each of the three discrepant comments was relevant and worthy of attention. Detailed analysis of comments brought out that these comments were more in the nature of apprehensions that could be mitigated by appropriate solutions and corrective steps. The comment on risk of abuse by self-taught homeopaths could be addressed by ensuring that the integrative model works only with trained and qualified physicians from modern and traditional streams of medicine AYUSH. The comment of naturopathy not accepting any chemically synthesized medicines could be addressed by recognizing that the integrative model will only seek to combine compatible best practices while isolating factors of concern that go against the benefits of an integrative system of medicine.

Naturopathy as a system of medicine has a large number of practices that are compatible with and would supplement the efficacy and benefits of modern medicine and prescriptions from other branches of AYUSH. The third discrepant comment related to practical apprehensions of a policy planner and administrator on the regulatory and monitoring framework required to handle double the number of practitioners, as both modern medicine and AYUSH would contribute a matching 750,000 practicing

doctors/practitioners each. The improved and enlarged network of physicians from all streams of medicine would help successfully implement the projected benefits of an integrative model.

The research brought out that "integrative approach was expected to benefit large number of diabetics and prediabetics with improved health outcomes."

Evidence of Trustworthiness

The framework of trustworthiness for this research was stated earlier in chapter 3 of this study. As the sole researcher, I was mindful of my special responsibility and made conscious and consistently effort to ensure trustworthiness through all the progressive stages of collection of data, transcription and analysis. My experience with the various components of trustworthiness is summarized below:

Credibility

Earlier in this dissertation in chapter 3, I had cited Patton's (2002) comment that the credibility of qualitative research substantially depends on the researcher, who is the primary instrument of research. I remained conscious of this critical need throughout the opening, developing and closing stages of the study. I was able to successfully address possible threats to internal validity in the case of this study. The first anticipated concern for internal validity was the possibility of my own enthusiasm/over-enthusiasm about the dire need and urgency of containing the emerging diabetes pandemic in India. This was ensured by maintaining a stoic and completely professional stance during the stages of selection of participants, interviewing and data collection process and finally through the stages of analysis and interpretation.

The second anticipated concern was that the proposed research questions might not evoke adequate interest among participants. This apprehension turned out to be unfounded and the response to the research questions and the interview process was complete with high level of participation by the interviewed participants. The third anticipated concern was that as sole researcher and analyzer of data, my personal biases and prejudices should not transfer to the study in any way including by way of non-verbal cues and/or signals of body language. This did not happen and the data collection and analysis were performed objectively and professionally.

Observing the participants diligently and conducting the interviews professionally as per the protocol approved by Walden IRB ensured reliability of the study. Observations, interviews, and planned visits to appropriate settings helped me gather detailed and descriptive data. The transcribed data were reviewed with the participants for clarification and to confirm accuracy of transcription. This further strengthened the credibility of the research, transcription and analysis. The only external threat envisioned was disdain for other systems of medicine by practitioners of a particular system. This was not experienced during the course of this study.

Transferability

As stated in chapter 3, the transferability of the study and its findings to related contexts and research situations were essential to the process of research. Transferability reflects the strength of design of the study, its assumptions, and the process followed for selection of participants and collection of data. By providing explicit details and specifics of the assumptions, sampling strategy, and the thought process followed to determine the

research design of the study, I ensured the transferability and reproducibility of the study. In the study, I have clearly identified the constraints and limitations encountered during the process of collection and analysis of data. These details will make it easier for any researcher or reviewer to seek transferability of this study. As seen and reported in chapter 1, the global phenomenon of diabetes and the scale and enormity of its challenge calls out for wide and expansive collaborations and corroboration between and among researchers and other stakeholders. The required information in preceding chapter and description of its execution in the current and later chapters will ensure transferability of the study to any other locale where the study or any of its components needs to be recreated.

Dependability

I noted in chapter 1 that the monumental challenge posed by diabetes in India and the world is engaging global attention from many stakeholders, the policy planners, global and national institutions, academic researchers and the solution providers. Diligent conformance to the protocol that was laid out and detailed in the earlier parts of the study, and accurate transcription and analysis of the collected data helped me ensure the dependability of this study. The conscious effort made to prevent my preconceived views, notions or prejudices from impacting the process of study and/or its eventual findings helped the process. I kept detailed notes of interviews along with audio recordings of the interview, where allowed, and the observation sheets. Dependability of the study was significantly aided by maintaining clear focus on the research questions and observance of research process as laid out in the design.

Confirmability

The interviews were audio-recorded wherever possible so that all transcripts accurately captured the responses from the participants. Where audio recording was not permitted, the accuracy of notes and answer was verified at the end of the interview process. The time tested qualitative research tool of triangulation was also used to validate confirmability. The triangulation was achieved through data collected during the observation process and cross-referencing with the transcripts of interviews and comments from the peer group during the process of coding and analysis. The data generated during the literature review process were also factored in the triangulation process. The collected data from diverse individuals and settings supported the confirmability factor of the study. The extension of participant pool from 35 to 36 helped achieve saturation and completeness of data as also helped established the confirmability factor.

Results

Results mark the finale of data collection and analysis process. "Qualitative research involves the collection, analysis, and interpretation of data that are not easily reduced to numbers." (Anderson, 2010) The two research questions of this study were as follows:

- How can the modern and traditional medicine approaches be combined to contain the proliferation and immensity of the emerging diabetes pandemic in India?

- What are the challenges and barriers of combining the methodologies articulated in the traditional systems AYUSH and the modern system of medicine in containing diabetes?

The above research questions were studied using the five-question questionnaire and the responses to the questions have been summarized. The following are the detailed results and findings of the 36 interviews in context of the two research questions.

Findings Related to Research Question 1

The analyses of data brought out the many ways in which the modern and traditional medicine approaches could be combined to contain the proliferation and immensity of the emerging diabetes pandemic in India. All participants commented on the methods and process that could be used to combine the modern and traditional approaches of medicine to manage diabetes. The participants stated that the emerging pandemic of diabetes was an urgent public health concern in India. The participants commented that effective efforts for managing and reversing the growth rate of diabetes and efforts beyond current framework are needed to contain the growth rate of diabetes in India. Analyses of data revealed that all medical traditions have guidelines that can be used jointly to prevent and manage diabetes in Indian adults in age groups of 25-45 years.

The data showed the view of participants that integrative approach was a good solution but needed careful and well-regulated execution and implementation. One of the participants suggested that all physicians be asked to take short courses in other systems of medicine to build appreciation for integrative medicine. Another participant favored conducting of joint continuing medical education seminars. Many participants suggested

setting up of pilot integrative health centers where all systems are practiced and made available to patients to build awareness of integrative methods. Analyses of data brought out the importance of education and awareness of integrative approach to be created among the patients and the community. Some of the participants' felt that creation of diagnostic labs be made available in remote areas will facilitate wider utility of integrative approach.

The analyses of interview data and observation notes brought out that the favored methods of combining medical traditions for an integrative approach to tackling diabetes would be to approach this by way of patient interaction guidelines from the central councils of medicine and by placing information materials in doctor's clinics and hospitals and by creating a mass media campaign.

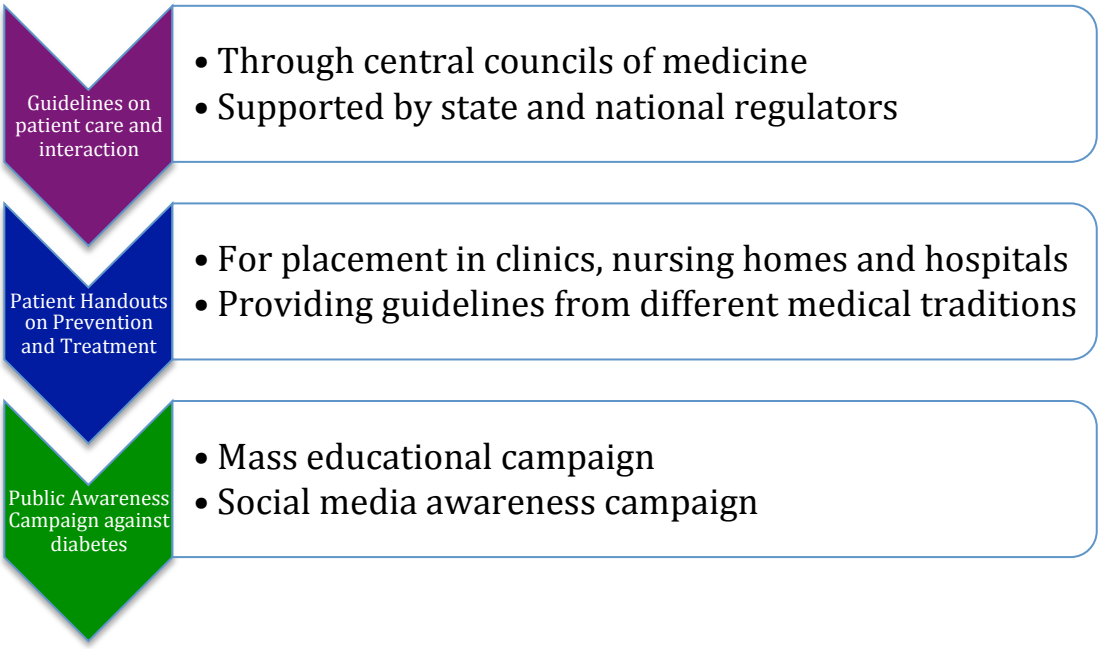

Figure 18. Recommended steps for combining modern and traditional methods.

Findings Related to Research Question 2

The second research question sought data on the challenges and barriers of combining the methodologies articulated in the traditional systems AYUSH and the modern system of medicine in containing diabetes. Analysis of data showed that 34 out of the 36 participants agreed that there were few significant but surmountable challenges in deploying an integrative approach. Two participants did not see any significant challenges or barriers. Analysis of data brought out that 35 out of the 36 participants agreed that policy framework changes would be required to implement an integrative approach.

The challenges and barriers of combining the methodologies articulated in the traditional systems AYUSH and the modern system of medicine in containing diabetes were; lack of trained personnel and resource persons, anticipated lukewarm interest among medical professionals to know about other traditions. General lack of awareness and knowledge of integrative approach, both among patients and physicians, was identified by participants as a barrier. The barriers are depicted below in a figure.

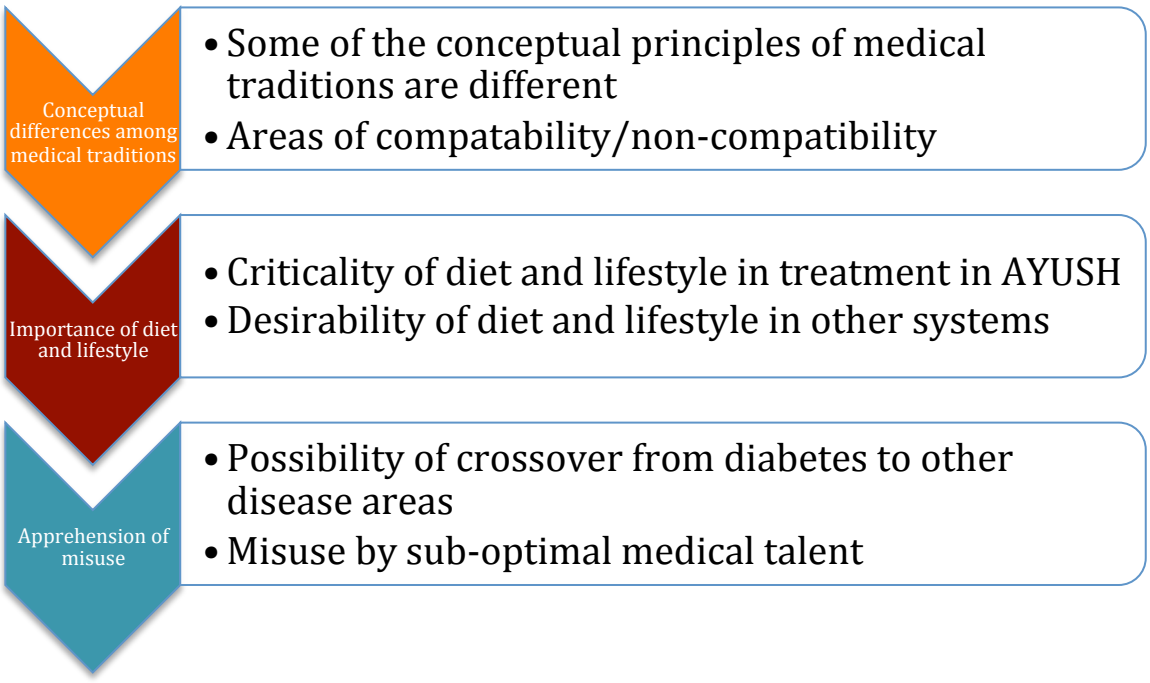

Figure 19. Challenges in implementing integrative approach.

Summary of Responses to Questionnaire

The responses to five questions by the participants from all segments are summarized below in tabular form. The responses are summarized by question for each category of participants. Table 2 captures key comments that emerged from analysis of data.

Question 1. What are the main guidelines in your medical tradition that might help prevent occurrence of diabetes among Indians in the age group of 25-45 years?

Table 2

Summary of Responses to Question 1

Medical tradition	Responses
Modern medicine	Diet, fitness, regular testing, monitoring, review of family history
Ayurveda	*Prakriti* determination, moderation in diet, balanced lifestyle, avoidance of stress, prophylactic supplements like *Triphala*
Yoga	Specific exercises for pancreatic health, overall fitness, regularity of fitness regime, moderated eating, daily routine
Naturopathy	Maintain gut health, practice detox diet once a year, more raw foods, stay with five elements
Unani	"Diabetes in Unani is called zayabetus; diabetes is caused by stress, anxiety, strain and tension, Soo-e-Mizaj-e-Kuliya, overeating, excessive use of alcohol, sedentary mode of lifestyle"
Siddha	In Siddha, diabetes is referred to as Madhumegam. Insulin metabolism is the principle for prevention and treatment of diabetes management of a disease depends on the medicine and includes modification of food, habits, and lifestyle as well.
Homeopathy	Homeopathy regards diabetes as treatable in many conditions and therefore seeks intervention at early stages. Apart from prudent management of diet and lifestyle, particularly in high-risk families where there is history of diabetes, homeopathy does not offer any specific suggestions or guidelines on prevention.
Policy/administrators	Presently the National Health policy has no guidelines for patients becoming or suffering from diabetes. Those patients who can't afford to pay private practitioners can seek treatment from state owned hospitals - both modern medicine and traditional medicine at highly subsidized or no cost. As the disease has not yet been officially declared as a pandemic or an epidemic, there are no reporting and registry guidelines.

Question 2. Please list five important preventive actions, as stated in your system of medicine, by practicing which a person can minimize the risk of becoming diabetic.

Table 3

Summary of Responses to Question 2

Medical tradition	Responses
Modern medicine	Prudent eating, regular exercise, regular clinical review, periodic testing, awareness campaign.
Ayurveda	Moderation in food, eat in accordance with Prakriti, regular exercise, eat raw food, lead a balanced life.
Yoga	Daily practice of physical yoga, practice of yogic breathing, meditation and relaxation techniques, raw food, light dinner.
Naturopathy	Stress-free life, harmony within, embrace five elements in daily living, live close to nature, eat naturally.
Unani	Syzygium cumin, Momordica Charantia, Azadirachta indica, Gossypium herbaceous, Aegle marmelos are the plant sources that can prevent diabetes.
Siddha	In Siddha tradition, the five main preventative herbs are Jambolinor Naval (Syzygium cuminii). Sarkarai Kolli (Gymnema Sylvestre), Kadalazhinjil or Eganayakam (Salacia reticulate), Seenthil or Amrithu (Tinospora cordifolia), and Vilwam (Aigil marmalose). In Siddha, siesta is not considered good for diabetes and is generally discouraged.
Homeopathy	Homeopathic medicines help in maintaining the levels of sugar, protein and fat metabolism and also help in preventing further progress and hence complications of the disease. It effectively reduces the risks associated with the disease to the bare minimum. Strict restrictions in diet and regular exercising, especially jogging or walking, are a must in diabetes management. In diabetes, people suffer from obesity, blood pressure. Specifically, supplementation of Magnesium, Vitamin B6, Manganese, Vitamin C & E, Zinc and Omega 3 through homeopathic medicines is helpful in preventing diabetes.
Policy/administrators	From a policy perspective, both the federal and state governments allocate funds from the public health budget for multimedia campaigns to educate masses about the steps required to prevent and/or treat diabetes. In the past two years, AYUSH Department has carried out a 'try AYUSH' campaign to help patients explore AYUSH as a possibility.

Question 3. What are your views on the coexistence and concurrent usage of your medical tradition with other medical traditions in India that may help to address the emerging epidemic-scale challenge of diabetes in India?

Table 4

Summary of Responses to Question 3

Medical tradition	Responses
Modern medicine	Good idea, feasible, will improve outcomes, pharmacological commonalities.
Ayurveda	Diagnostics tools, clinical trials, pathway studies.
Yoga	Yoga can coexist with all systems, catalyzes efficacy of other systems, facilitates all other therapies, make patients more positive and receptive.
Naturopathy	Coexistence only partially possible, as there is no role for chemicals in health. Modern tools of diagnosis are the meeting point.
Unani	Unani system is plant, herb, and mineral based and can coexist with all other systems.
Siddha	Siddha and other traditional systems of medicine are recognized for their effectiveness in treating chronic health conditions like diabetes. If diabetes is officially declared as a pandemic and every patient visit to any physician - modern or traditional has mandatory questioning/diagnosis or screening for diabetes, it would help contain the growth rate of disease.
Homeopathy	By its very nature and philosophy, homeopathy is compatible with all systems of medicine and is in practice used in combination with other therapies and traditions. Homeopathic medicines are thought to strengthen the immune system and to stimulate the body's vital force to heal itself based on the principle "similia similibus curenter," which means “same cures same.” This paradigm is used in modern medicine in production of vaccines. Homeopathy can be the main, complementary or adjunct therapy for most chronic and acute health conditions.
Policy/administrators	While this is an excellent idea that must be tried, the efforts in this direction so far have been very limited and restricted to a few states like Rajasthan and Maharashtra where modern medicine and Ayush physicians practice together in primary health clinics and hospitals. The success of these experiments has not yet been evaluated and it would be timely and appropriate to make an assessment before rolling out a national initiative.

Question 4. What, in your assessment, will be the main challenges of combining the modern and traditional schools of medicine to tackle the rapidly growing incidence of diabetes in India?

Table 4

Summary of Responses to Question 4

Medical tradition	Responses
Modern medicine	Common acceptable protocol, misuse by untrained people, need robust oversight mechanism, might wean people away from modern evidence-based medicine.
Ayurveda	Not enough exchange of information between and among traditions, common forums unavailable.
Yoga	Acceptance of yoga by other traditions as a complementary therapy, adequate talent pool of proficient yoga therapists, wider recognition of yoga as a medical therapy.
Naturopathy	Create greater awareness of naturopathy through educational curriculum. Give wider media exposure to benefits of using naturopathy.
Unani	While patient population accepts both traditional and modern systems of medicine, the practitioners of modern medicine do not see alternative traditions as respectfully. If this can be achieved, Unani can work in tandem with all other traditions—modern and traditional—as a part of a national containment strategy for diabetes.
Siddha	The main challenges will be that health is a state subject in India and an advisory guideline issued by Central Government faces an uphill task for execution and implementation. A way needs to be found that central guidelines are uniformly implemented throughout the country.
Homeopathy	There will be two principal challenges. First, that homeopathy is practiced by lot of self taught people who have not received any formal education or training in homeopathy. That is also the reason that this tradition is viewed as 'uncontrollable' from a policy standpoint.
Policy/administrators	The main challenge is to prevent abuse of the system by some physicians who may start prescribing medicines from systems they are not fully versed with. Some states in India have recently created a framework whereby AYUSH physicians undergo an accelerated module of pharmacology training in modern medicine. This however works differently as it enables AYUSH physicians to prescribe medicines from modern medicine. This process does not achieve the intended benefits of combining the outreach of modern and traditional medicines. The challenge of real integrative approach remains unmet.

Question 5. What are the policy changes that would be required to check the incidence of diabetes in India?

Table 6

Summary of Responses to Question 5

Medical tradition	Responses
Modern medicine	Mandatory screening, mass media awareness campaign; guidance to physicians to talk about diabetes with every patient, patient education handouts at all clinics.
Ayurveda	The policy initiatives that will need to be changed are: recognition of Ayurveda and Ayush as complete systems of medicine; enforcement of stricter standards on Ayurvedic medicines; making detection of diabetes as an integral protocol of investigation for all patients in the age group of 18 to 45 years; insurance reimbursements for Ayush treatments and medicines.
Yoga	Make yoga mandatory in all schools and colleges. All TV channels to carry yoga for health content for one-hour everyday. Funding for yogic research for diabetes. Clinical Trials, School of Integrative health at national level.
Naturopathy	Factor salient features of naturopathy in national integrative health agenda for diabetes. Encourage cooperation and not competition among medical traditions.
Unani	Diabetes should be accepted and proclaimed as a national challenge in which all traditions are welcomed to participate and play a role. The regulatory framework should be aligned appropriately to facilitate this interaction. The patient education materials and campaigns should provide equal weightage to traditional methods and systems.
Siddha	The key policy changes required are that Medical Council of India (for modern medicine) and Central Council for Indian Medicine be asked to synchronize their strategies and guidelines to allow full benefits of leveraging the scope and potential of complementarity.
Homeopathy	Two changes will be required. The Central Council for Research in Homeopathy should bring out Standard Operating Procedures and Guidelines on how all registered practitioners should identify and diagnose diabetes, irrespective of the reason of patient's visit. Second, the national formulary to be used for treatment of prediabetics and diabetics should include well-established and proven homeopathic medicines. With these two changes it should be possible to tame the runaway growth

	in incidence of diabetes.
Policy/ administrators	The policy frameworks would need to be amended and modified at multiple levels. First, would be clear guidelines on detection and diagnosis of diabetes by patients who visit modern and traditional medicine practitioners. The second layer would be guidelines on treatment within the larger scope of integrative medicine that uses both the modern and traditional approaches of medicine. The third policy change that may be helpful is to make diabetes notifiable so that the data and patient's health can be tracked in order to provide necessary help and support. The fourth policy change would be to increase availability of medicines for prevention and treatment of diabetes both from modern and traditional schools. The fifth and most important policy initiative would be to increase awareness and information about diabetes through educational curriculum and mass media campaign both print and electronic. The sixth initiative would be to harness the outreach power and capacity of 1 billion mobile telephones to help contain the growing incidence of diabetes.

Summary and Conclusions

The study has generated very useful data in support of implementing an integrative approach to addressing the emerging diabetes pandemic challenge in India. The analysis of data from interviews brought out the pros and cons of using an integrative approach with overwhelming support in favor of using the integrative approach. The data supported the concept. The challenges in implementing an integrative approach, as stated before are real but manageable with enabling regulatory support. The next chapter will deal with a discussion on findings and also explain the conclusions and recommendations. A comment in an editorial in the journal of ayurveda and integrative medicine had the following to state: “Today India is poised for a transformational revolution. Among many other priorities the new government is expected to focus on rediscovery of the contemporary relevance of our cultural identity, indigenous capabilities and aspirations of our people. Thus during 2014-2019 South Asian health sciences like Ayurveda, Yoga, Unani, Siddha, and Sowarigpa are likely to receive a big boost.” (Patwardhan, 2014)

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Chapter 5: Discussion, Conclusions, and Recommendations

Overview

The purpose of this study was to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic. The case studied in this dissertation was the emerging diabetes pandemic in India. Participatory action research was used to engage with key stakeholders to evaluate both the practicability and challenges of using an integrative approach combining the methods and outreach of modern medicine with methods and outreach of traditional medicine (AYUSH) as a potential solution for India's emerging diabetes pandemic.

The study has filled a void in the scholarly literature as well as the policy framework of healthcare in India by evaluating an integrative health delivery model that seeks to combine modern and traditional schools of medicine to contain the growth of diabetes in India. I addressed the background of the problem; the scale, enormity, and magnitude of diabetes; and the AYUSH schools of traditional medicine in the first chapter. In chapter 1, I also described the purpose and framework of the study and the rationale for the choice of research method and the theoretical framework. In chapter 2, I offered a comprehensive review of published scholarly literature on the subject of diabetes to understand the areas of emphasis and the resonating themes used in research. I reviewed 108 scholarly articles and identified a gap in scholarly literature that led me to evaluate an integrative approach that seeks to combine modern and traditional medicine as a method of dealing with the enormity of the diabetes challenge in India.

The findings of the study could potentially add significant value to the body of

knowledge for the containment of diabetes in India. In the third chapter, I detailed the research methodology and framework together with the sampling plan and the steps for data collection and analysis. The results of data analysis and the findings of the research were reported in the fourth chapter. I conducted qualitative research by way of 36 detailed interviews covering all key stakeholders as participants of the participatory action research design. Of the 36 participants, 30 were medical practitioners: five from modern medicine and five each from the five constituent medical traditions of AYUSH. The remaining six participants were policy planners and/or healthcare administrators, five from the state sector and one from the private sector. I transcribed and analyzed data collected during interviews. The data were carefully coded to inductively derive themes. The analyzed data supported a compelling case for designing and implementing an integrative approach involving modern and traditional systems of medicine (AYUSH) in meeting the challenge of the emerging diabetes pandemic in India.

An integrative approach to addressing the diabetes pandemic in India was welcomed and appreciated by the interviewed participants as a possible solution to India's emerging diabetes pandemic. The questionnaire designed to elicit answers to the research questions also sought perspectives from participants as to what might be the challenges, hurdles, and pitfalls in implementing the integrative approach. Analysis of data identified challenges that would need careful attention before, during, and after implementation of an integrative model. One of the anticipated sub objectives of participatory action research was to put together a list of key actions available in various medical traditions that could help prevent the onset of diabetes among high-risk and at-

risk populations. The objective of compiling a list of preventative tools for averting diabetes was successfully met in this study; the compiled list has been attached as Appendix O.

Discussion

As a researcher, I view discussing and understanding findings as a very important aspect of research, both for scholastic and practical reasons. "Qualitative research is useful to policymakers because it often describes the settings in which policies will be implemented" (Murphy, 1998, p. 37). The key findings of this research and their practical implications have been summarized at a later point in this chapter. The framework of participatory action research (PAR), described in chapters 2 and 3, was the method of choice for this study. This method, as stated in chapter 3, is used where there is active and interactive involvement of community and stakeholders in a research subject oriented for achieving or propelling social change. Participatory action research, as noted earlier in Chapters 2 and 3, also helps in stimulating social change through stakeholder engagement, and this study was a successful effort in that direction. The inclusion of policy planners/administrators among the panel of selected participants ensured that those responsible for policy decisions were fully engaged in this discussion. I propose to provide an executive summary of research from the contents of this chapter to all participants in the true spirit of the process of participatory action research. Walden IRB approved of this mode of dissemination of the research findings.

Research Findings in Context of Reviewed Scholarly Literature

In the second chapter, I identified six broad themes after the review of scholarly

literature. The six themes culled from the reviewed 108 scholarly research papers were as follows:

- Diabetes is a complex, multifactorial disease, and much remains to be done in medical and scientific terms to explain its causation and find a permanent cure for the various types of diabetes.
- Incidence of diabetes is much larger than estimated because of extensive nondiagnosis in all parts of the world and noninclusion of high-risk prediabetics in the count.
- Diabetes is a life-changing phenomenon for the patient, the family, and the nation's healthcare system, and therefore the educational and support needs of the patient and community need to be well provided.
- Innovative solutions need to be explored to tackle the emerging pandemic of diabetes in India.
- There are potential benefits of using complementary systems of medicine to address diabetes.
- Literature supports the continued quest for breakthrough and innovative methods to tackle the challenge of an emerging diabetes pandemic in India and the world.

The peer-reviewed literature clearly brought out the enormity of the challenge posed by diabetes in India and the rest of the world. Literature supported the need for breakthrough and innovative approaches to significantly increase the impact of methods that could halt and/or reverse the growth rate of diabetes in India and the world. Multiple

researchers evaluated the impact of different medical schools and traditions on the management of diabetes. The gap identified after the review of literature was that there was no published research to evaluate the possibility of an integrative approach combining the methods and outreach of modern medicine with traditional medicine (AYUSH) as a method to address the emerging diabetes pandemic.

This study was designed in keeping with this gap identified in the scholarly literature. The choice of methodology and theoretical framework was also made in keeping with the need to have a complete evaluation of the two chosen research questions. The two research questions that this study strived to find answers for were the following:

- How can the modern and traditional medicine approaches be combined to contain the proliferation and immensity of the emerging diabetes pandemic in India?
- What are the challenges and barriers of combining the methodologies articulated in the traditional systems (AYUSH) and the modern system of medicine in containing diabetes?

I used these two questions with the intent to determine whether and how the modern and traditional medicine approaches could be combined in an integrative healthcare model and what the challenges and barriers to this effort might be. The selection of participants, questionnaire, interviews, transcription, and data analysis were done to ensure the ability to answer the two research questions. The analysis of data brought out that the modern and traditional approaches could be combined to contain the

challenge of an emerging diabetes pandemic in India. The themes of the reviewed literature and the identified gap in scholarly literature were well addressed by this study, as demonstrated in Figures 19 and 20.

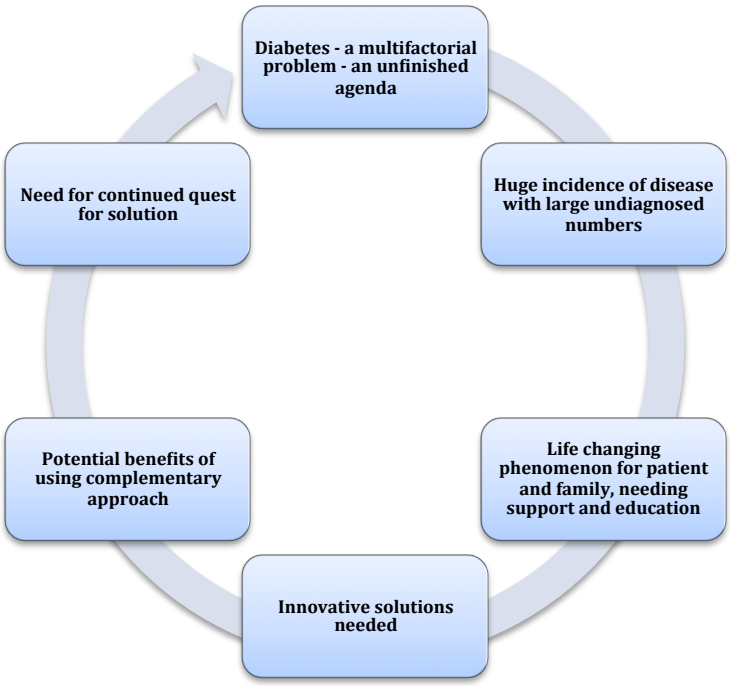

Figure 19. Themes of literature review.

Figure 20. Findings of this study.

Interpretation of Findings

The analysis of data revealed a broad roadmap for implementing the integrative approach that seeks to combine methods and outreach of modern and traditional systems of medicine. The three stages of the roadmap that emerged from analysis of data are as below.

First, the healthcare policy regulators and medical research councils of modern and traditional medicine in India could be requested to issue guidelines to medical practitioners, both for the modern medicine and traditional AYUSH practitioners. The guideline could encourage all doctors to briefly discuss diabetes with every visiting patient, the objective of patient visit to the clinician notwithstanding. In doing so, the patient population will get highly sensitized to the risk of diabetes. Patients with primary

or clinical symptoms of diabetes or family history of diabetes could be encouraged to undergo confirmatory tests for to determine the status of diabetes. Those with prediabetes symptoms could receive dietary and lifestyle guidance as per integrative tools to help them stave off the risk and challenge of becoming diabetic. The patients with confirmed diabetes could receive guidance and medication for management of diabetes to minimize or eliminate the risk of life threatening co-morbidities linked with diabetes. This could result in lowering the risk of co-morbidities and lead to likely increase in the lifespan, and quality of life of people with diabetes.

The second step could be to provide patients and at-risk population with handouts, books, e-books, catalogs, and multi-media content on methods and tips for avoiding diabetes as stated in both the modern and traditional schools of medicine. These handouts could be placed at doctor's clinics, nursing homes and hospitals and other places frequented by people. The multi-media content could be played on radio, television, and cinema as also relayed by way of text messages on the 900 million mobile phones in India. The use of preventative methods will help in containing the incidence of diabetes.

The third step could be to increase awareness of diabetes through an information and education campaign that could be coordinated by the public health machinery of the federal and state governments in India. The campaign could draw content from best practices of the modern and traditional systems of medicine. This could be by way of educational content on diabetes in different medical traditions to be included in the school curriculum and through social media campaigns of the public health agencies.

Challenges and barriers to implementing the integrative approach. A number of challenges and barriers were identified during analysis of data that could potentially interfere with smooth implementation of an integrative model that seeks to combine methods and outreach of modern medicine with methods and outreach of traditional medicine AYUSH to tackle the challenge of diabetes. The first challenge was that there are a few noteworthy conceptual differences between and among various systems of medicine. The modern medicine uses chemically synthesized drugs whereas naturopathy favors use only of natural products and herbs. This could potentially limit the extent of integrative approach in practice. The second challenge, as stated by a participant was that "in traditional systems of medicine the do's and don'ts of diet are very important in treatment of diabetes, whereas modern medicine offers only broadly contoured dietary guidelines." The corrective mechanism in modern medicine is "primarily through drug intervention", as was stated by a participant. The third challenge that was articulated was that "not all practitioners in the AYUSH schools of medicine or even modern medicine have the right credentials to practice and participate in an integrative model" and therefore "appropriate safeguards against potential misuse would have to be established." This was the comment offered by another participant.

The barriers stated above are both real and serious, but as stated by a participant "manageable." The success of an integrative model stated a participant "would require careful monitoring and oversight." A policy administrator commented, "The true metrics for success of integrative model would be in terms of marked reduction in the growth rate of diabetes in India."

Limitations

In the design of this study, I had listed three potentially limiting factors in the context of validity of this study. First was the inherent limitation of qualitative research, where the sample size is small when compared to quantitative or even mixed methods research. However, for a research a situation like the one being studied here, it would not be possible to use any method other than the qualitative method. This has been adequately discussed in the Chapter 1 and Chapter 3 of this dissertation. The subject of this dissertation required close interaction and discussion with medical practitioners and policy stakeholders and the quality and intensity of data gathered during detailed interviews could not have been obtained through the quantitative or mixed methods approach. The limitation of small sample size was in essence an academic limitation. The experience of research showed that sample size was adequate and data saturation point was systematically achieved in this study. The snowballing approach gave the opportunity to expand the sample size so that level of data saturation could be achieved.

The second limitation was that I was the single person responsible for collection and analysis of data. This potential limitation was more to do with my personal research integrity and ability to remain completely professional and objective during the course of this study. It was very important for me to keep all my "researcher biases" at bay. This objective was successfully achieved and both the interviews and data analyses processes were completed without any bias or pre-conditioning from my personal perspectives or views.

The third limitation was the omission of newest component of AYUSH – Sowa

Rigpa, the Tibetan school of medicine was not studied specifically in the data collection and analysis process. As seen in the definitions section of Chapter 1, Sowa-Rigpa appeared to be compatible with the other AYUSH constituent systems and could after appropriate research be drafted in to the integrative model.

Social Change

One of the key objectives of this study was that the participatory action research process, interviews and analysis of data should result in positive social change. In the chapters 1 & 3, some expectations were stated for the potential of this study to contribute to positive social change. I could clearly perceive the build-up for positive action on social change as I went through the process of data collection. In my assessment, the study has generated keen interest and in some measure sown the seeds for starting positive social change. The study has created a body of information that will increase the medical touch points for patients who need medical assistance or help. Medical practitioners of different traditions, as a result of the interviews and findings were able to communicate key preventative measures regarding diabetes in their respective traditions. The preventative tools could be further refined and offered for larger good of the patient population in India. The key preventative steps recommended by practitioners have been summarized and restated in the Appendix 8 as one of the key outcomes of this study.

The study has successfully drawn the attention of policy administrators to the need of aligning and fine-tuning the policy initiatives that would likely "result in wider and beneficial implications for India that is battling the scrooge of diabetes", as aptly stated by a participant.

The study, as stated by a participant "might inspire researchers to suggest integrative, wholesome and affordable approaches to preventing the incidence of diabetes and possibly other forms of non-communicable diseases in the future." The study has generated high level of interest and its eventual publication will bring its recommendations into the wider public domain and be of "great interest to the community of researchers and scholars," as commented by a participant.

The social change factors of this study will also arise, as envisaged before, and as confirmed by a participant " by way of increased acceptance of traditional medicine by people, practitioners, policy makers and the society." "The more inclusive medical engagement of various traditions will lead to a new beginning in India" was the comment offered by another participant. The comment made by a policy planner participant of the study was, "gradually an integrative approach will begin to receive wider support both from the state and the society." This study has made available valuable information on prevention and management of diabetes from both streams of physicians (modern and traditional medicine) and public health policy administrators. The study has added to the body of knowledge that may help, as stated by a participant "in prevention of a chronic lifelong disease and result in positive social change both in the public health scenario and in the lives of the individual and the community." The collaborative efforts in the future "could lead to joint clinical trials to validate the efficacy of traditional methods and medicines," was a comment by one of the participants. This could "inspire greater confidence in usage of traditional medicines and ensure better quality of products and services that would benefit the patient community in India and the world" was a

participant comment.

As demonstrated in the reviewed literature, research of this nature has the potential of causing positive social change in the lives of people by highlighting and publicizing well-researched modes of diet and lifestyle changes as championed by various medical traditions (Hu, Wallace, & Tesh, 2010). Innovative ways of prevention and containment of diabetes will save valuable socio-economic resources in the large developing economy of India (Shetty, 2012). IDF (2011) is of the view that diabetes is not only a health crisis; it is a global societal catastrophe. The ability of this study to potentially result in positive social change is clear from the above analysis.

Future Action

The study has paved the way for compilation of guidelines on prevention and treatment of diabetes as per different health traditions of India. The indicative guidelines provided in the Appendix 8 can be expanded into a very useful document that could become an important aspect of using integrative approach for containment of diabetes. The guidelines could be illustrated with visual content to make them better and easier to grasp by all shades of Indian population. The model of integrative approach could be developed further with more specificity and operational details. A pilot implementation of integrative approach could provide useful data and information for is national rollout. One of the participants recalled a comment from journal of ayurveda and integrative medicine (JAIM) in this context "A rational policy for promoting integrative medical practice based on new models of medical education needs to be formulated and promoted." (Patwardhan, 2014)

Scope for Further Research

The study has also opened up further avenues for research. The further research could take place in the area of integrative approach to diabetes or using integrative approach for other health conditions and non-communicable disease or even integrative approach as a method of designing and implementing public health policy. A participant referred to a published comment in JAIM that "AYUSH professionals should be encouraged to do robust documentation of clinical experiences, observations, case studies and procedures, so that sufficient evidence for practice is established." (Patwardhan, 2014) The study could lead to further research in all countries and geographies where traditional medicine is available as a means to complement and augment the healthcare delivery. The further research could be in the areas of joint clinical trials and development of integrative drugs and vaccines.

Conclusion

There is a visible global shift from alternative medicine to integrative health. The holistic wisdom of traditional schools like ayurveda, yoga and other AYUSH traditions offers a rich source of experience, wisdom and capabilities that are crucial for initiating enduring transformational change (Patwardhan, 2014). Innovative approaches where Indian health systems and modern medicine synergize together can realize the dream of futuristic integrative health systems. (Patwardhan, 2014)

Every modern society, community and nation is working to provide a better model of healthcare for its people "Health and healthcare systems are essential pre-requisites for a happy, successful and prosperous nation and world. Innovative and

creative thinking and solutions hold promise for a new tomorrow and a new commencement", was the comment from a participant of this study. This study has reached the conclusion that there is a powerful case for trying integrative approach combining methods and outreach of traditional and modern medicine. AYUSH research deserves a prominent place in national science laboratories and modern medical schools. (Patwardhan, 2014) This study may open many new vistas for developing future strategies of healthcare in India and other countries. I learnt during the course of interviews and data collection that while new inventions are important, harnessing time tested age-old traditions is equally essential. This study has recommended combining modern and traditional medicines for a nation that is deeply rooted in its tradition and culture in all aspects of its cultural and social life. "Countries like China and Korea have very boldly integrated traditional and modern medicines. India may also need to discover its own model of integration." (Patwardhan, 2014)

An integrative approach combining modern and traditional methods of medicine will ensure better quality of life for the people with diabetes and will help in prevention for people diagnosed with pre-diabetes. A participatory and collaborative approach amongst physicians of different streams of medicine will support a patient-centric healthcare system. AYUSH has universal value and potential to provide innovative, holistic and affordable healthcare. This is possible not by any political declaration but only if an open, scientific, critical, approach and a continuous quest for right evidence is practiced. (Patwardhan, 2014) With adequate training of modern medicine and tools of modern medicine made available to practitioners of traditional schools of medicine and

frequent interactions so as to benefit the patient will enrich the doctors and will enhance the knowledge of the patient regarding their health conditions.

India is a large nation, rooted in ancient traditions and cultural richness. It has an abundant availability of skilled resources in varied systems of medicine, and the most modern medicine with all its tools and technology. Physicians, scientist, and policy planners could come together to implement the integrative approach. The integrative approach has the potential to successfully address the emerging diabetes pandemic in India.

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Appendix A: Questionnaire for the Interviews

Q1. What are the main guidelines in your medical tradition that might help prevent occurrence of diabetes among Indians in the age group of 25-45 years?

Q2. Please list five important preventive actions as stated in your system of medicine, by practicing which a person can minimize the risk of becoming diabetic?

Q3. Request your views on coexistence and concurrent usage of your medical tradition with other medical traditions in India, that may help address the emerging epidemic scale challenge of diabetes in India?

Q4. What in your assessment will be the main challenges of combining the modern and traditional schools of medicine to tackle the rapidly growing incidence of diabetes in India?

Q5. What are the policy changes that would be required to check the incidence of diabetes in India?

Appendix B: Hindi Translation of Questionnaire

साक्षात्कार के प्रश्न

प्र १ . आप की चिकित्सा प्रणाली में मधुमेह रोग के रोकथाम के लिए क्या उपाय एवं मार्गदर्शन उपुश्ब्हें. कृपया इस प्रश्न का उतर २५ वर्ष एवं ४५ वर्ष की आयु के भारतीयों के सन्दर्भ मे बताइए?

प्र २. आप की चिकित्सा प्रणाली में मधुमय रोग के रोकथाम के लिए मुख्य पाँच उपाय बताइए, जिन के अनुसरण से मधुमय रोग एक व्यक्ति के जीवन में ना आए?

प्र ३. मधुमेह के प्रकोप से भारत को बचाने के लिए यदि आपकी चिकित्सा प्रणाली और अन्य प्रणालियों का प्रयोग और उपचार अगर एक साथ किया जाए तो इस विषय पर अपने विचार व्यक्त करें?

प्र ४. नवीन एवं प्राचीन चिकित्सा प्रणालियों को एकसाथ मधुमेह के रोकथाम में प्रयोग करने में क्या अवरोध एवं रुकावटें आ सकती हैं?

प्र ५. भारत की चिकित्सा नीतियों में क्या परिवर्तन किए जाएँ जिससे मधुमेह रोग की रोकथाम सक्षम एवं संभव हो सके?

Appendix C: Back Translation of Hindi Questionnaire Into English

Q1. What are the main guidelines in your medical tradition that might help prevent occurrence of diabetes among Indians in the age group of 25-45 years?

Q2. Please list five important preventive actions as stated in your system of medicine, by practicing which a person can minimize the risk of becoming diabetic ?

Q3. Request your views on coexistence and concurrent usage of your medical tradition with other medical traditions in India, that may help address the emerging epidemic scale challenge of diabetes in India?

Q4. What in your assessment will be the main challenges of combining the modern and traditional schools of medicine to tackle the rapidly growing incidence of diabetes in India?

Q5. What are the policy changes that would be required to check the incidence of diabetes in India?

Appendix D: The AYUSH Infrastructure in India

Registered AYUSH Practitioners:	720,937
Number of AYUSH Teaching Institutions	496
Postgraduate AYUSH Institutions	117

Coverage - 7 AYUSH Practitioners per 10,000 population

Source: Slide from PowerPoint Presentation embedded in the Ministry of Health and Family Welfare website.

Appendix E: Press Release from Indian Medical Council

Press Information Bureau
Government of India
Ministry of Health and Family Welfare

29-November-2011 17:14 IST

Doctor-Patient Ratio in the Country

As per information furnished by Medical Council of India (MCI), the total number of doctors registered (allopathic) in the country till 31st July 2011, is 8,56,065 out of which approximately six lac are presently active practitioners. The current doctor-population ratio has been worked out to be approximately 1:2000.

A large number of steps have been taken to address shortage of doctors, specialists and faculty in the country:

1. The norms for setting up of a medical college in terms of requirement for land, faculty, staff, bed/ bed strength and other infrastructure have been relaxed.

2. Teacher-student ratio has been relaxed to increase the seats at Postgraduate level.

3. DNB qualifications have been recognized for appointment to various faculty posts in medical colleges.

4. Maximum intake capacity at MBBS level has been increased from 150 to 250.

5. Maximum age for appointment of faculty has been enhanced from 65 to 70 years.

6. 46 new medical colleges have been set up between 2009-11.

7. Under the scheme of `Strengthening and Upgradation of State Government Medical Colleges`, financial support to State medical colleges is being provided to increase postgraduate seats in various disciplines or start new postgraduate medical courses.

Union Minister of Health and Family Welfare Shri Ghulam Nabi Azad in Rajya Sabha laid this information today.

Appendix F: Communication for the Nodal Institutions to Enlist Participants

Director General Indian Council for Medical Research Central Council for Research in AYUSH Or The Health Secretary Government of India (or State of ...)

Request for accessing names of practicing physicians/medical professionals/ policy planners/administrators who could be interviewed as participants in a research study: Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach

Dear Sir (Madam),

My name is Chhaya Chaudhry and I am a PhD Health Sciences research scholar at the Walden University, United States. I reside in New Delhi, India.

The subject of my research is; "**Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach."**

My research includes interviews with medical professionals and/or policy planners/administrators in your area of responsibility. I will be interviewing at the least 35 medical professionals and policy planners. The composition of these will be five each from – medical professionals/doctors from modern medicine, from Ayurveda School of traditional medicine, from Yoga and Naturopathy Schools of traditional medicine, from Unani School of traditional medicine, from Siddha School of traditional medicine, from Homeopathy school of traditional medicine as also five from category of public health

policy planners and administrators.

I will be seeking answers and views for the following research questions:

> How can the modern and traditional medicine approaches be combined to contain the proliferation and immensity of the emerging diabetes pandemic in India?
>
> What are the challenges and barriers of combining the methodologies articulated in the traditional systems AYUSH and the modern system of medicine in containing diabetes?

I request approval to access the public-access database to select coordinates of around 15 doctors/practitioners/planners, who appear on your database because of their standing and qualifications. I would write to all of them a personal note to seek their agreement to take part in these interviews. I will finally select five or more from the list of 15 in each sub-constituency of the project.

The identity and feedback provided by participants will remain confidential. The data will be analyzed without revealing identity of the interviewed participants. The process will comply with all ethical norms as prescribed by the World Health Organization for conducing clinical and medical research.

I shall be grateful to get your approval to access the public database of professionals in your area of responsibility. It will be my privilege to present you an Executive Summary of the findings of my study upon completion. I am hoping that the suggestions that may

emerge from these interviews could help find new ways of fighting diabetes in India.

Sincerely,

Chhaya S Chaudhry

chhayasanjeev@gmail.com chhaya.chaudhry@waldenu.edu Tel. +91 9811027990

Appendix G: Hindi Translation of Communication

नोडल संस्थाओं के प्रतिभागियों को भर्ती करने के लिए पत्र

महानिदेशक
आयुष में अनुसंधान के लिए चिकित्सा अनुसंधान / केंद्रीय परिषद के लिए भारतीय परिषद (आयुष घटकों में से प्रत्येक एक अलग अनुसंधान परिषद है)
या
स्वास्थ्य सचिव
भारत सरकार (या राज्य ... का)

- एक एकीकृत दृष्टिकोण के लिए एक केस अध्ययन भारत में उभरते मधुमेह महामारी: एक शोध अध्ययन में प्रतिभागियों के रूप में साक्षात्कार किया जा सकता है, जो डॉक्टरों / चिकित्सा पेशेवरों / नीति नियोजकों / प्रशासकों के नाम का डेटाबेस तक पहुँचने के लिए अनुरोध

प्रिय महोदय (महोदया),

मेरा नाम छाया चौधरी है और मैं अपने पीएच.डी. का पीछा एक शोध छात्र हूँ Walden विश्वविद्यालय में स्वास्थ्य विज्ञान, संयुक्त राज्य अमेरिका में. मैं नई दिल्ली, भारत में रहती है

मेरे शोध प्रबंध का विषय है; "भारत में उभरते मधुमेह महामारी - एक एकीकृत दृष्टिकोण के लिए एक केस अध्ययन."

मैं आपकी विशेषज्ञता के क्षेत्र में जानकार चिकित्सा पेशेवरों (या नीति नियोजकों / प्रशासकों) के साथ साक्षात्कार आयोजित की योजना है. मैं कम से कम 35 चिकित्सा पेशेवरों और नीति निर्माताओं नहीं साक्षात्कार करने के लिए योजना है. ये आधुनिक चिकित्सा, पारंपरिक चिकित्सा, योग और पारंपरिक दवा का प्राकृतिक चिकित्सा स्कूलों की आयुर्वेद स्कूल से चिकित्सा पेशेवरों / डॉक्टरों शामिल होंगे, पारंपरिक चिकित्सा, सिद्ध स्कूल परंपरागत दवा की, पारंपरिक चिकित्सा की होमियोपैथी स्कूल के रूप में भी सार्वजनिक स्वास्थ्य नीति निर्माताओं और स्वास्थ्य के यूनानी स्कूल प्रशासकों.

मेरे अनुसंधान प्रश्न हैं:

1. कैसे आधुनिक और परंपरागत चिकित्सा दृष्टिकोण प्रसार, पैमाने और भारत में उभरते मधुमेह महामारी की विशालता को रोकने के लिए जोड़ा जा सकता है?
2. मधुमेह को नियंत्रित करने में आधुनिक चिकित्सा का उन लोगों के साथ पारंपरिक प्रणालियों आयुष द्वारा प्रतिपादित के तरीके के संयोजन की चुनौतियों और बाधाओं क्या हैं?

मैं अपने सार्वजनिक उपयोग डेटाबेस से 15 डॉक्टरों / चिकित्सकों क्योंकि चयन करना चाहते हैं. ये मजबूत साख और उचित योग्यता के पेशेवरों किया जाएगा . मैं व्यक्तिगत रूप से इन इंटरव्यू में भाग लेने के लिए अपनी सहमति की तलाश के लिए उन सभी को लिखना होगा . मैं अंत में प्रत्येक खंड में 15 की सूची से पांच या उससे अधिक का चयन करेंगे .

Appendix H: Back Translation of Hindi Translation

Communication for the nodal institutions to enlist participants

Director General Indian Council for Medical Research Central Council for Research in AYUSH Or The Health Secretary Government of India (or State of ...)

Request for accessing names of practicing physicians/medical professionals/ policy planners/administrators who could be interviewed as participants in a research study: Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach

Dear Sir (Madam),

My name is Chhaya Chaudhry and I am a PhD Health Sciences research scholar at the Walden University, United States. I reside in New Delhi, India.

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My research includes interviews with medical professionals and/or policy planners/administrators in your area of responsibility. I will be interviewing at the least 35 medical professionals and policy planners. The composition of these will be five each from - medical professionals/doctors from modern medicine, from Ayurveda School of traditional medicine, from Yoga and Naturopathy Schools of traditional medicine, from Unani School of traditional medicine, from Siddha School of traditional medicine, from Homeopathy school of traditional medicine as also from public health policy planners and administrators.

I will be seeking answers and views for the following research questions:

- How can the modern and traditional medicine approaches be combined to contain the proliferation and immensity of the emerging diabetes pandemic in India?
- What are the challenges and barriers of combining the methodologies articulated in the traditional systems AYUSH and the modern system of medicine in containing diabetes?

I request approval to access the public-access database to select coordinates of around 15 doctors/practitioners/planners, who appear on your database because of their standing and qualifications. I would write to all of them a personal note to seek their agreement to take part in these interviews. I will finally select five or more from the list of 15 in each sub-constituency of the project.

The identity and feedback provided by participants will remain confidential. The data will be analyzed without revealing identity of the interviewed participants. The process will comply with all ethical norms as prescribed by the World Health Organization for conducing clinical and medical research.

I shall be grateful to get your approval to access the public database of professionals in your area of responsibility. It will be my privilege to present you an Executive Summary of the findings of my study upon completion. I am hoping that the suggestions that may emerge from these interviews could help find new ways of fighting diabetes in India.

Sincerely,

Chhaya S Chaudhry

chhayasanjeev@gmail.com , chhaya.chaudhry@waldenu.edu

Tel. +91 9811027990

Appendix I: Informed Consent Form as per the Template and Guidelines of the World Health Organization

Informed Consent Form for participating in the research on the subject: "Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach"

This informed consent form is for research being conducted by the undersigned on the subject stated above. The researcher is seeking the privilege of your participation for an interview to seek answers to research questions associated with this study.

Name of Principle Investigator: Chhaya S Chaudhry, Tel. +91 9811027990, Email: chhaya.chaudhry@waldenu.edu

Name of Organization: Walden University, USA, Tel. +1 612-312-1210Name of Project and Version: Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach.

After reviewing the information in the Consent Form, I would like to request your consent to participate in this study as an interviewee. Please indicate your consent by signing and printing your name on the last page. Please retain one copy of the signed consent form for your records and I shall collect the second copy from you for my records.

Part I: Information SheetIntroductionMy name is Chhaya Chaudhry and I am a research scholar pursuing my Ph.D. in Health Sciences at the Walden University, United States. The subject of my dissertation is; 'Emerging Diabetes Pandemic in India – A Case Study

for an Integrative Approach.' My research involves conducting interviews with knowledgeable medical professionals (or administrators (where the form will be sent to administrators and/or policy planners). The research questions for which I will be seeking answers and views relate to desirability and viability of combining the modern and traditional approaches of medicine in India to combat the formidable problem of diabetes.

Purpose of the research. The emerging pandemic of diabetes and has become a major public health challenge in India. The purpose of this study is to assess the practicability of using an integrative approach as a potential solution for India's emerging diabetes pandemic.

Type of research. This research will be conducted through individual interviews with knowledgeable medical professionals and policy planners/administrators. It is requested that I may be allowed to audio record the interview to ensure that I have captured your responses in entirety. **Participant Selection**Medical professionals, policy administrators and planners are being invited to participate in this study. **Voluntary Participation**

Your participation in this interview process is purely voluntary. If at any stage, you feel uncomfortable with the process, you can withhold your consent to participate.

Procedures. You will be asked the five questions in the course of the interview. The questions for the other participants are also the same.

Duration. The interview is expected to last for between 45 and 60 minutes and will be

conducted at a time and place convenient to you with your prior appointment and approval.

Risks. Your response will be held confidential and the data will be analyzed without revealing name and identity. There is no risk of confidentiality. The intent of this research is to get your personal opinion and inputs regardless of the views held by others.

Benefits. It is expected that this study will result in generating additional information regarding innovative solutions to address the problem of diabetes in India and the options that are available to meet the challenge of emerging diabetes pandemic. I would be very happy to share an Executive Summary of my research findings with you.

Reimbursements. I will be immensely grateful to you for your time and views. There is no provision in the study design for any form of reimbursement or incentive for the participants.

Confidentiality. The data including the audio recording and transcripts will be held confidential at all times and the findings will be collated without any names or titles. The interview transcripts and recordings will be inaccessible to anyone other than the researcher and would be preserved in password-protected hard disks for the next five years.

Please do not hesitate to reach out to me for any clarifications or doubts on this consent form or the interview process or regarding your rights and privileges. My phone number is +91 9811027990 and my mail ID is chhaya.chaudhry@waldenu.edu.

Please also feel free to contact the representative of the Walden University, USA (Tel. +1 612-312-1210, Email ID: irb@waldenu.edu) for any clarifications on this form and/or regarding your rights and privileges related to your consent to be interviewed for this study.

Walden University's approval number for this study is 04-21-14-0191600 and it expires on April 20, 2015.

Thanking you,

Yours truly,

Chhaya S Chaudhry

Signature(s) of the Participant to notify consent

Name:

Place:

Appendix J: Hindi Translation of Consent Form

वशि्व स्वास्थ्य संगठन के दशिा नरि्देशों के अनुसार और स्वरूप अनुसूचति सहमतफिॉर्म

इस वषिय पर शोध में भाग लेने के लएि सूचति सहमतफिॉर्म: "भारत में उभरते मधुमेह महामारी - एक एकीकृत दृष्टकिोण के लएि एक केस स्टडी"

यह सूचति सहमतप्रिपत्र ऊपर कहा गया है इस वषिय पर अधोहस्ताक्षरी द्वारा आयोजति कयिा जा रहा है अनुसंधान के लएि है. शोधकर्ता इस अध्ययन से जुडे सवालों के अनुसंधान के लएि जवाब तलाश करने के लएि एक साक्षात्कार के लएि अपनी भागीदारी का वशिेषाधकिार अनुरोध है.

सद्धिांत अन्वेषक का नाम: छाया एस चौधरी, दूरभाष. +91 9811027990, ईमेल: chhaya.chaudhry @ waldenu.edu
संगठन का नाम: Walden वशि्ववद्यिालय, संयुक्त राज्य अमेरकिा, दूरभाष. +1 612-312-1210
परयिोजना का नाम और संस्करण: भारत में उभरते मधुमेह महामारी - एक एकीकृत दृष्टकिोण के लएि एक केस स्टडी

आप सहमतफिॉर्म में दी गई जानकारी की समीक्षा करने के बाद, मैं एक इंटरव्यू के रूप में इस अध्ययन में भाग लेने के लएि अपनी सहमतअिनुरोध करना चाहते हैं. हस्ताक्षर करने और अंतमि पृष्ठ पर अपना नाम मुद्रण द्वारा अपनी सहमतकिृपया बताएं. अपने रकिॉर्ड के लएि हस्ताक्षर कएि सहमतफिार्म की एक प्रतबिरकरार रखें. मेरे रकिॉर्ड के लएि मुझे एक प्रतभिेजें

भाग 1: जानकारी शीट

परचिय

मेरा नाम छाया चौधरी है. मैं अपने पीएच.डी. के लिए अध्ययन कर एक शोध छात्र हूँ Walden वशि्ववद्यिालय में स्वास्थ्य वजि्ञान, संयुक्त राज्य अमेरकिा में. मेरे शोध प्रबंध का वषिय है; 'भारत में उभरते मधुमेह महामारी -. एक एकीकृत दृष्टकिोण के लिए एक केस स्टडी' मेरा अनुसंधान जानकार चकित्सिा पेशेवरों (या प्रशासकों (प्रपत्र प्रशासकों और / या नीत नरि्माताओं के लिए भेजा जाएगा जहां) के साथ साक्षात्कार का आयोजन शामलि है.

अनुसंधान मधुमेह की वकिट समस्या से नपिटने के लिए भारत में चकित्सिा के आधुनकि और परंपरागत दृष्टकिोण के संयोजन की वांछनीयता और व्यवहार्यता से संबंधति हैं.

शोध का उद्देश्य

उभरते मधुमेह की महामारी और भारत में एक प्रमुख सार्वजनकि स्वास्थ्य चुनौती बन गया है. इस अध्ययन का उद्देश्य भारत के उभरते मधुमेह महामारी के लिए एक संभावति समाधान के रूप में एक एकीकृत दृष्टकिोण का उपयोग करने की संभावना का आकलन करने के लिए है.

अनुसंधान के प्रकार

इस शोध के साथ व्यक्तगित साक्षात्कार के माध्यम से आयोजति कयिा जाएगा

चकित्सा पेशेवरों और नीतनिर्माताओं / प्रशासकों जानकार. मुझे मैं संपूर्णता में अपनी प्रतक्रियाओं कब्जा कर लयिा है कयिह सुनश्चिति करने के लिए ऑडयिो रकिॉर्ड साक्षात्कार करने की अनुमतदि.

प्रतभिागी चयन
चकित्सा पेशेवरों, नीतप्रिशासक और योजनाकारों के इस अध्ययन में भाग लेने के लिए आमंत्रति कयिा जा रहा है.

स्वैच्छकि भागीदारी
इस साक्षात्कार प्रक्रयिा में आपकी भागीदारी पूरी तरह स्वैच्छकि है. कसिी भी स्तर पर, आप इस प्रक्रयिा के साथ असहज महसूस करते हैं, तो आप भाग लेने के लिए अपनी सहमतरिोक सकते हैं.

प्रक्रयिा
आप साक्षात्कार में पांच सवालों के जवाब देने के लिए कहा जाएगा. अन्य प्रतभिागयिों के लिए सवाल भी वही कर रहे हैं.

अवधदि
साक्षात्कार 45 के बीच और 60 मनिट के लिए पछिले होने की उम्मीद है और अपने पूर्व नयिुक्तऔिर अनुमोदन के साथ एक बार और आप के लिए सुवधिाजनक स्थान पर आयोजति कयिा जाएगा.

जोखमि
आपकी प्रतक्रियिा गोपनीय आयोजति कयिा जाएगा और डेटा नाम और पहचान का खुलासा कएि बनिा वश्लिेषण कयिा जाएगा. गोपनीयता का कोई

खतरा नहीं है. इस शोध के इरादे अपनी व्यक्तगित राय है और जानकारी प्राप्त करने के लिए है.

लाभ

यह इस अध्ययन भारत में मधुमेह और उभरते मधुमेह महामारी की चुनौती का सामना करने के लिए उपलब्ध वकिल्पों की समस्या का समाधान करने के लिए अभनिव समाधान के बारे में अतरिक्ति जानकारी पैदा करने में परणिाम होगा कि उम्मीद है. मुझे लगता है आप के साथ अपने शोध के नष्किर्ष के एक कार्यकारी सारांश साझा करने के लिए बहुत खुशी होगी.

मानदेय

मैं आपके समय और वचिार के लिए आप को बेहद आभारी रहूँगी; प्रतभिागयिों के लिए प्रतपिूर्तयि या प्रोत्साहन के कसिी भी रूप के लिए अध्ययन डजिाइन में कोई प्रावधान नहीं है.

गोपनीयता

ऑडयिो रकिॉर्डगि और टेप सहति डेटा हर समय गोपनीय आयोजति कयिा जाएगा और नष्किर्ष कसिी भी नाम या शीर्षक के बनिा वश्लिेषण कयिा जाएगा. साक्षात्कार के टेप और रकिॉर्डगि शोधकर्ता के अलावा अन्य कसिी के लिए दुर्गम हो जाएगा और अगले पांच साल के लिए पासवर्ड की रक्षा की हार्ड डस्कि में संरक्षति कयिा जाएगा.

इस सहमतपित्र पर या साक्षात्कार प्रक्रयिा या अपने अधकिारों और वशिेषाधकिारों के संबंध पर कोई स्पष्टीकरण या संदेह के लिए मुझसे संपर्क

करने में संकोच नहीं करते. मेरा फोन नंबर +91 9811027990 और मेरी मेल आईडी chhaya.chaudhry @ waldenu.edu है.

कृपया इस शोध अध्ययन में भाग लेने के लिए इस फार्म और / या अपने अधकिारों और वशिैषाधकिारों के बारे में पर कसिी भी स्पष्टीकरण के लिए: भी Walden वशि्ववद्यिालय, संयुक्त राज्य अमेरकिा (दूरभाष +1 612-312-1210, ईमेल आईडी irb@waldenu.edu) के प्रतनिधिसि संपर्क करने के लिए स्वतंत्र महसूस करें.
आपको धन्यवाद
नष्ठिा पूर्ण,
छाया एस चौधरी

हस्ताक्षर (ओं) सहमतकिो सूचति करने के लिए भागीदार की
नाम:
स्थान:

Appendix K: Back Translation

Consent Form

Informed Consent Form in accordance with Guidelines of the World Health Organization

Informed Consent Form for participating joining the research on the subject:

"Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach"

This informed consent form is for research being conducted by the undersigned researcher on the above stated subject. The researcher is seeking the honor of your participation for an interview session to seek answers to research questions that are related to the study.

Name of Principle Investigator: Chhaya S Chaudhry, Tel. +91 9811027990,

Email: chhaya.chaudhry@waldenu.edu

Name of Organization: Walden University, USA, Tel. +1 612-312-1210

Name of Project and Version: Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach

After you have reviewed the information in this Form of Consent, I would like to ask for your agreement to participate in this study and to be interviewed. Please indicate your consent to participate by signing and printing your name on the last page of this form. Please keep one copy of the signed consent form with you for your records and I shall collect the second copy from you for my records.

Part I: Information Sheet

Introduction

My name is Chhaya Chaudhry and I am a PhD student scholar in Health Sciences at the Walden University, United States. The subject of my dissertation is; 'Emerging Diabetes

Pandemic in India – A Case Study for an Integrative Approach.' My research involves conducting interviews with knowledgeable medical professionals and administrators. The research questions that I will seek to evaluate in interviews center around the theme of desirability and viability of combining the modern and traditional methods of medicine in India to address the formidable problem posed by the escalating phenomenon of diabetes.

Purpose of the research

The emerging diabetic pandemic is a major public health challenge for India. The purpose of this study is to assess the practicability of deploying an integrative approach as a possible solution for emerging diabetes pandemic in India.

Type of Research

This research will be conducted by way of individual interviews with knowledgeable medical professionals and policy planners/administrators. I request that I may be allowed to audio record the interview. This will ensure that I have fully captured your responses.

Participant Selection

Health and medical professionals, administrators and policy planners are being invited to be interviewed for this study.

Voluntary Participation

Your participation in this interview process is completely voluntary. If at any stage, you feel uncomfortable with the process, you can withhold your consent to participate in this study.

Procedures

I will be asking you five questions in the interview. The same five questions will be asked to the other participants in this study.

Duration

The interview is expected to last for no more than 45 to 60 minutes and will be conducted with prior appointment at a time and place convenient to you.

Risks

Your response will be kept confidential and the data will be analyzed without revealing your name and identity. There is no risk of breach of confidentiality. The intent of this research is to get your personal opinion and inputs irrespective of the views and opinions of others.

Benefits

It is expected that this study will generate useful information regarding innovative solutions to address the issue of diabetes in India and possible different options available to address the serious challenge posed by the diabetes pandemic. I would be very happy to share an Executive Summary of my research findings with you.

Reimbursements

I am beholden to you for giving your time and views. No form of reimbursement or incentive has been provided for participants in the study design.

Confidentiality

The data from the interview including the transcripts and audio recordings will be kept confidential the findings will be put together without any names or titles. The interview

transcripts and recordings will not be accessible to anyone other than me and would be kept in a hard disk with password-protection.

I am available at all times for any clarification on this consent form and regarding your rights and privileges. I can be reached on my phone number +91 9811027990 and mail ID: chhaya.chaudhry@waldenu.edu.

Please also do not hesitate to contact Walden University, USA representative for any clarifications and for your rights and privileges in relation to the consent form on email ID irb@waldenu.edu or Tel. No. +1 612-312-1210.

Thanking you,

Yours truly,

Chhaya S Chaudhry

Signature(s) of the Participant to notify consent

Name:

Place:

Appendix L: Letter to Snowballed Participants

Draft Email/ Letter Communication to Potential Snowball Participants

Dear Sir or Madam:

My name is Chhaya Chaudhry and I am a PhD student in Health Sciences at the Walden University, USA.

The subject of my research is "Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach".

I plan to interview select number of medical professionals and medical policy planners/administrators for this study.

Your name came up during the course of an interview and I feel truly honored to reach out to you for your consent and agreement to participate in research.

I am enclosing with this communication a copy of the Informed Form of Consent for your review, approval and signatures.

I would be most grateful for your acceptance of this request and will appreciate your sending back to me a signed copy of your consent for my records. Please do retain a copy of the Consent Form for your records as well.

As indicated in the Consent Form, the interview will be for a period of 45-60 minutes and will be conducted at a place of your choice and at a time convenient to you. I would be very happy to come over to your place of work for conducting the interview.

If for any reason, you would like to have a copy of the consent form or this communication in Hindi, please do let me know and I will be happy to send a copy of this letter in Hindi as also the Consent Form.

I am very keen to have the opportunity to interview you for this study. If for want of time or any other reason, you would not be able to participate in this study, will appreciate your kind response and will fully respect your decision.

Allow me the liberty to call you in a week's time to follow up on this request.

Thanking you,

Yours truly,

Chhaya Chaudhry

Tel. +91 9811027990

Appendix M: Hindi Translation of Snowballing Letter

संभावति स्नोबॉल प्रतभिागयिों को ड्राफ्ट ईमेल / पत्र संचार

प्रयि सर या मैडम:

मेरा नाम छाया चौधरी है और मैं Walden वश्विवद्यिालय, संयुक्त राज्य अमेरकिा में स्वास्थ्य वज्ञिान में पीएचडी वद्यिार्थी हूँ.

मेरे शोध का वषिय "- एक एकीकृत दृष्टकिोण के लएि एक केस अध्ययन भारत में उभरते मधुमेह महामारी" है.

मैं इस अध्ययन के लएि चकित्सिा पेशेवरों और चकित्सिा नीतनियिोजकों / प्रशासकों के नंबर का चयन साक्षात्कार के लएि योजना है.

आपका नाम एक साक्षात्कार के दौरान आया था और मैं अपनी सहमतऔिर अनुसंधान में भाग लेने के लएि समझौते के लएि आप तक पहुंचने के लएि सही मायने में सम्मानति हूँ.

मैं अपनी समीक्षा, अनुमोदन और हस्ताक्षर के लएि इस संचार सहमतकि बारे में बताया फार्म की एक प्रतकि साथ संलग्न कर रही हूँ.

मैं इस अनुरोध की अपनी स्वीकृतकि लएि सबसे आभारी होंगे और आपके मेरे रकिॉर्ड के लएि मुझे वापस करने के लएि अपनी सहमतकि हस्ताक्षरति प्रतभिेजने की सराहना करेंगे. साथ ही अपने रकिॉर्ड के लएि सहमतपित्र की एक प्रतलिपिबिनाए रखने करते.

सहमतफिॉर्म में सूचति कयिा गया, साक्षात्कार 45-60 मनिट की अवधकि लएि कयिा जाएगा और अपनी पसंद की एक जगह पर है और आप के लएि सुवधिाजनक समय पर आयोजति कयिा जाएगा. मैं साक्षात्कार आयोजति करने के लएि अपने काम की जगह पर आने के लएि बहुत खुशी होगी.

कसिी भी कारण के लएि, आप सहमतफिार्म या हदिी में इस संचार की एक प्रतकि लएि करना चाहते हैं, मुझे पता है और मैं भी सहमतफिार्म के रूप में हदिी में इस पत्र की एक प्रतभिेजने की खुशी होगी.

मैं इस अध्ययन के लएि आप साक्षात्कार के लएि एक अवसर प्राप्त करने के लएि बहुत उत्सुक रही हूँ. समय या कसिी अन्य कारण के अभाव में, आप इस अध्ययन में भाग लेने के लएि सक्षम नहीं होगा, तो अपनी तरह की प्रतक्रियिा की सराहना करेंगे और पूरी तरह से आपके फैसले का सम्मान करेंगे.

मुझे इस अनुरोध पर का पालन करने के लिए एक सप्ताह का समय में आप कॉल करने के लिए स्वतंत्रता की अनुमति दें.

आपको धन्यवाद

भवदीया,

छाया चौधरी
दूरभाष. +91 9811027990

Appendix N: Back Translation of Snowballing Letter

Dear Sir or Madam:

My name is Chhaya Chaudhry and I am a PhD Health Sciences student at the Walden University in USA.

The subject of my dissertation is "Emerging Diabetes Pandemic in India – A Case Study for an Integrative Approach".

I wish to interview select medical professionals and health policy planners and/or administrators for the purpose of this study.

Your reference emerged during the course of an interview. I feel honored to contact you for getting your consent and acceptance to participate in this research.

Please find enclosing with this letter a copy of the Form for Informed Consent for your review, approval and signatures.

I will much appreciate your accepting this request and will be very obliged to you accepting this request. I will appreciate your sending back to me a signed copy of the consent for the purpose of my records. Please do keep a copy of the Consent Form for your records too.

The interview as suggested will be for a period of 45-60 minutes. It will be conducted at a place of your choice whenever convenient to you. I amhappy to come to the place of your work for conducting the interview.

In case you would like to have a copy of the consent form and this letter in Hindi, I will be happy to send the same.

I am keenly looking forward to the opportunity to interview you for this study. In case you are unable to for want of time or any other reason join this study, I will fully respect your decision.

Allow me the freedom to phone or reach you in a week's time to follow up on my request.

Thanking you,

Sincerely,

Chhaya Chaudhry
Tel. +91 9811027990
chhaya.chaudhry@waldenu.edu
chhayasanjeev@gmail.com

Appendix O: Summary of Findings on Preventative Steps

Modern Medicine

Prudent eating, Regular Exercise, Regular clinical review, Periodic Testing, Awareness Campaign

Ayurveda

Moderation in food, Eat in accordance with priority, Regular exercise, Eat raw food, Lead a balanced life.

Yoga

Daily practice of physical yoga; Practice of yogic breathing, meditation and relaxation techniques; raw food; light dinner.

Naturopathy

Stress free life; harmony within, embrace five elements in daily living; live close to nature; eat naturally.

Unani

Syzygium cumin; Momordica Charantia; Azadirachta indica; Gossypium herbaceous; Aegle marmelos are the plant sources that Unani system recommends for prevention of diabetes.

Siddha

In Siddha tradition, the five main preventative herbs are Jambolinor Naval (Syzygium cuminii). Sarkarai Kolli (Gymnema Sylvestre). Kadalazhinjil or Eganayakam (Salacia reticulate), Seenthil or Amrithu (Tinospora cordifolia) and Vilwam (Aigil marmalose)

Homeopathy

Homeopathic medicines help in maintaining the levels of sugar, protein and fat metabolism and also help in preventing further progress and hence complications of the disease. It effectively reduces the risks associated with the disease to the bare minimum. Strict restrictions in diet and regular exercising, especially jogging or walking, are a must in diabetes management. In diabetes, people suffer from obesity, blood pressure. Specifically, supplementation of Magnesium, Vitamin B6, Manganese, Vitamin C & E, Zinc and Omega 3 through homeopathic medicines is helpful in preventing diabetes

Policy Perspective

From a policy perspective, both the federal and state governments allocate funds from the public health budget for multimedia campaigns to educate masses about the steps required to prevent and/or treat diabetes. In the past two years, AYUSH Department has carried out a 'try AYUSH' campaign to help patients explore AYUSH as a possibility

Curriculum Vitae

Chhaya S Chaudhry

Personal

Born in 1964, Indian citizen since birth. Have lived in India, Malaysia, Singapore, UK and USA. Presently based in New Delhi, India. Married. Two children.

Academic

BA (Honors) from Delhi University, India in 1986

Masters in English Language and Literature from Delhi University, India, 1988

Postgraduate diploma in Journalism, Bhartiya Vidya Bhavan University, 1989

Pursing Ph.D. in Health Sciences at Walden University since June 2010

Professional

Founding Director of Devang Holdings Private Limited, India. Devang is in the business of health and lifestyle and has business presence across India and other parts of the world.

Founding Director of Devang Health Private Limited, India. Devang Health is a wholly owned subsidiary of Devang Holdings and is in the business of healthcare innovations.

Founding Director of CSC Nutrigenomics Pte Limited, Singapore. The company was Asia's first business in the field of Nutrigenomics research.

Conferences

Participated in several international conferences and seminars in the field of health sciences in Europe, Asia and North America.

Delegate-Speaker at European Nutrigenomics Organization conference in Cork, Island.

Delegate-Speaker at Sage & Science International Conference in San Diego, CA.

Delegate-Speaker at Science Beyond Science conferences in India, UK, Mauritius and USA