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# Awareness of Type II Diabetes in the Developing World: Case Study in Binh Du'ong, Vietnam

Anna Hong Le  
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**AWARENESS OF TYPE II DIABETES IN THE DEVELOPING WORLD:  
CASE STUDY IN BÌNH DƯƠNG, VIETNAM**

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SCHOOL FOR INTERNATIONAL TRAINING  
VIETNAM: CULTURE, SOCIAL CHANGE, AND DEVELOPMENT  
FALL 2012

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Gracious thanks to Dr. Danh, my advisor. Thank you for allowing me to research at the Center of Health Prevention in Binh Duong. Thank you for taking the time out of your very busy schedule to advise me and provide me with the information and connections I needed to make this project successful. Thank you as well to the staff at the center for helping me in translating, interviewing, and analyzing my research results.

And finally, words cannot express my gratitude to Co Thanh and Chi Vy for their support and guidance throughout my entire semester in Vietnam. This experience truly was invaluable to me and has taught me a tremendous amount about myself and my ancestral homeland – my que huong.

### **ABSTRACT**

Vietnam's rapid economic development after 1986 forever changed the lifestyle of the Vietnamese. Economic development has highly impacted behavior, "changing from a traditional lifestyle to an industrial lifestyle [increasing] noncommunicable diseases (NCDs) : diabetes, overweight, high blood pressure, and high cholesterol disorders" (Danh, Personal Interview). With the increase of NCDs within the country, it is important to focus on awareness education that motivates the population especially those living in the urban sector to practice healthy behaviors. This study project focuses on the evaluating the reach and effectiveness of current diabetes awareness educational materials. One week was spent in Ha Noi, gathering background information from experts including medical professionals at the National Hospital of Endocrinology, one of the largest treatment and care centers for diabetes in the country. The second portion of the project was spent conducting a case study in Binh Duong, a province well-known for its industrial economic stronghold. My results and analysis are based on expert insights, NHE's 2011 large-scale survey, and my case study interviews with twenty-six Binh Duong residents. I focused my analysis based on age and occupations of my case study participants. I was also able to gather insight into the effectiveness of exposure and comprehension of awareness material through interviewing the participant. According to the NHE survey and my case study, there is a large amount of awareness material channeling through mass media, posters, leaflets, and medical staff, however comprehension of diabetes knowledge is low. With a tight budget for awareness communications, it is important that the communications tools utilized by the NHE and provincial centers are reaching those at high-risk from diabetes and other non-communicable diseases with comprehensible information and realistic advice. The next step in perpetuating awareness throughout the country is to identify the best communication method and to focus the awareness materials on healthy living styles of diet and exercise, as expressed by many case study participants and experts.

## **TABLE OF CONTENTS**

<b>ACKNOWLEDGMENTS</b>	<b>2</b>
<b>ABSTRACT</b>	<b>3</b>
<b>TABLE OF CONTENTS</b>	<b>4</b>
<b>LIST OF ABBREVIATIONS &amp; LIST OF IMAGES, TABLES, &amp; FIGURES</b>	<b>5</b>
<b>INTRODUCTION</b>	<b>6</b>
<b>BACKGROUND</b>	
GLOBAL CRISIS OF DIABETES EPIDEMIC WORLDWIDE	<b>6</b>
WHAT IS DIABETES?	<b>7</b>
<b>VIETNAM, DOI MOI, &amp; DIABETES</b>	<b>8</b>
<b>METHODOLOGY</b>	
A. INTERVIEW WITH EXPERTS	<b>10</b>
B. CASE STUDY AT TRUNG TÂM Y TẾ DỰ PHÒNG BÌNH DƯƠNG (CENTER ON HEALTH PREVENTION IN BINH DUONG)	<b>11</b>
<b>RESULTS &amp; ANALYSIS</b>	
A. CASE STUDY & NHE 2011 SURVEY	<b>12</b>
B. ECONOMIC DEVELOPMENT AND RISK FACTORS	<b>14</b>
C. CURRENT AWARENESS MATERIALS & ACTIVITIES	<b>18</b>
I. CHANGING DIABETES @ VILLAGE & WORLD DIABETES AWARENESS DAY WALK	<b>19</b>
II. POSTERS & LEAFLETS	<b>21</b>
III. DIABETES CLUB	<b>23</b>
IV. MEDIA BROADCASTING	<b>25</b>
D. IMPACT OF CURRENT AWARENESS EDUCATION MATERIALS	<b>25</b>
<b>DISCUSSION: BARRIERS AND FUTURE OUTLOOKS</b>	
A. LIFESTYLE & BEHAVIOR	<b>30</b>
B. UPDATING & DEVELOPMENT OF COMMUNICATION CHANNELS	<b>31</b>
C. HEALTHCARE STRUCTURE & FUNDING	<b>32</b>
<b>CONCLUSION</b>	<b>33</b>
<b>APPENDICES</b>	
A. GENERAL QUESTIONS FOR INTERVIEWS WITH PROFESSIONALS	<b>34</b>
B. INTERVIEW QUESTIONS FOR CASE STUDY SUBJECTS	<b>35</b>
C. EMAIL INTERVIEW QUESTION FOR DR. NGUYEN THANH DANH	<b>39</b>
D. NHE 2011 SURVEY RESULTS FROM SOUTHEAST REGION	<b>41</b>
<b>BIBLIOGRAPHY</b>	<b>42</b>

## LIST OF ABBREVIATIONS

NIDDM	Non Insulin Dependent Diabetes Mellitus
WHO	World Health Organization
IDF	International Diabetes Federation
CDC	Center for Disease Control
HCMC	Ho Chi Minh City
BD	Binh Duong
WDF	World Diabetes Federation
NHE	National Hospital of Endocrinology
MOH	Ministry of Health
BMI	Body Mass Index
NCD	Non-Communicable Diseases
NIN	National Institute of Nutrition
TTYTDP	Trung Tâm Y Tế Dự Phòng Bình Dương (Center on Health Prevention Binh Duong)
ĐTĐ	Đái Tháo Đường (Diabetes)

## LIST OF IMAGES, TABLES, & FIGURES

<b>Image 1:</b> TTYDP – Center on Health Prevention in Binh Duong	<b>10</b>
<b>Image 2:</b> Changing Diabetes Village ® Stage at Thong Nhat Park in Hanoi, VN	<b>18</b>
<b>Image 3:</b> Back design of Hanoi’s 1 <sup>st</sup> annual World Diabetes Day Walk T-shirt	<b>19</b>
<b>Image 4:</b> Diabetes is a Silent Killer, poster	<b>20</b>
<b>Image 5:</b> Changing Diabetes ® Booklet	<b>21</b>
<b>Image 6:</b> Phòng Chống Đái Tháo Đường Là Bảo Vệ Sức Khỏe Của Bạn, Leaflet	<b>22</b>
<b>Image 7:</b> Chế Độ Ăn Uống Và Luyện Tập Cho Người Bệnh Đái Tháo Đường, Leaflet	<b>22</b>
<b>Image 8:</b> Vì Cuộc Sống Tốt Đẹp Hơn của người mắc Đái Tháo Đường, Diabetes Club Info Card	<b>23</b>
 <b>Table 1:</b> Demographic Information of Case-Study Subjects	 <b>12</b>
 <b>Figure 1:</b> Occupation and Age Proportions of Case Study Participants	 <b>13</b>
<b>Figure 2:</b> Metabolic Risk Factors from WHO Vietnam Profile 2011	<b>14</b>
<b>Figure 3:</b> Comparison of Comprehensive Diabetes Knowledge with Subjects’ Habits	<b>17</b>
<b>Figure 4:</b> Comparison of Subjects who had heard about diabetes and their evaluated knowledge	<b>26</b>
<b>Figure 5:</b> Case Study – Source of Initial Communication Source about Diabetes by Age Group	<b>27</b>
<b>Figure 6:</b> Case Study – Source of Initial Communication Source about Diabetes by Occupation	<b>28</b>

## INTRODUCTION

On nearly every intersection throughout the city of Ho Chi Minh City sprouts signs of urbanization and economic development--of the fast food variety. From my morning jogs in District 3 to the afternoon motorbike rides home to my homestay in Tan Binh, sights of Jollibee, Lotteria, KFC, Pizza Hut, Pizza Inn, and even a new Burger King prompted a funny reminder of home but also reflects the influence of western urbanization. Access to a variety of food has exploded over the past two decades in Vietnam. There is a general ease to purchase quick meals right outside of schools, within neighborhood alleyways, and around the workplace. From morning to night, you can purchase breakfast to a late night dinner from many small restaurants, street vendors, and large franchised restaurants for relatively cheap prices. Vietnam's urban population is embracing the "western" lifestyle as the people are working more office jobs (*vấn phòng*) or manufacturing jobs (*công nghiệp*) that require less physical activity. The gradual shift over the past decade to a more "western" lifestyle is an unavoidable result of Vietnam's Đổi Mới, or economic reformation. These results need to be recognized and addressed for the present and future sustainability of the country's economic growth, especially in terms of the healthy well-being of the Vietnamese working population.

The purpose of this independent study aimed to analyze the reach and effectiveness of the awareness propaganda measures the the Ministry of Health, local community organization, and the healthcare providers were utilizing in order to inform the general urban public about diabetes. In order to conduct this study, I also had to understand the impact of economic development and the Vietnamese healthcare structure. To explore and evaluate the effectiveness of current measures I collected data from previous survey results and my own case study work in Bình Dương, Vietnam.

## BACKGROUND

### A. DIABETES WORLDWIDE

As of September 2012, WHO estimates that there are 347 million people worldwide suffering from diabetes, the "silent killer" (*Diabetes Factsheet*, WHO). Some may think the disease is exclusive to developed countries however, many developing countries such as India, have experienced a rapid

increase in the past few decades. Eighty percent of diabetes-related deaths occur in developing countries (*Diabetes Factsheet*, WHO). Between 2008 and 2030, WHO projects that diabetes-related deaths will increase by two-thirds. These are alarming projections especially for countries that are struggling to further their economic development and dealing with the burden of infectious diseases. The rise of non-communicable diseases will over-stress systems that were structured to treat and prevent infectious diseases (Lai)

## **B. WHAT IS DIABETES?**

Diabetes results from chronic high blood glucose. Blood glucose levels naturally rises after consumption of a meal, signaling the release of the hormone insulin from beta-pancreatic cells (Board, A.D.A.M.). The hormone triggers muscle, fat, and liver cells to uptake the excess glucose for storage. However, poor response or resistance by the body cells to insulin hinders the uptake of the glucose. There are different forms of diabetes resulting in similar complications. This study project focuses on Type 2 diabetes, which makes up 80-90% of all diagnosed diabetes cases (*Diabetes Factsheet*, WHO).

Diabetes Type 2 or non insulin dependent diabetes mellitus (NIDDM) results from poor cellular response to insulin. These cells' receptors have become degraded and unresponsive due to chronic high blood glucose, so they are unresponsive to insulin. A diabetic patient presents several of the following symptoms: "polyuria, polydipsia, constant hunger, weight loss, vision changes, and fatigue" (*Diabetes Factsheet*, WHO). There are several diagnosis tests such as a fasting blood glucose test, Hemoglobin A1c, or oral glucose tolerance test (Board, A.D.A.M). Undiagnosed and poorly managed diabetes care can lead to retinopathy and neuropathy particularly in the extremities. Diabetes can also increase risk of cardiovascular disease and renal disease (Centers)

In terms of treatment, proper control of glucose levels and care management of complications are necessary to delay chronic effects and improve quality of life. Behavioral changes have the most significant impact. Patients who "follow a health meal plan and exercise program," have "self-management education," and avoid risk factors that damage blood vessels such as tobacco usage are able to delay complications (*About Diabetes*, WHO). Along with behavioral changes, WHO recommends that



patients are screened yearly for retinopathy, blood lipid testing, and for renal disease precursors. A study in the U.S. found that “every percentage point drop in H<sub>A1c</sub> blood test result can reduce the risk of microvascular complications by 40%” in a diabetic patient (Centers 10). Patients who are at high-risk or pre-diabetic are able to reduce the chances of becoming diabetic. The Diabetes Prevention Program reported that interventions target at these patients reduced Type 2 diabetes development by 58% during a 3-year period, returning their blood glucose levels to normal (Centers 12).

Diabetes is an economic burden. The CDC reports that in the United States, “medical expenses for people with diabetes are more than two times higher than for people without diabetes”. Total cost directly and indirectly for the year 2007 was 174 billion dollars (Centers 7). Intervention targeted at high-risk, pre-diabetic, and healthy individuals is a cost-effective measure to reduce the economic burden of the disease.

### **VIETNAM, ĐỔI MỚI, & DIABETES**

The research results, interviews, and observations all took place in Hanoi, the capital of Vietnam located in the north, and Binh Duong, a province in the south, bordering HCMC. Vietnam is located in Southeast Asia, bordered on the west by Cambodia and Laos, on the north by China, and on the east by the Pacific Ocean. The 2011 estimated population is 89 million with a life expectancy of 73 years and 77 years for male and female, respectively (*Vietnam Profile*, BBC). In 1986, Vietnam experienced a major economic reformation, otherwise known as Đổi Mới. In the decades following, poverty levels significantly decreased, GDP per capita increased, and the urban population rate rose. The World Bank reported the GDP per capita was \$1,260 USD for the year 2011 with a GDP growth rate of around 5% (Nguyen, Lecture). From 1986 to 2011, the urban population sector has increased to 30% (Le, Lecture). Vietnam is currently considered a middle-income developing country (Tran).

The overall healthcare structure of Vietnam is organized into a hierarchy. Standing at the head is the Ministry of Health serving as the national authority over provision of health services (Beran). The MOH works directly with National Hospitals and large centers of health education and research, as well as the medical school system. Preventative healthcare, family primary care particularly for women and

children, and control of communicable diseases are under the provision of the provincial and district health authorities. Each of the 63 provinces has two branches of healthcare services -- health prevention and treatment. The district level authorities provide similar services as the provincial but also are responsible for serving in remote areas (Beran). There are 698 centers at the district level, with a majority equipped with mobile units to reach the remote area. The 11,112 commune health stations throughout the country are “focus on hygiene, providing vaccinations, antenatal care, and health education” (Beran). Although there are many levels and centers of healthcare access for the population, many prefer seeking treatment at the hospitals, causing an overload of patients at the hospitals.

The leading causes of death in Vietnam are cardiovascular disease (40%), communicable, material, perinatal, and nutritional conditions (16%), Cancers (14%), and respiratory diseases (8%). Diabetes only accounts for 3% of total deaths in 2010 (WHO Health profile 2010). Though diabetes is relatively low compared to the top five; it could be linked to hypertension, heart disease, and renal failure. From 1992 to 2001, the prevalence of DM increased by 2.5 times (Yokokawa). An estimated 5 million people have diabetes in Vietnam (Denmark). A 2005 survey evaluating prevalence showed that diabetes prevalence is as such: high mountainous areas-2.1%, midland-2.2%, delta and coastal areas-2.7%, and urban and industrial area-4.4%. The national prevalence is 2.7% (Le, Powerpoint). More recently, the IDF reported that the prevalence is 5.7% with 3 million diagnosed and 2 million undiagnosed. Vietnam is included in the IDF’s Western Pacific region, where the largest population of diabetic patients is living.

The National Hospital of Endocrinology is the major center of diabetes care and management. Eighty percent of the patients are diabetic patients (Le, Interview). Vietnam’s Diabetes Prevention Program was established in 2010 under the direction of medical staff at NHE with the support of the MOH. The program receives about \$2,000,000 USD from the government to spend on prevention programs, training, and awareness campaigns (Le, Interview). Under the National Diabetes Prevention Project, the NHE conducted a survey in 2011 to assess diabetes awareness. Over 13,000 subjects were interviewed and screened throughout five regions in the country. After assessment of the survey, the general outcome was that diabetes awareness was low (Le, *Survey 21*). The results of the survey directed

the Diabetes Prevention Program to write the *Master Plan for National Diabetes Mellitus and Metabolic Disorder Syndrome Control and Prevention in Vietnam Period 2011-2020*. Many of the experts I interviewed agreed that awareness education and proper training of medical staff and diabetic patients in care management were keys in controlling the prevalence of diabetes in Vietnam. Awareness programs are more cost-effective than expending on medications and covering costs of complications. Patients who maintain good blood glucose level spend about \$100-\$150USD per month where as a patient who has poor management and thus deals with complications resulting from diabetes pays up to \$800USD per month (En.baomoi.com).

## **METHODOLOGY**

### **A. INTERVIEWS WITH EXPERTS**

My objective for my week-long study in Ha Noi was to familiarize myself with the general structure of Vietnam's healthcare system, particularly of the preventative health branch and to learn about the current state of diabetes prevalence and awareness measures in Vietnam. I interviewed experts from the field of nutrition and medicine gathering their insights of current Ministry of Health's plans on prevention as well as discuss the relationship between economic development and the increase of NCDs. Several of the experts provided published data, survey results, and plans from their departments. I reviewed those works to supplement the information the experts provided during interviews. By coincidence, the week I stayed in Ha Noi was also the same week the National Hospital of Endocrinology in collaboration with Novo Nordisk, a Danish healthcare company, was holding events to commemorate Diabetes Awareness Month, concluding with a World Diabetes Awareness Day Walk.

In total, I was able to conduct 9 interviews. All were conducted in English except one where I had the assistance of Dr. Duong to translate Vietnamese terms I was not familiar with. Each interview was scheduled at the time most convenient for the interviewee at their place of work. The interviews were semi-structured with standard questions (Appendix A) and questions I prepared according to the interviewee's specific background.

## **B. CASE STUDY AT TRUNG TÂM Y TẾ DỰ PHÒNG BÌNH DƯƠNG (CENTER ON HEALTH PREVENTION IN BINH DUONG)**

Bình Dương is a province located about 30km from HCMC. BD is bordered by TP. HCMC in the southwest, Tỉnh Đồng Nai in the southeast, Tỉnh Tây Ninh in the northwest, and Tỉnh Bình Phước in the northeast. The province is divided into 4 districts -Bến Cát, Dầu Tiếng, Phú Giao, and Tân Uyên, 2 towns -Dĩ An and Thuận An and its capital city, Thủ Dầu Một (*Southeast/Binh Duong*). BD is well-known for its industrial parks, such as the Vietnam Singapore Industrial Park. According to the province of BD visitor website, the province has 28 industrial parks covering 8,700 areas with 1,200 domestic and foreign enterprises making a capital of \$13 billion USD in 2011. A majority of the population are industry workers (Nguyen, Personal Interview). The current population as of December 2011 is 1,727,154 where 59.9% is of the working age, 4.74% hold university degrees, and 16.02% hold vocational degrees. GDP increased from 2006-2010 at a rate of 14% (*Southeast/Binh Duong*). In 2010, contributions to the GDP of the province were as such: 63% industry/construction, 32.6% services, and 4.4% agriculture/forestry.

Dr. Nguyen Do Nguyen suggested that I conduct my case study research in BD with his former student, Dr. Nguyen Phan Danh, who had previously conducted diabetes research in Thuan An. Dr. Danh Nguyen has held the position of vice-director of the center for the past 12 years and is a specialist in diabetes.



**Image 1: TTYTDP – Center on Health Prevention in Binh Duong, where I conducted my interviews**

This province-level office provides services such as health screenings, education and training classes, and vaccinations for the public. Target health prevention services of the center are high blood pressure, malaria, endocrine diseases. Fifty-four people work at the center including 10 doctors. Approximately 100 people visit the center each day for vaccinations, screenings, or general check-ups. The center offers HPV virus, whopping cough, tetus, Polio, hepatitis B, chicken pox, measles, and flu vaccinations for a subsidized fee. In particular, the endocrinology department sees 2-3 patients per day for care management counseling. In terms of awareness education, this center is responsible for distributing information to the district and commune health stations. Each year, staff from the center visits local centers to retrain medical staff and conduct community classes (Nguyen, Personal Interview).

I conducted 27 interviews with the assistance of Trâm Trân, a recent graduate of the public health school in HCMC. She assisted with translating and conducting the interviews with me under the advice of Dr. Danh Nguyen. The interviews lasted between 5-7 minutes, taking place on the first floor of TTYTDP. Interviews were structured with yes/no, closed-ended, and open-ended questions (Appendix B). These interviews were informal, pooling subjects from the residents visiting the center for screening and vaccinations. The interview questions covered general background, lifestyle, diet and habits, and awareness of diabetes, particularly focusing on how the subject knew about diabetes. Interviewee identification was undisclosed. I labeled each of the interviewees by number and their names were not asked for. Though, this measure was not the best way to get a random sample of people, Dr. Danh expressed it would probably be the easiest measure to get in contact with participants especially in the amount of time I had in BD. I wanted to target non-diabetic, 25-65 years old individuals, but due to my limited time in BD and the difficulty in recruiting subjects for interviews, I did end up interviewing one diabetic patient and one person above the age of 67. I decided in my analysis to not include the response of the diabetic patient, who I assumed had already been educated about her illness through her physician.

Interviews during the case study were conducted in Vietnamese with the assistance of Tram translating responses I did not understand. I do not see the language barrier as a significant barrier overall.

## RESULTS & ANALYSIS

### A. CASE STUDY & NHE 2011 SURVEY

My analysis integrates results from come both from my case study and the most recent statistical data collected through the *Survey of Knowledge, Attitude and Practice on Prevention of Diabetes in Vietnam in 2011* provided to me by Dr. Phong Le. The objectives of that survey and assessment were motivated by the belief that “the knowledge, attitudes, and practices of the community play a decisive role in the successful prevention of diabetes” (2). The survey was a cross-sectional study targeting subjects between the ages 30-64 years old. The subjects were selected at the commune/ward level by a systematic random method. Selected subjects were interviewed with the same pre-set questions relating to general knowledge, prevention knowledge, and behavioral lifestyle. 13, 159 subjects were interviewed divided into one of the five regions: Northern Mountains, Red River Plain, Middle Region, highlands, Southeast, and Southwest. Since my case study location was in the southeast, I paid particular attention to the data collected from Southeast participants (Appendix D).

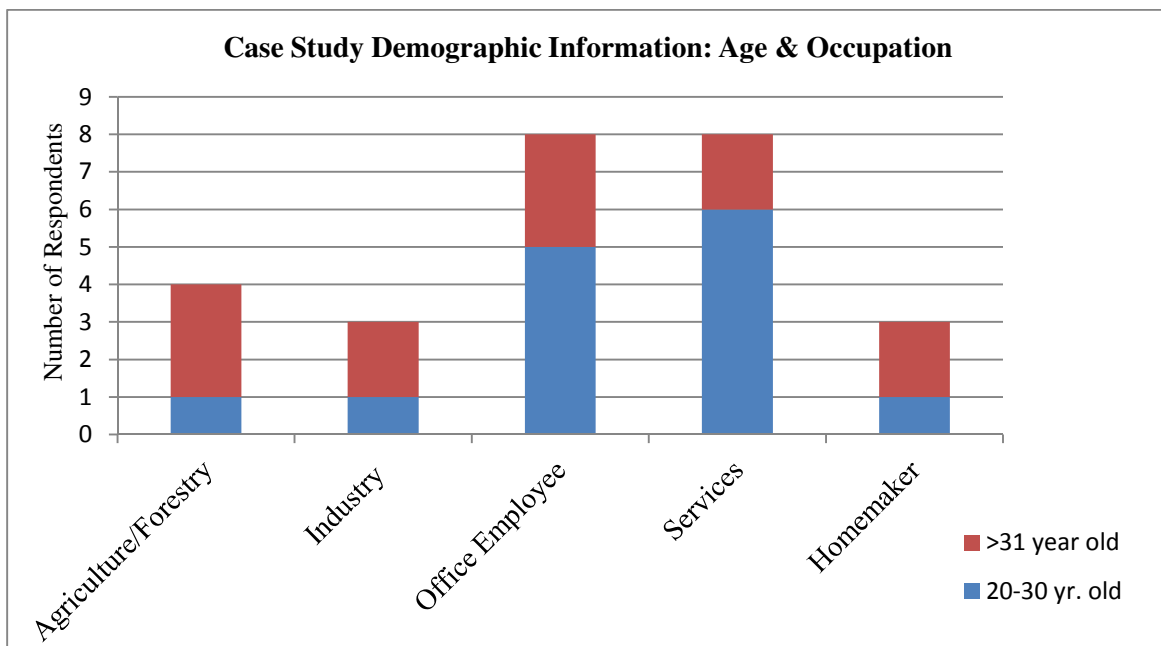
#### *Binh Duong Case Study Demographic Information*

	<b>Total</b>	<b>Male</b>	<b>Female</b>
<b>Interviews</b>	26	14	12
<b>Average Age</b>	37.9	38.5	37.25

**Table 1: Demographic Information of Case-Study Subjects**

Table 1 summaries demographic information I gathered from my case study interviewees. With a small case study sample, I expected to not gather any overall impressionable demographic information nor argue any statistically significant conclusion. All interviewees are Bing Duong residents, twelve residing in Thu Dau Mot, the capital city and none residing in the districts of Di An or Dau Tieng. The youngest subject was 23 years old, and the oldest was 76 years old. A large portion of the subjects were under 30 years old (n=14), mostly likely because many of them were young parents taking their children to receive vaccinations at the center. Occupations of the subjects were highly proportioned to office employee and services, I would have like to have had interviewed subjects in the industrial field because a large contribution to the economic strength of Binh Duong is industry. However, I think the timing and location of my interviews affected my case study reach to that group. Nevertheless, my main focus was to assess

diabetes awareness in the community. As I look through the results I gathered during interviews, I examines the channels of information the subjects received their awareness education from and whether it related to their age and occupation (analysis in diabetes awareness section). More importantly, I evaluated their comprehension of the materials they had came in contact with. Figure 1 categorizes occupation of case study participants by two age groups, 20-30 years old and  $\geq 31$  years old. A majority of the office employee and service jobs were held by those 20-30 years old.

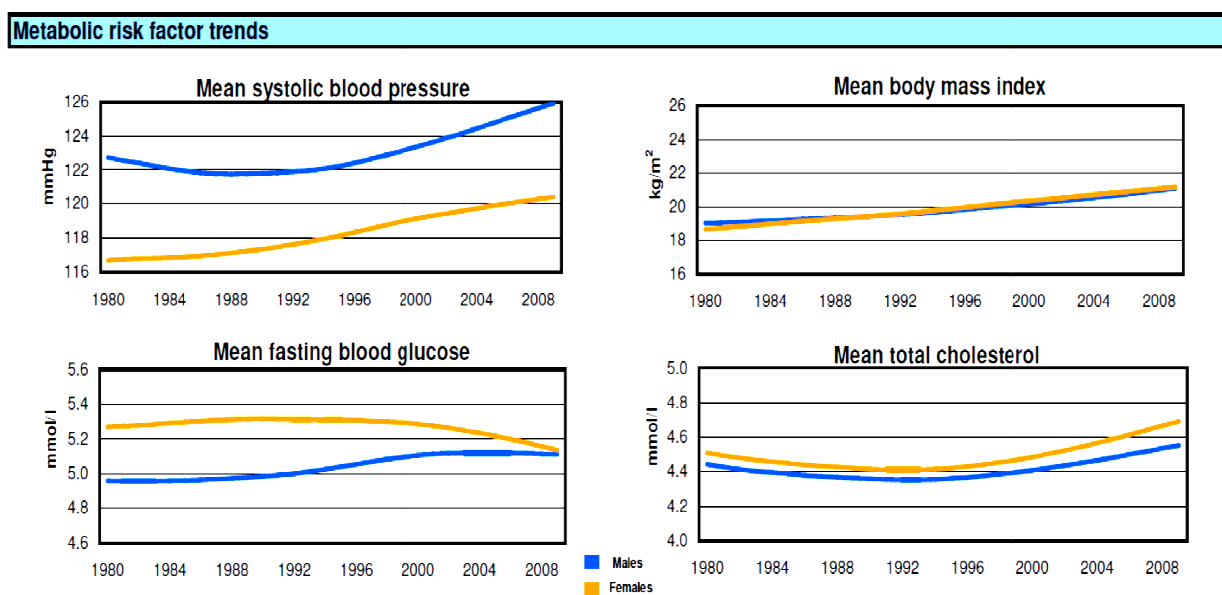


**Figure 1: Occupation and Age proportions of Case Study Participants** – 20-30 year old group was the majority of the sample size (n=14) and both office employee and services were the majority occupation type.

## B. ECONOMIC DEVELOPMENT & RISK FACTORS

Before, I looked at diabetes; I wanted to understand how economic development has impacted the behavior and health of the Vietnamese in general. Risk factor increases has been measured by many healthcare and public health organizations in Vietnam. The World Health Organization's 2009 STEP approach survey quantified eight risk factors of urban individuals between the ages of 25-60 years old. Subjects were interviewed for behavioral information such as tobacco usage, alcohol, diet, and physical activity, measured for BMI and blood pressure, and measured for their blood glucose and lipid levels (Lai). Most significant results were that 80% of the subjects did not meet WHO's recommended dietary

guidelines. Twenty-seven percent of the subjects admitted to being physically inactive and 7% were considered overweight/obese. These results though, have not been published and still being accessed (Lai). The only published data from the WHO on risk factors in Vietnam is based on a trend recorded from 1980 to 2008 (Figure 2). The trend shows mean systolic blood pressure, mean BMI, and mean total cholesterol increasing over the past three decades (WHO, *NCD Country Profile*). These risk factors are related to hypertension and overweight/obesity.



**Figure 2: Metabolic Risk Factors from WHO Vietnam Profile 2011 – Trend is recorded from 1980 to 2008.**

Risk factors of diabetes are family history, older than 45 years old, overweight/obese, history of gestational diabetes, little physical activity, high blood pressure, and high cholesterol ( ). The increased prevalence of risk factors plays a major contribution to the increased development of diabetes.

Risk factors like high blood pressure, high cholesterol, and overweight/obesity result from negligence of increasing physical activity and decreasing consumption of high-calorie foods as the “western” lifestyle settled into the urban Vietnamese lifestyle. Dr. Troung Lai, a researcher in the non-communicable disease department of WHO testifies from his medical experience that he rarely had to



diagnosis a patient with diabetes. Dr. Lai says economic development has traded agricultural labor for blue-collar and white-collar jobs.

At the National Institute of Nutrition, Dr. Van Tran and Dr. Thu Nhiem shared with me their work with developing the *National Nutrition Strategy for 2011-2020, with a vision toward 2030* for the MOH. The NIN has published the plan for 2010-2020 based on survey results and the outcomes of the 2001-2012 goals. The strategies outlined in the publication, specifically target decreasing factors causing malnutrition including overweight/obesity. Dr. Tran remembers just 12 years ago there was only one KFC in HCMC, when her family travelled to the city they would make a special visit for a meal. Now, multiple KFC locations are found in HCMC and Hanoi as well as many other western fast food vendors such as Pizza Hut, Dominos, and Lotteria. Dr. Nhiem commented,

*“Economic development allows people to have more money. They are able to spend on food and have greater access to food. In the city especially, children have more choices of food but many tend to choose KFC, Lotteria, basically any fast food places that gear their advertising to the young people. The urban population is consuming higher levels of fatty products. And the western lifestyle demands more time working leaving less time and energy for physical activity.”*

Binh Duong has been an industrial powerhouse even before the reunification in 1975 (Nguyen, Personal Interview). After Đổi Mới, economic development increased more rapidly in this province than other provinces, “changing the traditional lifestyle to an industrial lifestyle (from eating less energy foods, lots of physical activity to eating high-energy foods, less physical activity, more stress) leading to the increase of diabetes” (Nguyen, Email Interview).

In my case study, only 8 participants’ exercise regime met WHO’s recommended weekly physical activity definition. Walking was the major form of exercise, while others like interviewee #2 played soccer once a week for an hour with friends and interviewee #24 took an “American aerobic dance class.” All interviewees shared that exercise was good for one’s health. Those that did not exercise explained that they “did not have the time.” Interviewee #9, a farmer, said, “My job is an exercise throughout the day.”

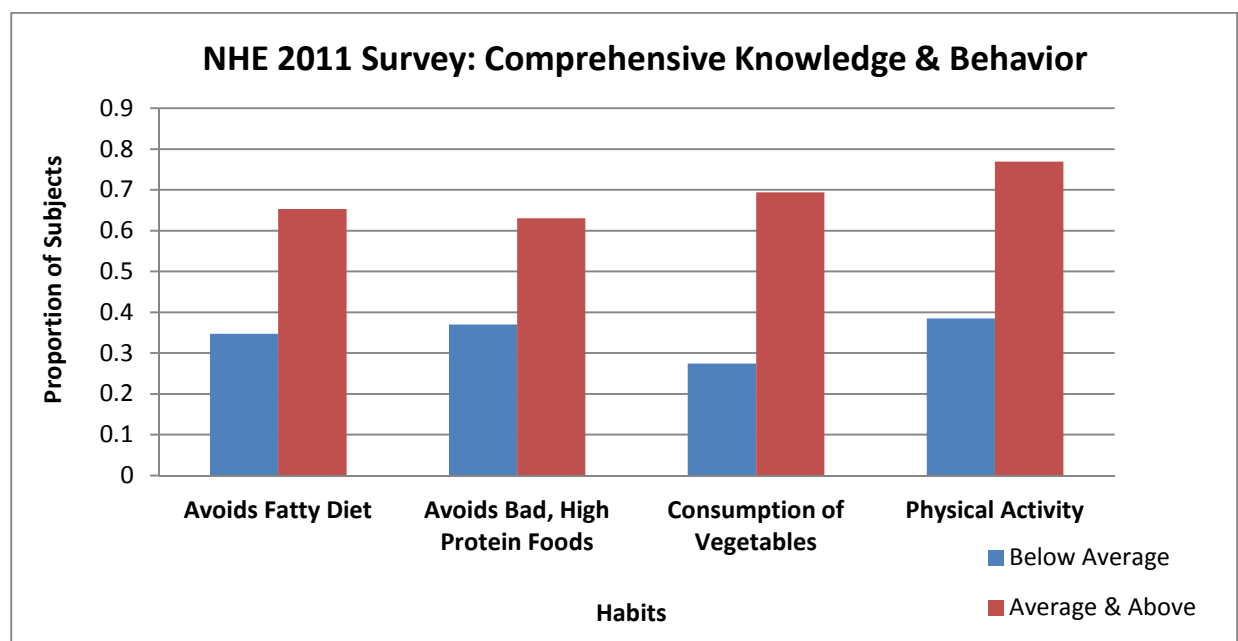
The staple diet of the case study participants were similar, consisting of meat, fish, vegetables, fruit, and very little sweets (cakes/candy/soda). I asked interviewees to describe their approximate daily portions of food items, but answers were difficult to gather because both I and the interviewees were not familiar with recommended portion sizes. A majority said they ate at least one dish of vegetables and a few pieces of fruit during the day. Interviewee #7 said she eats few vegetables during the day, she prefers vegetables prepared in “*canh*” or soup rather than “*sông*” or fresh. Consumption of fruits was not a consistent part of daily meals, some interviewees had a few pieces each day, others have fruit every other day.

Nineteen interviewees went out to eat at least once during the week. The number of times and reasons varied. For eleven subjects, eating out was “*tiên*” or more convenient for their work schedule. They regularly went out to eat for breakfast because it was easier to grab a quick meal from a *quan an binh dan* (small food vendor) early in the morning than prepare something at home. Interviewee #22 eats both breakfast and lunch outside his home 6 days per week because according to him, “I do not have the time to run home.” His wife also works from early in the morning to late afternoon, so she does not have the time to prepare breakfast and lunch during the work week either.

My final two questions related to diet were, “Do you think about the prices of the food products you buy before you make your purchase,” and “Do you look at the quality of the food you are going to purchase? And how so?” For the first question, I actually wanted to know if the interviewees did not purchase healthy products like vegetables and fruits because they are more expensive, but I think in the translation of the question, the interviewees thought more about their overall financial budgeting for grocery shopping. Another trend I found was that many of the men did not do the shopping so this question did not apply to them. A majority paid close attention to expiration date, freshness of the product in terms of physical appearance and when the product was packaged. Only 3 subjects look at the nutritional value with an understanding of what the label indicated. Interviewee #23 thought about the price in terms of the quality and nutritional value of the product.

In terms of wellness check-ups, 11 interviewees went at least once for a wellness and 5 went regularly for care management of another health issue such as high blood pressure, acid reflux disease, and diabetes. Eight interviewees who did not go to the doctor shared similar reasons for not going: “I see that I am healthy, so I do not need to go to the doctor.” Interviewee #19 shared, “I have always had good health until my motorbike accident a few years ago, my health is not the same, but I do not feel the need to see a doctor.” In retrospect, for this question I would have also liked to ask if financial or time cost played a role in their decision to visit the doctor at least annually for a wellness checkup.

A reason that practice of healthy habits is low or not a priority could be the lack of awareness about the long-term benefits and relation of good habits and decreased risk factors. Only 0.6% of southeast subjects scored “good” in their knowledge of risk factors that contribute to diabetes (Le, *Survey 8*). An alarming relationship in NHE’s 2011 survey found was that the group measuring a higher comprehensive knowledge score also practiced better habits than those with below average comprehensive knowledge (Figure 3).



**Figure 3: Comparison of Comprehensive Diabetes Knowledge with Subject Habits** –Knowledge is measured by the percentage correct answered on the assessment questionnaire (Le, *Survey 19*)

This is a significant finding because it is a major cost-effective benefit that should motivate the increase awareness programs to change behavior in order to decrease the prevalence of risk factors leading to diabetes.

### **C. CURRENT AWARENESS MATERIALS & ACTIVITIES**

This section highlights the awareness materials and activities that I came across during my independent study. I explain what information and service each source provided with comments of its effectiveness.

#### **I. CHANGING DIABETES ® VILLAGE & WORLD DIABETES AWARENESS DAY WALK**



**Image 2: Changing Diabetes ® Village Stage at Thong Nhat Park in Hanoi, VN.**

The Changing Diabetes ® Village is an active educational outlet utilized to increase diabetes awareness in almost all countries around the world. This year was the first year of its establishment in Vietnam. At the village, the public is able to get a free screening for risk factors, blood glucose screening, and receive counseling about healthy living through diet and exercise (Denmark). On November 6<sup>th</sup>, 2012, in addition to welcoming the visit of the Danish Prime Minister, events were kicked-off in both Ha Noi and HCMC for Vietnam's Diabetes Awareness week. In Ha Noi, From November 6<sup>th</sup> to November 14<sup>th</sup>, the Changing Diabetes ® Village was set up in Thong Nhat Park. The partnership was between the National Hospital of Endocrinology and Novo Nordisk, a Danish Healthcare company that sells diabetic care products. This was a new kind of partnership between a public and foreign private entity in healthcare promotion. Additional support was from the Vietnam Red Cross and the Ministry of Health.

That week, the entrance of Thong Nhat Park was adorned with a large blow-up balloon arch indicating the event. From the front to the back, where the village is located, banners with both the

hospitals and Novo Nordisk's logo hang from the trees with various "testimonies" of diabetic patients who have benefited from the increased awareness. During my observation period, I also participated in the screening. I had my weight and height measured, then a simple blood glucose test utilizing the daily glucose testing monitor. Afterward I was ushered to a short advising with a physician from the NHE who reviewed the measurements.

My blood sugar level were in the high-risk zone, but after revealing that I has just ate lunch, the physician said there was nothing to be concerned about. He advised that I continue to get yearly wellness check-ups including a screening for diabetes since my father is diabetic. At the exit, another volunteer stamps my information card, tear off one portion that has a copy of the screening information for records. I felt that the screening was quick and easy, had I been diagnosed or deemed "pre-diabetic," I think the information provided by the other booths covering nutrition, exercise, and general information about diabetes would have been very helpful to me.

Since 2005, the hospital has held meetings about diabetes awareness but has never had enough funds to do community awareness projects until this new partnership (Le, Personal Interview). At the Changing Diabetes ® Village, approximately 300-500 people have been screen each day, many are newly diagnosed cases. Some subjects were even immediately told to report to the hospital to begin treatment and therapy (Le, Personal Interview).



**Image 3: Back Design of Hanoi's 1st annual World Diabetes Day Walk**

On November 14<sup>th</sup>, World Diabetes Awareness Day, I was invited to attend the first annual walk with Dr. Le. At this closing event, I notice more people present, sporting the event's attire. I noticed that many of the participants were older men and women while the volunteers with college-aged. During the introduction ceremony, Mr. Jay, the general manager of the event from Novo Nordisk, shared

*“The vision of Changing Diabetes Village is to provide an opportunity for the Ha Noi community to access free screening, consultation, and educational materials. World Diabetes Awareness Day was established through the cooperation of the UN, WHO, and IDF. Around the world many events celebrating this day are taking place, and now Ha Noi is one of them.”*

I was able to briefly talk to Mr. Jay, hoping to get some insight from a foreign perspective of the Vietnam healthcare system and prevalence of diabetes awareness. He explained that the Danish founders of Novo Nordisk discovered the means to manufacture insulin in large quantities in 1922, establishing the company in 1923 with the mission to change diabetes in the world. When the UN recognized the issue of diabetes in the world, they work with Novo Nordisk to submit a resolution to increase diabetes awareness (Jay).

## II. POSTERS & LEAFLETS



**Image 4: Diabetes is a Silent Killer** – Poster display in bulletin board case at NHE

I observed and picked up various forms of educational materials in the form of posters and handouts. Educational materials that I saw at the National Hospital and found in the screening room of the TTYTDP of Binh Duong, illustrate the distribution of standardized awareness materials from the national healthcare levels to the local levels. The poster above (Image 4) was displayed in a heavily trafficked area at the

front gate of NHE, however, getting up close to the bulletin board displaying the poster along with leaflets of general information was blocked by the parking security's table.



**Image 5: Pages from *Changing Diabetes® Booklet*** –Received upon completion of screening process at that Changing Diabetes® Village in Ha Noi

This comprehensive booklet (Image 5) about diabetes covers a simple explanation of the types of diabetes, diagnosis, risk factors, treatment, and prevention measures. Included in the explanations are several illustrations of the disease at the cellular level, various exercises a diabetic patient should practice as a part of their care management, particularly paying attention to their legs and feet, and a food chart. This educational book was great for a non-medical person to read and understand how diabetes develops in the body. The illustrations were good to quick skim about symptoms of the disease, overall design was appealing, and the information was not wordy.



**Image 6: Phòng Chống Đái Tháo Đường Là Bảo Vệ Sức Khỏe Của Bạn – General Diabetes Information**  
 Leaflet from diabetes screening room at TTYTDP Binh Duong

I came across two leaflets similar in regards to defining diabetes, risk factors, diagnosis test, dietary recommendations and a small section highlighting physical activity. The green leaflet (image 6) also covered complications that arise from chronic, uncontrolled diabetes. Information about complications that arise from diabetes could be a motivating factor in behavioral changes.



**Image 7: Chế Độ Ăn Uống Và Luyện Tập Cho Người Bệnh Đái Tháo Đường – Educational leaflet**  
 focused on diet and exercise for diabetic patients

This handout (Image 7) is focused on behavioral activities of eating and physical activity, both major keys for prevention and care management. The leaflet proclaims, “Diet and exercise are the best solutions for decreasing the affects of diabetes. You can improve your quality of life and still live strong and healthy.”



One part breaks down the recommended food pyramid; however, I noticed that the visual proportions of the pyramid do not coordinate with the portion recommendations. The second part illustrates recommended physical activity and habits, listing on the next pages, several types of exercises. I thought these two handouts could be updated and revamped to be more attractive so to catch the attention of the public.

### III. DIABETES CLUB

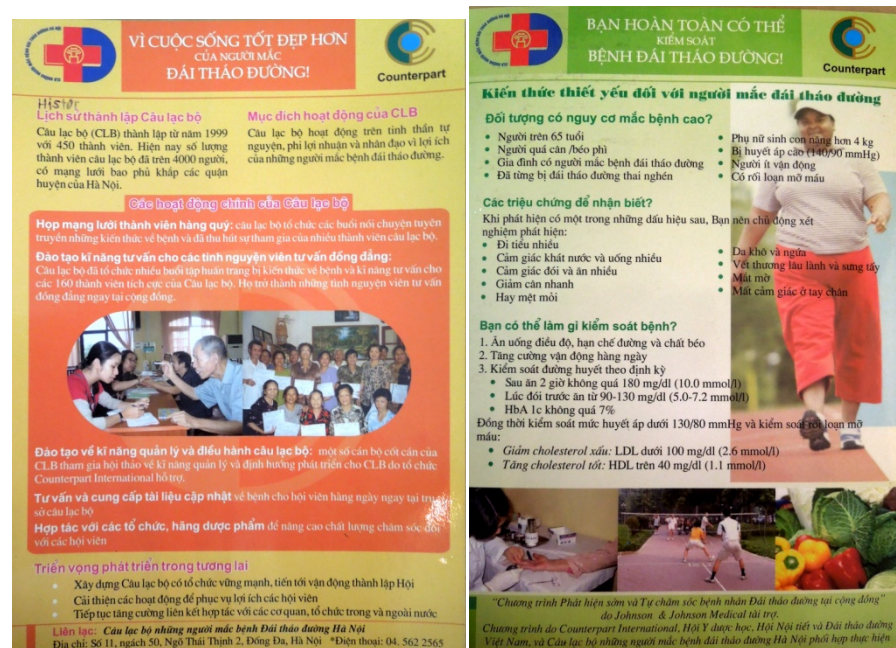


Image 8: Vì Cuộc Sống Tốt Đẹp Hơn của người mắc Đái Tháo Đường- Hanoi Diabetes Club Information Card

Through Dr. Duong at NHE, I was able to set up an interview with a retired physician of the hospital who leads the largest diabetes club in Ha Noi. Dr. Phuc invited me to his home, where some of the meetings take place. Dr. Phuc was motivated by many reasons to begin the club,

*"I saw that diabetes did not have an automatic cure, once a person is diagnosis with the disease they will most likely live with the disease for the rest of their lives, so education of care management and prevention is very important. I also saw from even my personal experience that doctors and nurses had very little time during a regular visit to educate the patient or even allow the patient to ask questions about the disease or why they must follow what I tell them. These factors motivated me to start a gathering that would allow doctors to teach, patients to ask questions, and even training the patients to tell their family and friends about diabetes prevention."*

Meetings are held every 3 months at the hospital with attendance up to 400 people. Most the advertising of the club is through members and physicians. Originally, the club was funded through Counterpart International, an American organization. After funds were depleted, he began asking for funds from other organization and Vietnamese companies. He explains “sometimes there is not enough money so we might not hold a meeting.” Overall, Dr. Phuc believes the club has been effective in education patients that do come to the meetings. They have a better understanding of the reasons why their physician recommends that they change certain behaviors of diet and physical activity. There two other clubs in the city, but they are not associated with each other. Each club usually does its own programs but providing similar information.

In the information leaflet Dr. Phuc gave me, I learned that the total network includes 4000 members. Besides offering organized lectures and question and answer sessions, the club also trains members how to manage the club, provides updated education materials, and works to build cooperation with other organization and companies like pharmaceuticals, in order to improve the quality of care and access for members (Image 9). This information card was an excellent supplement to the information that Dr. Phuc provided. It may however, need to be updated since according to Dr. Phuc, the club is no longer funded by Counterpart International.

#### ***IV. MEDIA BROADCASTING***

National level only asks communes to show the TV broadcasting program every two weeks. They want to increase awareness so that more people will come to their local health station to get a screening and promote understanding about the easy measures to prevent diabetes. Each province, city, and district has their separate public broadcasting channels, so the programming times are different (Nguyen, Personal Interview). In BD, due to monetary limitations, only one week during the year is dedicated to broadcasting educational information about diabetes. In HCMC, the broadcasts is more often, the program is from 6-7pm and covers many NCDs and their similar risk factors (Nguyen, Personal Interview). I was unable to come view any TV broadcasting, or radio broadcast and the only internet information I came across about diabetes awareness education in Vietnam was through the Danish foreign affairs’ press

release. I found it rather difficult to even find detailed information about the Changing Diabetes ® Awareness week events. Both Dr. Danh and Dr. Le expressed that financial limits the ability to fully utilize these mass media channels.

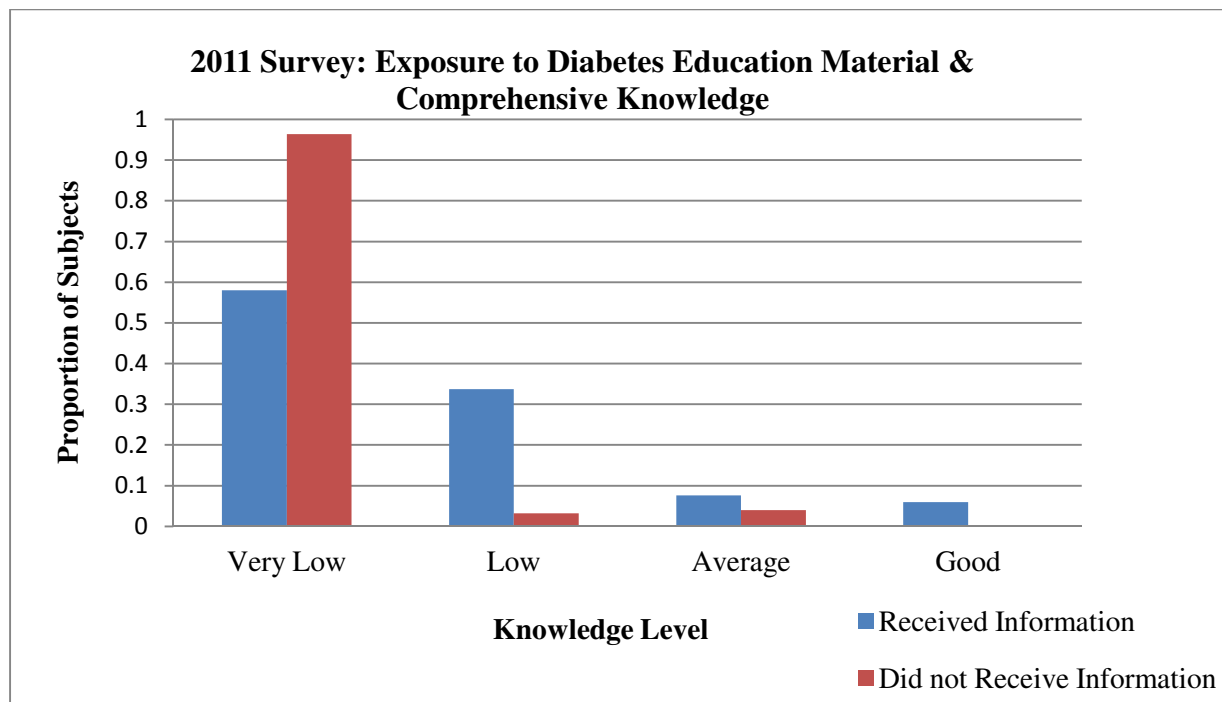
#### **D. IMPACT OF CURRENT AWARENESS EDUCATION MATERIALS**

The general consensus from the NHE 2011 assessment by the contributors was,

*“.... knowledge about prevention community diabetes is very low. Communication needs much effort to improve the community’s knowledge about diabetes prevention, especially the knowledge about the risk factors of diabetes and prediabetes.”(21)*

Significant findings were that the good comprehensive knowledge is at 4.1%, with the highest percentage of good status being in the SE region (6.2%). Good status means the subject answered >75% of the questions correctly. In the appendix D, results of the survey specifically of the South East Region are summarized. These results motivated the direction of the newly approved *Master Plan for National Diabetes Mellitus and Metabolic Disorder Syndrome Control and Prevention in Vietnam Period 2011-2020*. The first goal is to attain 50% community awareness of diabetes measured by the individual having had heard of the disease and could share some cause or symptom.

Only 66.6% of all 2011 NHE subjects said that they had heard of the diabetes before being interviewed. 64.2% of SE subjects had heard about diabetes from TV programming and 6.3% had heard through leaflets/pictures/posters. There is a significant relationship between the comprehensive knowledge and the exposure to diabetes education materials (Figure 4).



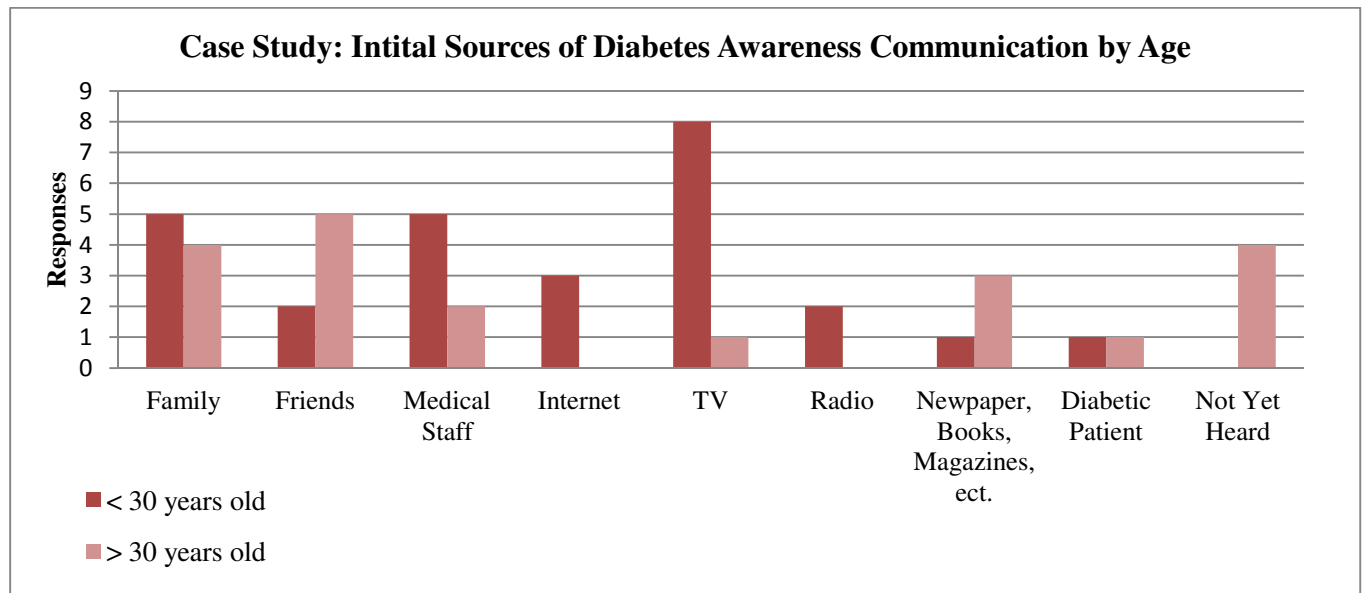
**Figure 4: Comparison of Subject who had heard about diabetes and their evaluated knowledge –** Data taken from 2011 NHE Assessment Survey; Knowledge level evaluated as follow very low (<25% correct) low (25-50% correct), Average (>50-75% correct), and Good (>75% correct).

The results of the NHE survey illustrate that exposure to diabetes educational materials have an impact on the subjects' comprehensive knowledge about diabetes (general, risk factors, and prevention). However, even those that had received education materials scored "very low" and "low" indicating a lack of comprehension or effective exposure to the educational materials.

For my case study, I found similar results, TV broadcasting was a major communication source the participants heard diabetes from, but I wanted to look what groups were actually coming into contact with each of the communication types. All but 3 had heard about diabetes before the interview. Eleven interviews knew someone with diabetes, three of these interviewees, though knowing someone with diabetes could not explain any causes. They also had never been exposed to educational materials. Interviewee #3 interestingly shared, "I do now know about the causes of the disease, but I notice when I eat with my friend, who I think has diabetes, she eats lots of vegetables and very little sweets."

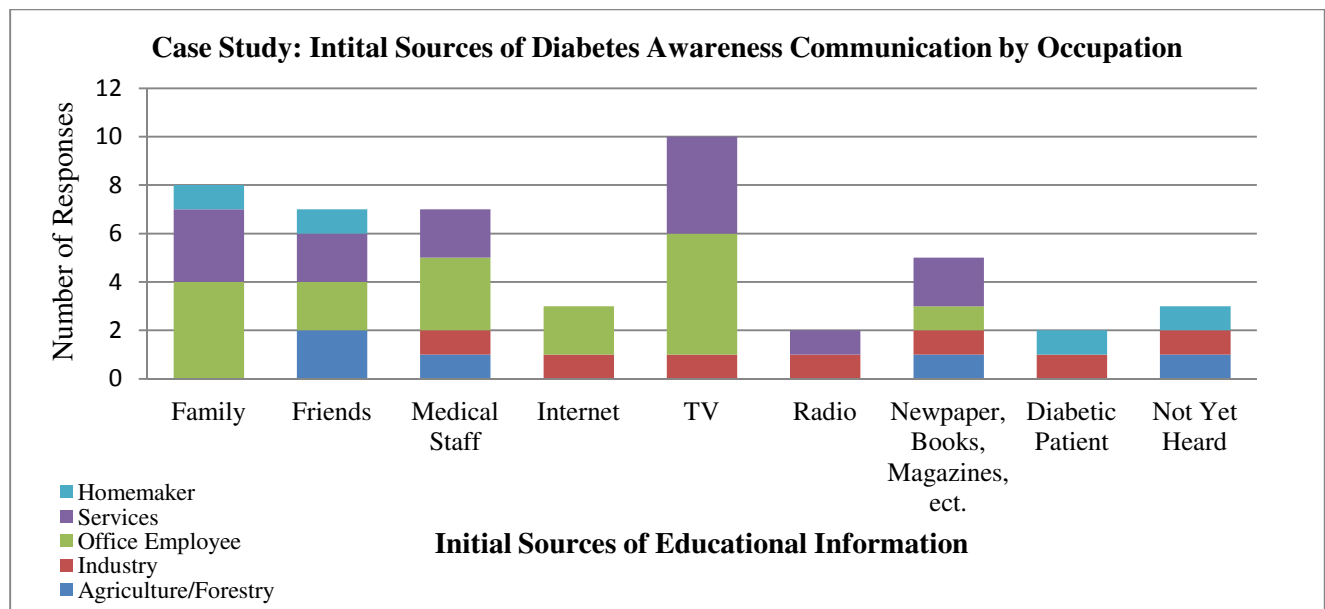
In figure 5 and 6, I analyzed at how the interviewees' age and occupation could be related to the source of communication they received awareness. This, I believe is, an original step in assessing what

communication method is reaching what type of groups within the community, leading to more cost-effective utilization of communication channels. Of course, the advantage of mixed method research is that I am able to supplement my quantifiable findings with testimonies from the participants, exposing a realistic perspective of the effect and reach of the awareness material.



**Figure 5: Case Study: Source of Initial Communication Source about Diabetes by Age Group--** Responses from the interviewees were grouped base on two age groups  $\leq 30$  years old and  $> 30$  years old. Interviewees were not limited to choose just one source.

In general, interviewees' initial sources of diabetes awareness were through TV programming, family, friends, and medical staff the most. Figure 4 illustrates that those  $\leq 30$  years old heard about diabetes through mass media sources such as the TV and internet more than those  $> 30$  years old.



**Figure 6: Case Study- Source of Initial Communication Source about Diabetes** -- Reponses from the interviewees were grouped base on five occupation types found in the case study sample. Interviewees were not limited to choose just one source.

Figure 6 illustrates occupation type and source of communication that reached the interviewees working in those occupations. The four interviewees in agriculture/forestry occupation were not exposed to diabetes awareness material through media sources such as the TV or internet. Interviewee #9, a farmer, first heard about diabetes through reading the newspaper and a medical staff at his commune’s screening. Though those that heard through TV broadcasting and the internet fell into the office employee, industry, and service work, I could not point out a distinct communication channel related to occupation based on the small sample size. Interviewee #25 who works in the service occupation, expressed when I ask if she had seen any TV broadcasting or internet postings about diabetes, that she did not have time to pay attention to media source because she and no one in her immediate family has diabetes. Interviewee #3, an industry employee, expressed a similar sentiment; she has not been exposed to any education materials and is “too busy to hear about it.”

My follow-up question asked if they could tell me what some causes of diabetes were. A majority of the responses was “eating too many sweets” or “being overweight.” Interviewee #2 who had been exposed to awareness material through the internet and TV explained, “The body cannot take in sugar, I

think, something is wrong with the pancreas.” Others like interviewee #18 though exposed to TV broadcast, could not remember the information he had seen. Interviewee #6 also exposed to TV broadcasting and a medical staff, admitted to forgetting the information he had been exposed to.

My next question asked if the interview that awareness communications about diabetes was important and how should the awareness material be distributed to more people. Some interviewees saw that it was important but had no suggestions. Interviewee #24 said, “It is important to tell people because DTD leads to many other diseases.” Interviewee #13 suggested, “Newspapers are a good way for men to know about diabetes because they read it each day.” Interviewee #19 did not know any causes of diabetes, thought it was important to spread awareness about it yet expressed that he was not too concern to learn about diabetes because he does not have it. A majority of the suggestions included an emphasis on nutrition, exercise, and encouraging people to bring up the subject with their friends.

## **DISCUSSION: BARRIERS & FUTURE OUTLOOKS**

### **A. LIFESTYLE AND BEHAVIOR**

The urban lifestyle is affecting the time and priority of the Vietnamese to integrate health habits into their lifestyle. Many of the case study participants felt their time was limited by their full work day and tasks causing their inability to integrate physical activity or even preparing home-cooked meals into their schedule. Others blamed limited free time as their inability to access awareness education about diabetes (Interviewee #2). So not only has economic development changed behavior, but it has also impacted the time for people to adjust their habits.

I could not get a clear answer about whether the cost of wellness check-ups was covered by insurance. This could affect the individual’s decision to seek out annual doctor visits if they see that they are healthy. These wellness check-ups are an important component to measuring significant changes in weight, blood glucose, blood lipids, and detecting early NCDs indicators. At NIN, I learned that there are outpatient counseling centers available in the city including gone right down the street. The services are not free or covered by medical health insurance (Nghiem).

## B. UPDATING & DEVELOPMENT OF COMMUNICATION CHANNELS

Though my sample size was too small to draw any strong statistical evidence of low diabetes awareness, from the data I did collect, I was able to still see some interesting relationships. The critical perspective I decided to take to analyze my data, I believe is the next step of developing cost-effective education awareness materials. Based on the evidence of the 2011 survey, there is a strong correlation between exposure to diabetes awareness material and comprehensive knowledge, and more importantly, how that comprehensive knowledge can impact behavior. There is obviously no lack of communication material, but it is a waste to have these multiple communication channels yet be unaware of the reach and effectiveness of the information presented. The survey discusses,

*“To enhance communication about the quantity and quality to not only increase the proportion of people in the community received information about diabetes, but also receive comprehensive information about diabetes” (23).*

Dr. Danh expressed when I had asked how he thought the awareness materials could be improved: “To improve the educational leaflets [we] need to assess patient knowledge and survey patient responses, from that a new leaflet can be made agreeable for a diabetic patient.” The current educational leaflets I found needed updating for appeal and simplistic and realistic information.

Some RAPIA subject surveyed, “questioned the quality of the information [of educational materials], if it was easily comprehensive by patients and its relevance to the socio-cultural in VN” (Beran 41). They wanted more community based education programs and easier access to written information. Nutritional information could adopt a more realistic display. A few years ago, the U.S. revamped its traditional food pyramid for the MyPlate design. The plate displays food in terms of portions on a round plate—a realistic display of how people see their food. Another useful, but might be a difficult task to implement, is to include in each of the districts’ leaflets information about places and classes where people could exercise. I thought the booklet from the Changing Diabetes @ Village was the best presentation of information.

Although, mass media such as television broadcasting is costly, the prevention program can look into utilizing social media channels such as Facebook, Pinterest, and Twitter, free social networks, to



increase awareness and inform the community about screenings and big events such as the Changing Diabetes ® Awareness week.

It was definitely a positive note to see that information from the NHE was being distributed to the provincial offices. I find that it is important to distribute standardized information. Though, the handouts may need an update in design for attractive appeal and design to better present the information, all the handouts generally covered information that the public and especially those with diabetes should be aware of. I would have like to have seen a television program, observe a diabetes club meeting, or listen to a radio broadcast, but with limited time and sources, I could not make the contacts.

### **C. HEALTHCARE STRUCTURE & FUNDING**

The financial limitation of the healthcare system is due to the split focuses of the system on infectious and NCDs. The government allocates 2000 billion VND for healthcare prevention; 40 billion VND is for diabetes, that is 5% of the budget. “Vietnam is facing the burden of two diseases—infectious and chronic, the budget is split between those efforts that cannot be weighed against each other.” (Le, Phong, Interview) Dr. Mai Li, who works as an epidemiologist, shared that the focus of her department is still on infectious disease, however predicts that in the near future they will be working with data related to non-communicable diseases such as diabetes. Though comparatively, only 30% of cases are infectious diseases, Dr. Van Tran express that there is difficulty in prioritizing which disease and risk factors the government should focus. For example, in the case of addressing the issue of malnutrition, the government does not yet recognized overweight/obesity as a malnutrition issue since there is a large portion of the population suffering from chronic energy deficiency (Tran). In light of those financial constraints, both the NIN and NHE do receive support from the MOH for their projects and both departments have developed strategic action plans for the next decade.

At the WHO-Western Pacific Office, Dr. Lai and his colleagues are developing a National Overwriting Policy for 2013-2020, in this plan that objectives are decrease the prevalence of NCD or at least decrease the rate at which the prevalence is growing each year. There are 5 programs, each with its own budget and specific target NCD disease – cancer, COPD, Health maintenance, Hypertension, and

Diabetes. The objectives of the diabetes committee are to reduce death/complications resulting from diabetes and increasing awareness and capacity of healthcare workers (Lai).

Another issue is the alleviation of patient overload at the NHE. This overload is affecting the ability of the doctors to educate their patients during appointments. The overload is a result of the limited availability of specialized physicians and healthcare employees at the provincial, district, and commune levels. At TTYTDP, Dr. Danh would like to hire more doctors and healthcare workers specializing in diabetes care. He is the only specialist at the center, but cannot do as many consulting and screening sessions due to his responsibilities as the vice-director. These individuals will be specifically trained on how to monitor and explain to the patients about their conditions. There are pilot programs being implemented in other provinces to increase training of healthcare workers. These programs are still small and need improvement from the previous decade when screening and training were too rushed and too big, causing a deficit on return of investment (Le, Personal Interview).

### **CONCLUSION**

Though a majority of the interviewees in my sample size had heard about diabetes, I would assess that their knowledge of the disease was not representative of the information they had heard. Through my experience I learned that several factors play into how the individual comes in touch with awareness material. These factors related to their occupation, their lifestyle, and their age. In the future I would want to do a larger sample or focus on the population within a few districts. I would also want to focus my interview on evaluating how much interviewee recalled from the communication source they had come across about NCDs and particularly diabetes through closed-ended questions instead of open-ended questions that I felt made the subjects feel uncomfortable and unqualified to answer. Effective reach of awareness material is the first step toward prevention, and with financial constraints, measuring current impact of awareness materials is important so that development and dissemination does not become a wasted expense.

## **APPENDICES**

### **APPENDIX A. GENERAL QUESTIONS FOR INTERVIEWS WITH PROFESSIONALS**

1. What is your background with diabetes research or care?
2. What is the trend of diabetes prevalence in Vietnam over the course of the past two decades?
3. What do you think are the contributing factors to the increasing prevalence?
4. How has the government and Ministry of Health been involved with diabetes awareness and prevention measures?
5. How many patients do you diagnose with diabetes on a weekly basis?
6. What do you think are the barriers an urban middle class individual faces in leading a healthy lifestyle during this development age?
7. What do you think are the most effective measures to combat a diabetes epidemic in Vietnam?

**APPENDIX B. VIETNAMESE QUESTIONNAIRE (WITH ENGLISH TRANSLATION) FOR CASE STUDY**

**NGHIÊN CỨU NHẬN THỨC VỀ BỆNH ĐÁI THÁO ĐƯỜNG  
BỘ CÂU HỎI PHỎNG VẤN  
(Diabetes Awareness Research – Interview Questions)**

<b>A. Thông tin chung (General Information)</b>	
1. Giới tính: (Gender) a. Nam (male)      b. Nữ (Female)	
2. Năm sinh: (Year born)	
3. Chỗ ở hiện nay: (Current Address)	
4. Nghề nghiệp: (Occupation)	
5. Số ngày làm việc trong 1 tuần: (Number of work day in 1 week)	
6. Số giờ làm việc trong 1 ngày: (Number of work hours in 1 day)	
7. Trình độ học vấn: (Education Level) a. Mù chữ (illiterate) b. Tốt nghiệp tiểu học (Graduated Primary school) c. Tốt nghiệp trung học cơ sở (Graduated Middle school) d. Tốt nghiệp trung học phổ thông (Graduated High school) e. Tốt nghiệp trung cấp chuyên nghiệp (Graduated 2 year program) f. Tốt nghiệp cao đẳng (Graduated from 3 year program) g. Tốt nghiệp đại học (Graduated from University) h. Tốt nghiệp trên đại học (Graduated from graduate school)	
<b>B. Lối sống (Lifestyle)</b>	
1. Ông/bà thường dùng phương tiện gì để lưu thông hàng ngày? (What type of transportation do you use everyday?) a. Đi bộ      b. Xe đạp      c. Xe máy      d. Xe hơi      e. Xe buýt	
2. Ông/bà có thường xuyên tập thể dục không? (Do you exercise regularly?) a. Có b. Không	Nếu không → Vì sao? → Chuyển đến câu 6 (If not, why not? → Continue to question 6)
3. Trong 1 tuần, ông/bà tập thể dục mấy ngày? (In one week, how many days do you exercise?)	
4. Mỗi lần tập thể dục, ông/bà dành bao nhiêu thời gian? (Every time you exercise, how long do you exercise?) a. Dưới 30 phút      b. 30 - 60 phút      c. Trên 1 giờ (Under 30 min)      (30 – 60 min)      (More than 1 hour)	

<p>5. Môn thể dục ông/bà thường chọn là gì? (What type of exercise do you choose?)</p> <p>a. Đi bộ      b. Chạy bộ      c. Xe đạp      d. Cầu lông      e. Khác:</p> <p>a. (Walking)      b. (Running)      c. (Biking)      d. (Badminton)      e. (Other)</p>	
<p>6. Theo ông/bà tập thể dục mỗi ngày có tác dụng gì? (In your opinion, what is the purpose of exercising?)</p>	
<p>7. Trong 1 năm nay, ông/bà có đến bác sĩ để kiểm tra sức khỏe không? (This year, have you gone to see the doctor?)</p> <p>a. Có (Yes) b. Không (No)</p>	<p>Nếu không → Vì sao? → Chuyển đến C (If not, why not? → continue to Part C)</p>
<p>8. Ông/bà đã kiểm tra sức khỏe bao nhiêu lần? (How many visits did you make?)</p>	
<p>9. Ông/bà thường kiểm tra sức khỏe về vấn đề gì? (Why did you going to the doctor?)</p>	
<p><b>C. Chế độ ăn uống</b></p>	
<p>1. Trong 1 tuần, ông/bà thường dùng những thực phẩm gì? (During the week, what food items do you eat?)</p> <p>a. Thịt      b. Cá      c. Trứng      d. Hải sản      e. Rau      f. Trái cây      g. Sữa      h. Bánh/kẹo/đồ ngọt</p> <p>a. Meat      b. Fish      c. Eggs      d. Seafood      e. Vegetables      f. Fruit      g. Milk      h. cakes/candy/soda</p>	
<p>2. Hàng ngày, ông/bà ăn bao nhiêu phần trái cây? (How many servings of fruits do you eat per day? 1 serving = 150g)</p>	
<p>3. Hàng ngày, ông/bà ăn bao nhiêu phần rau? (How many servings of vegetables do you eat per day? 1 serving = 150g)</p>	
<p>4. Trong 1 tuần, ông/bà dùng bao nhiêu phần bánh/kẹo/đồ ngọt? (During 1 week, how many servings of sweet products (cake, cookies, candy, sodas) do you</p>	

eat?)	
<p>5. Trong 1 tuần có nhiều lần ông/bà đi ăn ở ngoài? (During the week, how many times do you eat out?)</p>	<p>Nếu không → Vì sao? → Chuyển đến câu 8 (If not, why not? → Continue to question 8)</p>
<p>6. Vì sao? (Why?)</p>	
<p>7. Ông/bà thường ăn ở đâu? (Where do you usually eat?)</p> <p>a. Thức ăn đường phố      b. Quán ăn bình dân      c. Nhà hàng      d. Khác:</p> <p>a. Street Food      b. Local food vendor      c. Restaurant      d. Other:</p>	
<p>8. Khi mua thực phẩm, ông/bà có do dự trước giá cả của các loại thực phẩm đó không? (When you purchase food, do you think about the prices of different types of food?)</p> <p>a. Có (Yes)      b. Không (No)</p>	
<p>9. Vì sao? (Why?)</p>	
<p>10. Theo ông/bà, có cần thiết phải kiểm tra chất lượng của thực phẩm trước khi mua không? (In your opinion, do you need to check the quality of the food product before you purchase it?)</p> <p>a. Có (Yes) b. Không (No)</p>	<p>Nếu không → Vì sao? → Chuyển đến câu 12 (If not, why not? → continue to question 12)</p>
<p>11. Kiểm tra như thế nào? (How do you check?)</p>	
<p>12. Ông/bà có hút thuốc lá không? (Do you smoke?)</p> <p>a. Có (Yes) b. Không (No)</p>	<p>Nếu không → Chuyển đến câu 15 (If not, continue to question 15)</p>
<p>13. Ông/bà đã hút thuốc lá bao nhiêu năm? (How many years, have you been smoking?)</p>	
<p>14. Trong 1 ngày, ông/bà hút bao nhiêu điếu thuốc lá? (During 1 day, how many cigarettes do you smoke?)</p>	

15. Ông/bà có uống rượu/bia không? (Do you drink?) a. Có (Yes) b. Không (No)	Nếu không → Chuyển đến <b>D</b>  (If not, continue to Part D)
16. Trong 1 tuần, ông/bà uống bao nhiêu ly/lon rượu/bia (chuẩn)?  (During 1 week, how many glasses/cans of liquor/beer do you drink?)	
17. Ông/bà đã uống rượu/bia bao nhiêu năm?  (How long have you been drinking?)	
<b>D. Kiến thức về Đái tháo đường (Diabetes Awareness)</b>	
1. Xung quanh ông/bà có ai bị bệnh đái tháo đường không? (Do you know anybody with diabetes?) a. Có (Yes) b. Không (No)	Nếu có → Ai:  (If yes, who?)
2. Ông/bà biết bệnh đái tháo đường từ đâu? (From where did you first hear about diabetes?) a. Người thân (Close family and friends) b. Bạn Bè (Friends and co-workers) c. Nhân viên y tế (Medical staff) d. Internet e. TiVi (Television) f. Radio g. Sách, báo (Books, Newspapers, Magazines) h. Khác: (Other)	
3. Theo ông/bà, nguyên nhân gây ra bệnh đái tháo đường là gì?  (According to you, what are the causes of diabetes?)	
4. Theo ông/bà, có nên tuyên truyền cho nhiều người biết về kiến thức của bệnh ĐTD không? (In your opinion should there be propaganda for more people to know about diabetes?) a. Có (Yes) b. Không (No)	Nếu không → Vì sao?  (If no, why not?)
5. Theo ông/bà tuyên truyền như thế nào?  (In your opinion, what kind of propaganda?)	

## **APPENDIX C: EMAIL INTERVIEW WITH DR. DANH THANH NGUYEN**

### **1/ Kết quả nghiên cứu đái tháo đường tại Bình Dương? (What were the results of your long-term diabetes research in Binh Duong?)**

Từ trước chưa có nghiên cứu ĐTĐ trong cộng đồng, năm 2010 BS Danh nghiên cứu tỷ lệ Tiền ĐTĐ và ĐTĐ trên đối tượng có nguy cơ tại Thuận An (độc nghiên cứu).

*Previously there were not any studies on diabetes in this community, in 2010 BS Danh studied the rates of pre-diabetes and diabetes of subjects at risk in Thuận An.*

### **2/ Theo anh/ chị tại sao ĐTĐ tăng trong 2 thập kỷ qua?(In your opinion, why has diabetes increased over the past two decades?)**

Trong 2 thập kỷ gần đây cả nước nói chung, Bình Dương nói riêng có tốc độ phát triển kinh tế nhanh làm thay đổi lối sống truyền thống sang lối sống công nghiệp (từ ăn ít năng lượng, vận động thể lực nhiều sang thức ăn nhiều năng lượng, ít vận động, stress nhiều) dẫn đến ĐTĐ gia tăng.

*In the past two decades, BD particularly has quickly developed its economy changing the traditional lifestyle to a industrial lifestyle (from eating less energy foods, lots of physical activity to eating high-energy foods, less physical activity, more stress) leading to the increase of diabetes.*

### **3/ Kinh tế và công nghiệp ở Bình Dương phát triển ảnh hưởng thế nào đến lối sống người dân? (How has economic and industrial development in BD affected the lifestyle of the people?)**

Như câu 2. Like question 2

### **4/ Kinh tế và công nghiệp ở Bình Dương phát triển ảnh hưởng thế nào đến hiện mắc những nguy cơ thừa cân và Tăng huyết áp? (How has economic and industrial developing in BD affected the prevalence of risk factors like overweight and high blood pressure?)**

Thay đổi lối sống truyền thống sang lối sống công nghiệp làm gia tăng các bệnh không lây: ĐTĐ, thừa cân, tăng huyết áp, rối loạn mỡ máu ...

*Changing from a traditional lifestyle to a industrial lifestyle increases NCD: diabetes, overweight, high blood pressure, high cholesterol disorders...*

### **5/ Cách truyền thông trong cộng đồng về ĐTĐ, cách nào hiệu quả nhất? (What way of communicating to the public about diabetes do you think is most effective?)**

Cần có nhiều kênh truyền thông:

- Đại chúng: Tivi, phát thanh..
- Gián tiếp: sách báo, pa nô, áp phích, tờ rơi.
- Trực tiếp: Các phòng tư vấn, nói chuyện trực tiếp.

Phải khảo sát nhóm cộng đồng để chọn kênh truyền thông phù hợp mới có kết quả.

*Need more channels of communication:*



- Mass– TV, radio
- Indirect – newspapers, panels, posters, leaflets
- Directly – screenings, talking

*Need to survey the community to choose the channel of communication most effective results*

**6/ Làm thế nào cải thiện nội dung tờ rơi tuyên truyền về giáo dục bệnh nhân. (How can the design of the educational leaflet/handout be improved?)**

Môn cải thiện nội dung tờ rơi cần đánh giá kiến thức bệnh nhân và khảo sát nhu cầu của bệnh nhân, Từ đó mới xây dựng nội dung phù hợp cho bệnh nhân.

*To improve the educational leaflets need to assess patient knowledge and survey patient responses, from that a new leaflet can be made agreeable for a diabetic patient.*

**7/ Cách trung tâm báo cáo Bộ Y tế và bao nhiêu lần trong năm. (How does the center report to the ministry of health and how many times every year?)**

Mỗi tháng trung tâm báo cáo các hoạt động cho Sở Y tế Bình Dương, mỗi 3 tháng báo cáo cho Bệnh viện Nội tiết Trung ương (Bộ Y tế), 4 lần/ năm.

*Every month the center communicates its activities to the Health Department of BD, every 3 months the center communicates to the hospital of Endocrinology (Ministry of Health), 4 times/year.*

**8/ Anh/ chị làm việc tại Trung tâm y tế dự phòng bao lâu? (How long have you worked at the TTYTDP?)**

BS Danh làm việc tại Trung tâm y tế dự phòng được 12 năm ( năm 2000 đến nay).

*Dr. Danh has been working at the TTYTDP for 12 years (from year 2000 to now).*

**9/ Nguồn lực hay dụng cụ gì Trung tâm y tế dự phòng cần? (What resources or tool does the TTYTDP need?)**

Hiện nay Trung tâm y tế dự phòng cần Bác sỹ được đào tạo chuyên môn về ĐTĐ và có kiến thức về Y tế cộng đồng.

*Currently, TTYTDP needs doctor specializing in diabetes and knowledge of public health.*

**APPENDIX D: SURVEY RESULTS OF KNOWLEDGE, ATTITUDE, AND PRACTICE ON PREVENTION OF DIABETES IN THE SOUTH EAST REGION OF VIETNAM, 2011.**

<b>Table D.1 – South East Region – 1,783 Subjects</b>				
<b><i>Knowledge of</i></b>	<b>Very Low</b>	<b>Low</b>	<b>Average</b>	<b>Good</b>
<b>General Information</b>	55.3	28.9	14.5	1.3
<b>Risk Factors</b>	90.7	6.2	2.4	0.6
<b>Prevention &amp; Treatment</b>	56.4	27.5	10.0	6.2
<b>Comprehensive*</b>	70.4	22.5	6.2	0.8

Very Low: <25% of answers correct

Low: 25-<50% of answers correct

Average: >50%-<75% of Answers correct

Good : 75% of answers correct

\*Comprehensive knowledge measured in accordance with other 3 fields

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