

THE MECHANISM ON THE ACUPUNCTURE

TREATMENT OF TYPE 2 DIABETES

BY

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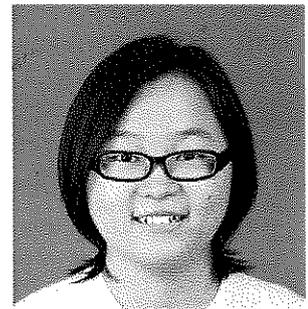
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## DECLARATION

I declare that I have written this dissertation completely by myself, and that I have used no other sources or resources other than the ones mentioned.



A handwritten signature in black ink, appearing to be 'Connie Wong Hsueh Nee', written in a cursive style.

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## ABSTRACT

Type 2 diabetes mellitus are quite common among the public in modern society. However, there is no cure for diabetes mellitus, most of the patients need to take life-long medication to prevent complication due to type 2 diabetes mellitus. That is why the prevention of diabetes mellitus become important, identify the potential type 2 diabetes group of people decrease their possibilities to proceed to type 2 diabetes mellitus patients. Understanding the pathogenesis of type 2 diabetes mellitus in Chinese Medicine to find out the causes of type 2 diabetes mellitus and prevent it through acupuncture treatment.

Keywords:

Type 2 diabetes mellitus

“Pi Dan”

Acupuncture

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## LIST OF ABBREVIATIONS

TCM – Traditional Chinese Medicine

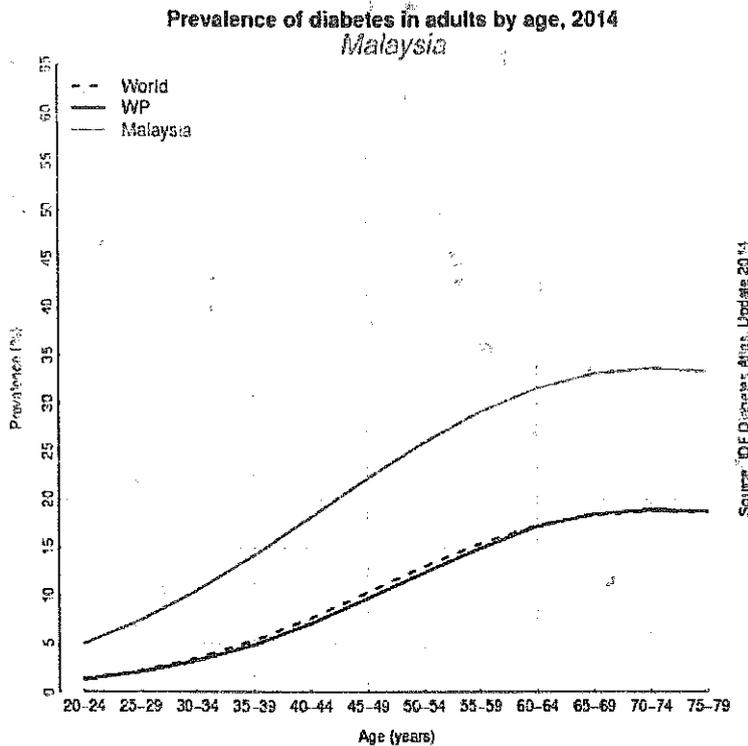
WM – Western Medicine

I GR -impaired glucose regulation

DPN – diabetic peripheral neuropathy

## CHAPTER 1: INTRODUCTION

### 1.1 Introduction



The figure describes which age groups in the population have the highest proportions of diabetes. The dotted line is the distribution of diabetes prevalence by age for the world; the black line is the distribution for the region; and the country distribution is plotted in the red line. Many middle- and low-income countries have more people under the age of 60 with diabetes compared to the world average. Meanwhile, for high-income countries, a growing population over the age of 60 makes up the largest proportion of diabetes prevalence. In 2014, 9% of adults 18 years and older had diabetes. In 2012 diabetes was the direct cause of 1.5 million deaths. More than 80% of diabetes deaths occur in low- and middle-income countries.(WHO 2012)

World Health Organization report in 2011 noted that there are 346 million people worldwide suffer from diabetes, in 2004 an estimated 3.4 million people died of the consequences of high blood sugar ,more than 80% of diabetes deaths occur in low- and middle-income countries(WHO

2014). 2013 global total of three hundred eighty-two million diabetics, of which 90% are type II diabetes (WHO 1999) The proportion of people with diabetes in adults has come to 8.3% (IDF 2013), the sex ratio is approximately equalize (IDF 2013). In 2035 patients I expected to increase to five hundred ninety-two million worldwide. 2012--2013 years, diabetes cause 15000000-5100 million deaths annually, ranking eighth in the cause of death. Generally, diabetes doubles the risk of death, global spending in 2013 due to diabetes caused an estimated five hundred forty-eight billion US dollars (IDF 2013), in 2012 in the US alone had spent two hundred forty-five billion US dollars. Another study found that Asians (especially East Asia) are more likely to develop diabetes, and to rice-based highly positive correlation utensils ( All record is based on WHO (world-health organization) report for years)

## 1.2 objectives

### General objectives

To discuss on the treatment mechanism of type 2 diabetes.

### Specific objective (s):

To investigate the obesity type of type 2 diabetes mellitus. (脾瘕型)

To investigate the emaciate type of type 2 diabetes. (消瘕型)

To investigate the collateral disease. (络病)

## CHAPTER 2:LITERATURE REVIEW

### 2.1 脾瘕 obesity type of type 2 diabetic

“脾瘕” “Spleen Dan” this term was earliest found in <SuWen• weird disease (奇病论)>. In this book, Huang Di asked there is a type of sickness with sweet taste inside the mouth, what is that called? And how is the patient contracted with this kind of disease?. Qibo answered that this kind of disease is caused by overflow of five Qi, named Spleen Dan . Five types of flavor enter the mouth and store in the stomach, spleen transform the essence, and the fluid is hold by the spleen which caused sweetness tasted inside the mouth, this is caused by heavy diet. The patient must have consumed heavy diet, the heavy diet caused internal heat, and sweet diet caused stomach distension, and the qi rise upward and lead to XiaoKe. “帝曰： ‘有病口甘者，病名为何？何为得之？’ 岐伯曰： ‘此五气之溢也，名曰脾瘕。夫无味入口，藏于胃，脾为之行其精气，津液在脾，故令人口甘也；此肥美之所发也’ 。”

According to the conversation between Huang DI and Qi Bo , heavy diet is the main caused of Spleen Dan and middle(stomach) distension with heat is the main pathogenesis. In this term Spleen Dan, “Dan “ should be the heat, the full meaning is spleen heat.

Before Han dynasty, the important literature such as <Classics on Medical Problems>, < treatise on febrile diseases >, and others did not state anything about “Spleen Dan”

During Jin ,Tang dynasty, most of the literature only used or elaborate the explanation of the Spleen Dan in <internal Classic>. For example the first etiology and pathogenesis literature <General Treatise on Causes and Manifestations of All Diseases> when stating SpleenDan, it quote the explanation from <internal Medicine> “there is a type of sickness with sweet taste inside the mouth, what is that called? And how is the patient contracted with this kind of disease?. Qibo answered that this kind of disease is caused by overflow of five Qi, named Spleen Dan. Five types of flavor enter the mouth and store in the stomach, spleen transform the essence, and the fluid is hold by the spleen which caused sweetness tasted inside the mouth, this is caused by heavy diet. The patient must have consumed heavy diet, the heavy diet caused internal heat, and

sweet diet caused stomach distension, and the qi rise upward and lead to XiaoKe diabetes.”; Sun SI Miao also used the same explanation from <internal medicine>.

During Song Jin Yuan dynasty, (圣济总录) (Total Record of Sacred Relief) evolve the explanation on Spleen Dan, expand the clinical manifestation of Spleen Dan and treatment method. It is not only “treated with Lan 治以兰 (佩兰)”, but it summarize 11 formula to treat syndrome accordingly. For example, “treat Spleen Dan sweetness in mouth with stomach distension with LanCao decoction”; “treat Spleen Dan with yellow face and sweetness in mouth, irritations and thirsty, treat with GeGen decoction” and etc. During this period, the understanding on pathogenesis is not only from <Internal medicine>, but also adding in their own theory, such as from <heat accumulation at middle burner>: ZhongJing said, heat at middle burner, will be firm, that is why the Qi is sthenic, and caused obstruction, and lead to isolation of the upper burner and lower burner, heat will caused heaviness of the body, yellow eyes, and sweetness of the mouth, those of the symptoms of Spleen Dan.”

<(Treatise on Three Categories of Syndromes<sup>3</sup> (三饮病症方论)> is also called in simplified name as “San Yin Fang (三因方)”. It consists of 18 volumes, composed by Chen Yan of Song dynasty during 1174 A.D did not directly explain on PiDan, but still it state that wasting of middle is related with spleen, as long as the heat (Dan) is form, wasting of middle will occur. He even categories the wasting of middle. One of the category is causing by cold, yin over and caused stagnation of Yang, prolong caused heat in the middle.

JinYuan dynasty, Liu Wan Su, in his book <three Xiao Lun>, when he is explaining PiDan from <internal Medicine>, saying”because of Spleen heat and lead to Spleen Dan”. He also take heat as main pathogenesis of Spleen Dan; <xuanminglunfang> did not explain anything about Pi Dan, but it linking “Dan” with heat. Zhu Dan Xi also stated in <Mai Yin Zheng Zhi(脉因证治)> that spleen that will lead to sweetness in mouth>, this is very close to the Pi Dan.

During Ming and Qing dynasty, most of the literature is characterize by summarizing ancient literature. Other than explaining the context, most of the theory regarding Pi Dan is taken from <internal medicine>, and include the theory into “XiaoKe” or “mouth” chapters. <LeiJing> also explain the context from <internal medicine>, such as “Dan, warm disease. Transform from five

Qi, and five taste” ; <internal medicine Su Wen>: “five Qi, soil Qi, soil Qi at the middle, numbered at five, taste as sweet, smell is fragrance, internal organ at Spleen, orifices at the mouth. Excessive consuming of sweet and left the smell in the spleen, Spleen Qi overflow at the mouth, “Dan” is heat. ...., people like this over consume the heavy food and caused sweetness in mouth, muscle wasting and thirsty, is a neither internal or external causing disease.”. It explained the causing of diabetes is due to consuming of heavy food, it also explained the pathogenesis of diabetic, including how consuming heavy food will lead to sweetness of mouth. In this period , warm disease type of literature had bring a lot of development in the theory regarding Spleen Dan. They even describe the tongue manifestation of the Spleen Dan, and add in “dampness” as another pathogenesis of Pi Dan. Ye Tian Shi stated in the <the treatise on warm and heat pathogen> that: “the tongue with white and greasy tongue fur, vomiting turbid sputum, the mouth must have sweet taste, this is Pi Dan, this is caused by dampness qi accumulate and mixed with Food Qi, the spleen is overflow and flow out from the mouth in the form of turbid sputum, and the mouth will taste sweet. Should use PeiLan (佩兰) leaves to eliminate dampness with it pungent nature.

## 2.2 消瘵 Xiao Dan, emaciated type of type 2 diabetic

消瘵病名“XiaoDan” (emaciated type of type2 diabetic) appear in the< internal medicine> for 14 times, scattered among 5 chapters . throughout the generation, physician had different perspective toward Xiao Dan, some said XiaoKe is same as XiaoDan; some said XiaoDan is the complication of Diabetic mellitus; some assume that Xiao Dan is able conclude the whole stage diabetic mellitus. But throughout the studies of classic . “Xiao” has different meaning, first it should be eating a lot but still feeling hungry. According to the explanation of WangBing is “easily digest the food”; second will be emaciation, but inside “XiaoKe” chapter, there is no statement on emaciation, that is why emaciation is not a main symptom; third, will be depletion. In <JingYueQuanShu>, chapter “XiaoKe” , stated that “Xiao”, depletion, as long as there is using up in Yin Yang and Qi and Blood; Forth, means “fire”, in <RuMenSHiQin> stated, three “Xiao” need to be diagnose through “fire”. “Xiao” is burning, like fire cooking the stuff(food). All the meaning stated is direct to the symptoms of eating a lot but still hungry, or emaciation. Is

the pathogenesis of fire consuming the Qi and Blood, it is just a different perspective of understanding the pathological features.

“Dan” had a very broad meaning as stated in the ancient literature. As related to the disease, there are four implications, first, is “sickness”. <Hou Han Shu>, Li Tong Chuan stated that, “dan” is sickness; second, “dan” is very similar to the word “dan (jaundice)”; Third, in <internal medicine>, “dan” had a meaning of heat, is a warm disease. As stated in <Suwen • malaria>, jaundice type of malaria, there are heatiness at the Lung, the heat Qi inverse upward and caused wasting of muscle, and named jaundice type of malaria”. WangBing stated that: “dan”, extremely heat; Forth, the meaning of “dan” is toil. Zhu Jun Shen explained “dan” as a sickness due to over work, but this explanation is not recorded in <internal medicine>, this can be conclude that, the overwork meaning is very blur in <internal medicine>.

## 2.3 Type 2 Diabetes mellitus

### Early Origins

The Sanscrit oral tradition that is extended back over thousands of years, the following attributes the description to Susruta, almost always cited in the translation of Chandra Bose (1907): “Madhumeha (honey urine) is a disease which the rich principally suffer from, and is brought on by their overindulgence in rice, flour and sugar. The patient feels weak and emaciated and complains of frequent urination, thirst and prostration. Ants flock around his urine. Boils and tuberculosis are frequent complications”. This sounds like a clear description of type 2 diabetes. Aretaeus of Cappadocia (c 100-200 AD) described diabetes as a chronic disease with a slow prodrome and rapid final decompensation, but makes no link with obesity or overindulgence. Thomas Willis (1621-75), in contrast, writes that: “Diabetes was so rare among the ancients that many famous physicians did not mention it but in our age given over to good fellowship and guzzling down of unallayed wine, we meet with examples enough, I may say daily, of this disease” [Tattersall RB. 2009]

### The Nineteenth Century

Most of the clinicians began to distinguish between the two types of diabetes in the second half of the nineteenth century, and the linking between diabetes and obesity became more obvious, although the frequently cited comment that Apollinaire Bouchardat(1806-86) observed an improvement in his patients because of enforced starvation during the siege of Paris may turn out to be a legend. He did however advise his patients to "mangez le moins possible".

#### 2.4 Obesity and diabetes

Elliot Joslin (1870-1962) was one of the first to apply statistical methods to diabetes, drawing upon his own extensive case records as well as life insurance and mortality data[2 Joslin EP. Treatment of Diabetes Mellitus. Second Edition, Lea and Febiger, Philadelphia and New York, 1917]. Kelly West (1925-1980), often called the "father of diabetes epidemiology", credits Joslin with the first systematic examination of diabetes in terms of obesity, and the first use of the term "epidemic" in relation to diabetes in 1921[West KM. 1978].

#### 2.5 The impact of insulin

Insulin transformed the lives of children and young adults with diabetes, but had limited impact upon the survival of those diagnosed at the age of 50 [4]. This was probably because insulin had little effect upon the high cardiovascular mortality associated with late onset diabetes.

##### Insulin sensitive and insensitive diabetes

Clinicians soon noted that higher doses of insulin were needed to control glucose levels in older or fatter patients, and this was established on a more formal footing when Sir Harold Himsworth MD, FRS (1905-1993) (1905-93) tested the ability of injected insulin to clear an oral glucose load from the circulation. From this he deduced that there were insulin sensitive patients whose diabetes was due to insulin deficiency and insulin insensitive patients whose diabetes was due to resistance to insulin. He also noted the existence of an intermediate type of patient who did not fit into either category.

#### 2.6 Body composition and diabetes

Anthropometrists who set out to define the diabetic phenotype in the 1940s soon noted that patients attending a New York diabetic clinic were slender if young and more adipose when the disease presented in later life. John Lister in London combined anthropometry with Himsworth's insulin sensitivity test, and noted the distinctive phenotype of the older insulin-insensitive patients, whom he referred to as type 2, in contrast to the less distinctive type 1 patients. The terminology did not catch on until the 1970s.

## 2.7 Diabetes becomes a risk factor

For the first half of the twentieth century, diabetes meant symptoms plus glycosuria. Borderline diabetes - raised blood glucose without obvious symptoms - was well recognised, but generally not considered worth treating. One reason for this is that the renal threshold for glucose rises with age, and older people can therefore run higher blood glucose before this spills over into the urine. Consequently they experience fewer symptoms of thirst and polyuria.

Two developments changed this relaxed attitude. One was that prospective studies such as Framingham identified hyperglycaemia as a risk factor for cardiovascular disease in parallel with hypertension and hyperlipidaemia. The other was the introduction of tolbutamide in 1957, which greatly simplified the management of the condition[5]. The combination of risk factor and effective therapy provided a great stimulus to wider population screening and intervention.

The discovery of type 1 diabetes led to greater recognition of type 2 diabetes as a distinct variant of diabetes[6]. The older terms "maturity onset diabetes" and "non-insulin-dependent diabetes" (NIDDM) were abandoned in favour of the newer terminology between 1980 and the 1990s.

The recognition of hyperglycaemia as a cardiovascular risk factor resulted in a long-running and still unfinished discussion as to the level of glycaemic exposure (and ways of defining that level) that would justify intervention. Since cardiovascular risk begins to rise within the normal