I. Analysis of Fuctions and Effects of Health Qigong · Ba Duan Jin

In modern studies, treating diabetes mellitus (DM) by intervention of behavioral psychology and life style has achieved greater progress and has been used extensively in clinical practice. The TCM life nurturing method as a kind of non-medicine therapy for treating “wasting-thirst” has been recorded in ancient literatures for many times. Traditional Chinese Medicine has realized long ago the importance of exercise to rehabilitation of “wasting-thirst” patients. Both Zhubingyuanhoulun (Treatise on the Pathogenesis and Manifestations) of Sui Dynasty and Waitaimiyao (Medical Secrets of an Official) of Tang Dynasty recorded the exercise therapy for “wasting-thirst”, such as “wasting-thirst” patients “should not lie down immediately after having a full meal, and also should not sit down all day long; they should do small labor works, but should not do it for a long time and exhaust their energy, and also should not constrain themselves to do things beyond their capacity”, which explains the effects of exercise, amount of exercise and manner of exercise on treatment of DM patients. The basic feature of the TCM life nurturing method is integration of motion and quietness. Qigong, also called “Daoyin (conduction exercise)” in TCM, refers to “the exercise leading qi to make it tranquil, and stretching the body to make it flexible”, namely, exercising Qigong to make breathing calm and smooth as well as the body soft. Health Qigong·Ba Duan Jin is a life nurturing method for guiding, leading and running qi.

Health Qigong·Ba Duan Jin (hereinafter referred to as “Ba Duan Jin” ), as one of traditional Chinese bodybuilding skills and life nurturing methods, can adjust and improve man's psychological state, and physiologically dredge meridian system through adjusting body, breath and mind. By special body movement cooperated with breath, Ba Duan Jin has function of maintaining essence, nurturing qi and keeping spirit.

(I) Adjusting unnatural body gestures. The research results of Behavioral Psychology have proved that all the behavioral expressions of a person is related to corresponding psychological activities. Ba Jin Duan applies various physical activities to adjust each part
of the body to conform to physiological natural state, in order to make skeletal muscles highly relaxed and change unreasonable and unnatural body postures, thus realize the synchronization process of relaxation of body and mind, which is the so called "body regulation" process of Ba Jin Duan.

(II) Adjusting breathing. Adjusting(regulating) breathing means consciously adjust and exercise the manner, frequency and depth of breathing. In the course of conducting Ba Duan Jin exercise, exercisers are required to breath in a fine, even, deep and long manner and "sink qi to cinnabar field", and such requirement is of special value of healthcare of body and mind.

(III) Self-regulation of mentality and emotion control. So called "regulating mind" refers to consciously conduct self-regulation of mentality and emotion monitoring through conscious and ideation activities in the course of exercise, which is an important characteristic of Ba Duan Jin different from medicinal therapy and general medical gymnastics, and is also the critical factor of Ba Duan Jin for exerting its function of psychological healthcare. In the study on effects of Health Qigong on psychological health, Zhai Xiangyang found that: the reason of Health Qigong being able to produce positive impact on human emotions lies in that Health Qigong makes an exercise to generate good self-feeling in his mind.

II. Health Qigong  •  Ba Duan Jin may improve the depression state of T2 DM Patients with Depression.

This Study shows that, during the 12 weeks of intervention of the T2 DM Patients with Depression the in the Ba Duan Jin Group, its SDS score decreased gradually; and in the 12th week, the SDS score of the Ba Duan Jin Group was lower than that of the Community Conventional Group, and the difference has a statistical sense; according to the comparison of the SDS scores of the two groups at 3 time points of intervention, the SDS scores of the Ba Duan Jin Group in the 6th and 12th weeks were lower than the pre-intervention level ($P<0.05$), while the difference in the SDS scores of the Community Conventional Group at all time points has no statistical sense ($P>0.05$). It shows that regular exercise of Health Qigong Ba Duan Jin can reduce the depression degree of T2
DM Patients with Depression.

Some studies show that, exercise can positively influence the level of some neurotransmitters in the brain, and reduce the level of the stress hormone cortisol, thus improve depression symptoms. The study by Yang Juan et al also shows that, regular exercise is negatively correlated to depression. TCM Traditional Qigong is one of methods of exercise therapy. Research proved that, Qigong exercise can produce good influence on nervous system, respiratory system, circulatory system and internal secretion of human body; exercising Ba Duan Jin changes the control of nervous system, adjusts the existment levels of different centers, reduces tension and anxiety of human body, makes body and mind pleasant, thus achieves the goal of strengthening physical health. Lin Yingna et al applied the Symptom Check List (SCL-90) to evaluate the effects of different TCM methods, and the results show that Ba Duan Jin produces certain improving effects on the abnormal psychological state of T2 DM patients, especially Ba Duan Jin has better effects for improving somatization, obsessive-compulsive symptoms and depression.

According to the analysis of single routines of Ba Duan Jin, Routine 1 “Holding the Hands High with Palms up to Regulate the Internal Organs” mainly contains of stretching exercises of limbs and trunk, which has certain preventive and treating function to low back pain, cervical spondylosis and platypodia. As a patient holds his hands high with palms up and inhales, his chest position rises, the exercise of diaphragmatic muscle is enhanced, thus increasing breathing depth and reducing squeezing by internal organs to heart and lungs, which is good for sufficient working of heart and lungs, and enables more oxygen-containing blood to be supplied to the brain, thus refreshing the brain and relieving fatigue; Routine 2 “Posing as an Archer Shooting Both Left-and-Right-Handed” is good for releasing chest qi, removing chest distress, and regulating liver qi; in Routine 5 “Swinging the Head and Lowering the Body to Relieve Stress”, the upper body bends down forward, and the coccygeal end swings, which enables the kidney water to ascend and the heart fire to descend. The so called “heart fire” in TCM is caused by excessive contemplation and exuberant endogenous fire, with such visible symptoms as vexation, apha, insomnia, dreaminess, constipation and reddish urine, whereas kidney water is a must for ascending heart fire, and coordination between water and fire can be realized
only through intercourse between heart and kidney; Routine 6 “Moving the Hands down the Back and Legs and Touching the Feet to Strengthen the Kidneys” has the function of dredging the belt vessel and freeing the conception vessel and the governor vessel, and can open the orifices and improve vision; in Routine 8 “Raising and Lowering the Heels to Cure Diseases”, regular elastic vibration of heels is good for circulation of spinal fluid and enhancement of functions of spinal nerves, and has the regulating function of strengthening nerves of the whole body.

III. Health Qigong · Ba Duan Jin can improve the life quality of T2 DM Patients with Depression.

(I) The feasibility and necessity of using life quality to evaluate the curative effects of DM therapy: On the basis of the requirements for comprehensiveness of the evaluation of curative effect for patients, the modern DM treatment purpose has been transformed from simply controlling blood glucose level to preventing and delaying the occurrence of complications, relieving disease symptoms, and improving the life quality of patients. Matthias et al put forward the action mechanism of psychosocial factors in occurrence and development of DM, and have the opinion that whether the survival quality of patients is improved should be taken as one of the indicators for measuring DM control. Life quality is the subjective evaluation by patients themselves to such aspects as physiology, psychology, society and family, which can provide doctors with the comprehensive information from patients, and such information is an important reference basis for medical staff to select treatment regimen, therefore evaluating the curative effects of MD patients should not only consider biochemical indicators, but also consider life quality.

(II) Health Qigong · Ba Duan Jin exercise can improve the overall life quality of T2 DM Patients with Depression.

1. Therapeutic action of sports to DM and depression: the reason for analyzing the efficacy of sports to T2 DM Patients with Depression lies in that Health Qigong·Ba Duan Jin is a kind of sports, so discussing its efficacy can not avoid discussion of the effects of sports. Sports is an important therapeutic method to both DM and depression. Sports can increase insulin sensitivity, and lower the increased blood glucose to normal level. The
studies by Vickers et al and Goodwin et al show that, depression and lack of exercise present a correlation, while sports can produce positive effects for improving emotion, meanwhile, it can alleviate depression symptoms. Therefore, sports is an important intervention method for T2 DM Patients with Depression, and the study on carrying out exercise therapy intervention for such patients is of big significance. However, a study finds that, the existence of depression causes an individual patient to be difficult in persisting in exercise, therefore, it deserves study to put forward a kind of exercise form that is easy for patients to persist in and pleasant for them to accept.

2. Unique efficacy of Qigong for preventing and treating diseases: Traditional Chinese Medicine has realized long ago the importance of exercise to rehabilitation of “wasting-thirst” patients. Both Zhubingyuanhoulun (Treatise on the Pathogenesis and Manifestations) of Sui Dynasty and Waitaimiyao (Medical Secrets of an Official) of Tang Dynasty recorded the exercise therapy for DM, such as “wasting-thirst” patients “should not lie down immediately after having a full meal, and also should not sit down all day long; they should do small labor works, but should not do it for a long time and exhaust their energy, and also should not constrain themselves to do things beyond their capacity”. Qigong as one of sports has richer effects than general sports, as it has better effects for preventing diseases, treating diseases and rehabilitation. Chen Xuanjing et al adopted the method of doing Dayuan (Taiji) exercise for lowering blood glucose after meal to observe the insulin sensitivity index of 38 cases of old-aged DM patients, and the results showed that the insulin sensitivity index of the group of doing Dayuan (Taiji) exercise for lowering blood glucose after meal was improved remarkably. A researcher summarized the efficacy of Qigong, and has the opinion that, in addition to the efficacy of general sports, Qigong as one of TCM sport also has the effects for patients with chronic disease in the following three aspects: first, the principle of Qigong Daoyin Shu is similar to that of relaxation therapy, which is that, through adjusting the physical state of a person and then improving his emotional state, namely through adjusting body, hearth and breath, it relaxes the muscles of all parts of the body, and relaxes the emotion of a patient; second, Qigong can adjust the level of body metabolism, have promoting effects to health condition of patients, and help improve body comfort; third, the steps in Qigong exercise,
such as getting into quietness, concentration of consciousness, holding breathing and movement postures, can adjust human emotion and will, and enable patients to break away from some bad impulsive behaviors, and relieve negative ideas and lack of confidence in interpersonal communication.

3. Therapeutic action of Health Qigong • Ba Duan Jin to DM and depression: Ba Duan Jin, as an important component of Qigong, contains such movements as stretching, bending forward, leaning backward and swinging, which respectively act on such parts and organs of human body as triple energizers, heart, lungs, spleen, stomach, kidney and waist, and can prevent and cure heart fire, five toils and seven injuries and various diseases, and are good for lubricating joints, developing muscles, increasing strength, strengthening sinews and bones, helping digestion and adjusting functions of nervous system. In *Beijiqianjinyaofang* (Essential Prescriptions Worth a Thousand Gold for Emergencies), Sun Simiao, a life nurturing master in Tang Dynasty, mentioned that “the way of nourishing life is that a person should often do small labor works, but not exhaust his energy, and should not do things beyond his capacity”. The *Waitaimiyao* (Medical Secrets of an Official) of Tang Dynasty records that “wasting-thirst” patients “should not lie down immediately after having a full meal, and also should not sit down all day long; they should do small labor works, but should not do it for a long time and exhaust their energy, and also should not constrain themselves to do things beyond their capacity”. According to the exercise intensity of Ba Duan Jin, it is a kind of aerobic exercise with small and middle intensity, therefore “small labor” is an important feature of Health Qigong • Ba Duan Jin for body building and life nurturing.

According to clinical reports, Health Qigong • Ba Duan Jin has unique preventing and treating effects to DM. Studies show that, exercising Health Qigong • Ba Duan Jin can lower the blood glucose and glycolated hemoglobin levels of T2 DM patients, and regular Ba Duan Jin exercise can also enhance the breathing function of T2 DM patients, and can remarkably improve the body mass index (BMI), waist-hip ratio (WHR), lipid metabolism and glucose tolerance of patients. The method also has the effect of improving unhealthy psychology. The study by Wu Yanming et al shows that, Ba Duan Jin exercise in combination with health education can produce positive impacts on the life quality of DM
patients in subhealthy state, and can obviously improve its social function, physical role function and emotional role function. In addition, Health Qigong · Ba Duan Jin features scientific principle as well as simple movements for easy learning, and due to without such requirements as sticking to internal viscera and getting into quietness, it can be exercised at any time and is suitable for application in community. The adjuvant therapeutic action of Health Qigong · Ba Duan Jin to DM can improve the symptoms of patients, thus lighten the degree of depression caused by DM, and then improve life quality.

(III) Health Qigong · Ba Duan Jin can improve the psychological dimension score and satisfaction dimension score of life quality of T2 DM Patients with Depression.

In the 12th week of intervention, the psychological dimension score and satisfaction dimension score of the patients in the Ba Duan Jin Group were improved on the pre-intervention basis ($P <0.05$), which shows that regular Ba Duan Jin exercise has positive impacts on improvements in such two aspects of life quality of T2 DM Patients with Depression. In order to guarantee that the patients could conduct regular Ba Duan Jin exercise, the researchers supervised and urged the patients to persist in regular exercise of Ba Duan Jin, and made evaluations of the exercise condition of the patients when they conducted centralized exercise every week, corrected their incorrect practice postures, emphasized the efficacy of Ba Duan Jin, advised them to watch the the Ba Duan Jin teaching disk and exercise by themselves at home, encouraged and supervised the patients to persist in Ba Duan Jin exercise. Health Qigong · Ba Duan Jin, through adjusting body, breath and mind, can regulate and improve the unhealthy psychological state of patients, physiologically dredge meridians and collaterals, and coordinate breathing through specific physical movements; since Ba Duan Jin is an overall life nurturing exercise dominated by heart nourishing, and has the effects of maintaining essence, nourishing qi and keeping spirit, the researchers paid attention to guiding the patients in management and control of self-emotion upon their exercise, as a result, regular Ba Duan Jin exercise effectively improved the psychological state of the patients.

In the 6th and 12th weeks of intervention, the satisfaction degrees of the Ba Duan Jin Group were all higher than that of the Community Conventional Group ($P <0.05$), which might be due to that on the basis of community health education, regular Ba Duan Jin
exercise enhanced the communication and exchange with the patients, and let them feel the access and convenience of medical services, thus the satisfaction of the Ba Duan Jin Group was improved.

**IV. Health Qigong • Ba Duan Jin exercise can help T2 DM Patients with Depression control their blood glucose level.**

(I) Health Qigong • Ba Duan Jin exercise can lower HbA1c. Diabetes mellitus is a syndrome of disturbance in metabolism of sugar, protein and fat which is caused by lack of insulin in human body or failure of insulin in exerting normal physiological function in target cells. HbA1c refers to the hemoglobin in blood which is combined with glucose; its formation is irreversible, and its concentration is related to RBC life and the average concentration of blood glucose in the period concerned, and does not suffer the impact from the glucose fluctuations every day, so what HbA1c detection reflects is the average blood glucose level in the first 120 days, and therefore it provides a reliable lab indicator for evaluating the situation of glycemic control. Generally it is required to be examined once every 3 months, and it should be examined at least twice every year after such control meets the standard, which is good for monitoring of DM patients.

In the 12th week of intervention for this Study, HbA1c of the Ba Duan Jin Group is (6.42±1.18)%, which is lower than HbA1c(7.24±1.70)% of the Community Conventional Group(\(p<0.05\)), which shows that regular exercise of Health Qigong • Ba Duan Jin can help T2 DM Patients with Depression effectively control their blood glucose and reduce the fluctuations in blood glucose. This result is similar to the result of the study by Wang Yaoguang et al. Studies have proved that, during exercise, the metabolism rate of muscle tissues increase, the demand for glucose increases as well, promoting the decomposition of glycosylated hemoglobin, which results in lowering of blood glucose, promoting the increase in combination rate of hemoglobin and oxygen; in addition, exercise can also increase the quantity of insulin receptors on membranes of muscle cells, which increases the sensitivity of muscle and bone tissues to insulin action, and improves insulin resistance, thus increasing glucose utilization by such tissues as muscle and fat, promoting glucose to enter cells and reducing blood glucose.
This Study shows that, the fasting plasma glucose (FPG) comparison for the two groups at three time points has no significant difference, indicating that regular exercise of Health Qigong·Ba Duan Jin produces no impact on FPG; however, through observation of the average values of the two groups at three time points, the decreased percentage of the Ba Duan Jin Group is obviously higher than that of the Community Conventional Group. The P value of FPG comparison of the two groups in the 12th week is 0.083(Table 18), approaching the level of \( \alpha=0.05 \), which is probably due to that the limitation of intervention time makes the action of Ba Duan Jin to FPG fail to be displayed completely. A study shows that, Ba Duan Jin exercise can relieve massive secretion of such hormones as growth hormone, glucagons and adrenal gland caused by anxiety and psychological pressure resulting from nervousness, which is good for controlling blood glucose.

V. Impact from Health Qigong · Ba Duan Jin exercise to BMI of T2 DM Patients with Depression:

After intervention for 12 weeks, no obvious change was found in the body mass index (BMI) of the two groups. It is possibly due to that Health Qigong · Ba Duan Jin is a kind of mild and moderate sports, and the exercise for 12 weeks is difficult to influence the body mass (all the patients in the groups are adults, and the change in their heights is extremely tiny). Pan Huashan et al ever utlized Health Qigong · Ba Duan Jin to formulate a rehabilitation exercise prescription, and carried out a 24-week intervention to 24 cases of T2 DM patients; the results indicate that Ba Duan Jin exercise prescription can strengthen the breathing function of T2 DM patients, and can remarkably improve the body mass index (BMI), waist-hip ratio(WHR), lipid metabolism and glucose tolerance of patients.