

## **Effectiveness of Physical Activity in the Management of Type 2 Diabetes Mellitus: Evidence Based and Local Practice in Kuwait by: DIAB 50**

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Type 2 diabetes mellitus (DM) is a worldwide epidemic that is classified as one of the leading cause to death globally via cardiovascular complications as myocardial infarction (MI) and stroke beside blindness and renal failure as illustrated clearly in the World Health Organization report (WHO 2016) [1]. Besides, many adults who are obese or overweight having asymptomatic type 2 diabetes and unfortunately, they are unaware of their condition and might be presented with complications and suffering that was confirmed by International Diabetes Federation (IDF Atlas 8<sup>th</sup> edition) [2]. Hence, many international studies have conducted deeply in diabetes mellitus risk factors, pathophysiology, and treatment modalities. So huge efforts was applied on prevention and screening purposes to control diabetes trend especially type 2 DM. Also, American Diabetes Association (ADA) recommended that: type 2 DM can be prevented or delayed in those who at high risks through modification of risk factors such as weight loss regime, enhancing physical activity, dietary change and behavioral control based on multiple strong accumulative evidences which include international Randomized control trials and meta-analysis (ADA 2019) [3] like:

1. Diabetes Prevention Program (DPP) of United State of America
2. The Finnish Diabetes Prevention Study (DPS)
3. The Da Qing Diabetes Prevention Study (Da Qing Study)

Recently new meta-analysis from south Asian countries was performed properly to stand with and support reality of prevention of type 2 DM through physical activity and life style changes, so I will discuss the preventive and therapeutic effects of physical activity in each study mentioned above and show how trials were conducted to confirm that.

### **Main life style trials in primary prevention of type 2 DM**

**Da Qing Study:** One of first trials in the Da Qing city of China where more than 577 adults with impaired glucose tolerance (IGT) in 1986 were collected and divided into 2 groups, control group include those with IGT under only regular follow up annually, in other hand intervention group include those who received specific advices on diet and intensive exercise for 30 - 50 minutes every 3 - 5 days a week, enhancing movement at all and reduce sedentary life style, after 6 years of assessment the results were impressive, there were significant reduction in incidence of diabetes by 41.1% in intervention group compared with control group 67.7% [4].

**The Finnish Diabetes Prevention Study (DPS):** Led to similar outcomes of Da Qing study, in DPS there were 577 adults (mean age was 55, BMI around 31) with IGT, divided into 2 groups, control group and intervention group where each one received individualized counselling to reduce weight by 5% at least, reduce fat intake and encourage fiber intake with regular physical activity with minimum level 30 minutes/day, then oral glucose tolerance had done annually to monitor them for 6 years duration. Finally, they found that huge reduction in the incidence of diabetes by 11% in intervention group and 23% in control group, weight loss by 3.5 Kg after 2 years of intensive regime and overall reduction in diabetes risk by 58% in intervention group [5].

**The US Diabetes Prevention Program (DPP):** Which recruited 3234 adults with IGT and divided them into 3 groups: life style intervention group who advised to practice exercise for 150 minutes weekly, reduce weight by 7% and dietary counselling, while medication group received Metformin only, and placebo control group for 2.8 years average duration. Life style intervention group showed obvious reduction in diabetes incidence by 58% and Metformin group was 31% compared with control group, so DPP concluded study with emphasizing that life style intervention prevent diabetes more than Metformin alone [6].

**Many Asians country also have participated in this field with precious RCTs and meta-analysis and I am going to discuss them briefly**

**The Indian Diabetes Prevention Program:** where 531 adults with IGT divided into 4 groups, control group, life style group, Metformin group, and adding combination group of metformin with life style changes. In this program physical activity intensity was reduced to maximum 30 minutes/day of cycling and dietary changes advised for intervention group, they found reduction in incidence of the disease by 28.5% in intervention group, 26% in Metformin and 28% in combination group compared with control one, thus low intensity of physical activity is less effective compared with Medication [6].

**Japanese trial:** More than 455 subjects with IGT recruited and divided into 2 groups, intervention group and control group, also the study aimed to see the effect of strict healthy diet (increase intake of vegetables and fruits, reduced fat intake and alcohol) and regular moderate exercise (30 - 40 minutes/day) on weight reduction and diabetes risks for 4 years duration, they found clear reduction in incidence of diabetes 67% less than control group beside more than 2 Kg of weight loss, so good diet with moderate intensity exercise have significant impact on both diabetes incidence and weight loss [6].

### **Physical activity effects on secondary and tertiary prevention of type 2 DM**

Recently meta-analysis conducted by Cochrane Collaboration to detect the positive effects of exercise in treatment of type 2 diabetes and prevention of macrovascular complication particularly Myocardial Infarction. Then the study was applied for 8 weeks duration and illustrated a good outcomes on glycated hemoglobin (HbA1C reduced by 0.6%) in spite of short time of study and promising result established for 6 months duration. In addition to that study found clear improvement in metabolic status for those who diabetic and carry on regular exercise, these changes in parameters include obvious reduction in diastolic blood pressure to -0.13%, systolic blood pressure to -4%, Triglyceride to -0.25%, HDL to -0.2%, LDL to -0.12% and clear reduction in myocardial infarction incidence by -0.86% in those who practice exercise for 4 hours/week with moderate to strenuous physical activity [6]. Thus exercise is considered as a prescription for the treatment of type 2 DM and significant tool to avoid fatal diabetes complication such as MI and stroke beside improving quality of life and psychosocial conditions of diabetic one.

### **Physical activity in my local health care setting in Kuwait: facilitators, barriers and solutions**

In 2016 highly standardized cross sectional study was conducted by Al-Baho and her team to assess physical activity among adult Kuwaitis and possible barriers to solve them correctly, they found that: the level of physical activity among adults is very low less than 3000 - 4000 footsteps/day, and similar results were established in gulf region. Then study had divided into 3 parts with 1500 Kuwaitis adults who met the criteria throughout Kuwaiti governments, first part of study aimed to collect personal data and clinical information from each participant via questionnaire, while second part targeted to estimate level of physical activity in adults by using Arabic version of the official International Physical Activity Questionnaire (IPAQ) which consist of several questions about type of physical activity, duration, frequency and participants were divided into mild, moderate and high physical activity based on exercise performed in the last 7 days. Finally third part of study directed towards barriers that affects adults in Kuwait, then barriers were categorized into Personal barriers (includes 12 items), social barriers (includes 4 items) and Environmental barriers (includes 2 items), so we will discuss all barriers in

details and how we manage them as health care providers [7]. Moreover, in my primary care clinic there are high percentage of obesity and reduced physical activity among general population, furthermore more than half of type 2 diabetic patients are obese, and most of them are overweight, so when I ask them frankly about exercise and lifestyle intervention, I found the result is disappointed and most of our patients are living with sedentary activities such as consuming long time on TV, sitting in office working on computer or using mobile phones applications particularly YouTube, Facebook and Twitter.

### **Barriers of physical activity in my local primary care setting**

Based on Al-Baho and her colleague's study there are 19 items make our local patients are less active, most of barriers are personal factors which include 12 items like people who having chronic diseases limiting their activity, some of participant are lazy and think exercise is boring and cause them fatigability and tiredness, some individuals work all day and have no time. Beside, Environmental Barriers have crucial limiting effects on exercise, unfortunately Kuwait has very hot weather most of the year associated with humidity that leading to feel uncomfortable and lazy to practice exercise outdoor. Also, community around us participate negatively by lack of support from family member, relatives and friends, some social factors as family responsibilities and care with children let parents less active.

### **Promotion and possible solutions for physical activity barriers in primary care setting**

Globally health education programs are focused on prevention of type 2 diabetes via lifestyle interventions, so ADA (2019) and Diabetes Canada guidelines recommended that exercise is a prescription as diet and medication aside, with 150 minutes/week at least to keep glycemic control and moderate to high intensity exercise to lose weight [8]. In Diabetes Canada there are effective plan to make individual more active which include following steps:

- A. **Reduce sedentary behaviors:** By breaking up prolonged sitting at home or work through repetitive talk in mass media about this issue, beside health care providers teach and monitor diabetic patients about harmful effects of sedentary life.
- B. **Use and activate Chronic Care Model (CCM) in enhancing physical activity in health setting:** Components of CCM help to improve physical activity through providing health education training program at diagnosis and annually by skilled educators [9], moreover, I suggest implementing diabetes education programs (for example DSME and support program, DAFNE and DESMOND) in our practice to improve care delivered for patients like giving patients evidence based advices in type of exercise, frequency and duration according to clinical state of patients in the form of individualized plan with goal setting for each patient. Registry and clinical record system keep us in the track of good care and monitor exercise benefits or laps for long time, while applying organization system and polices effectively based on available resources have impact on governmental decisions such as providing safe areas in each city for exercise, press on media to spread messages of physical activity importance, promoting and encouraging sport activities like marathon and suitable sport for both males and females age and culture.
- C. **Use of motivational interviewing and behavioral changes skills:** It is not easy to change your own habit that you have, so recent psychological approach have been introduced to change our bad habits into good one, so Oslon., *et al.* (2015) have emphasized that patient taking his responsibility of health and rising their physical activity confidence is very important and we have to focus on [10], after making patients confident then transfer them from pre-contemplation where patient refused to change into contemplation state where patient accept the idea to change, then health care provider discuss the plan of change and offering suitable options to select from them and finally maintain sufficient exercise through motivational sessions is significant process to avoid relapse, this illustrated clearly by Miller., *et al.* (2012) [11].

### **Changes to improve physical activity in my local primary care setting**

In my clinic presence of multi-disciplinary team which consist of physician, nurses, nutritionist, ophthalmologist and administrators, so we have no diabetic health educator who is delivering health education plan and motivate patients. In order to that, physicians and

nurses arrange health education session individually and in group to change behavior of our patients and rise level of confidence and efficacy of patient ability to change harmful habits particularly exercise and diet that include:

- A. Promoting and motivating patients to initiate and maintain exercise.
- B. Setting plan for exercise target, tell them to start with nearby exercise and around home for 10 - 15 minutes then increase gradually with accompanying family members or friends to support them.
- C. Elderly and individual with comorbidities like previous MI or Stroke need pre-exercise assessment like ECG, eGFR, HbA1C and general clinical examination to prescribe them suitable exercise.

In future we need more focus on physical activity as preventive and therapeutic habit for everyone that means big efforts from government to spread the messages, modify policies to encourage sport, provide safe free areas for exercise around homes, fund researches of diabetes education program and train both health care providers and patients.

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