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Effect of pelvic floor exercises in women with type 2 diabetes

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Abstract
Background: Sleep is one of the most essential and inevitable things that we have to aquire in our lives. Nocturia can be associated with long term sleep deprivation, in addition to the inconvenience that it causes. nocturia detrimentally affect sleep, and that significantly affect type 2 diabetes prognosis. We will strengthen their pelvic floor muscles and abdominal muscles to control voiding so their sleep will not disturb to decrease their sufferance.

Keywords: sleep, type 2 diabetes, nocturia, pelvic muscles and abdominal muscles

Introduction

There is powerful link between sleep and cardiovascular disease (CVD). T2D plays a central role in the development of CVD. as its relation to epicardial adipose tissue (EAT) and pericardial adipose tissue (PAT) in particular is important in the pathophysiology of coronary artery disease. as its relation to the heart and coronary vasculature, EAT exerts a direct metabolic impact by secreting inflammatory adipokines and free fatty acids, which promote CVD locally. Decreasing quality of sleep has been linked with the development of CVD, as confirmed in several meta-analytic studies. There is also evidence that presence of disturbed or restless sleep is a risk factor later CVD. Furthermore, short sleep duration and sleep-breathing disorders have been associated with CVD and all-cause mortality. Good sleep related with a healthy profile of cortisol release. there is
afinding concerning the relation between sleep quality and cortisol release. there is a finding that people with sleep problems suffer from stress all over the day and that has a great effect on increasing cortisol level and this patient suspected to be a T2D patients
It is founded that poor sleep quality increase the gherlin hormone which is the hormone of hunger and decreasing the release of leptin hormone which make the patient want to eat to feel satiety.
It was founded that patients with T2D have sleep problems due to high blood sugar levels and accompanying diabetes-related symptoms, High blood sugar (hyperglycemia) and low blood sugar (hypoglycemia) during the night can lead to insomnia and decreasing concentration next day. As with many chronic conditions, feelings of fear or stress about the problem itself may also keep patient awake at night.
High blood sugar level make the kidney to urinate more than the normal and that interfere with sleep and decreasing sleep quality and may also makes patients suffer from headache and thrist and that interfere with sleep. people who sleep less than six hours are suspected to have high blood sugar levels.
Nocturia has a negative effect on sleep poor or inadequate sleep may lead to poor glycemic control for individuals with diabetes
The main therapeutic modalities are conservative therapies, such as pharmacological treatment and behavioral therapy. Behavioral therapy includes the association of various resources, such as: educational program; changes in lifestyle; bladder training and pelvic floor muscle training. Sleep loss can contribute to T2D by interfering with nighttime glucose regulation directly, mainly due to a shorter duration of sleep and decreasing quality of sleep or by disturbance of appetite and decreasing glucose tolerance with an increased risk for obesity.
nocturnal sleep duration was significantly correlated with T2D in the presence of high levels of total and low-density lipoprotein cholesterol
Although exercise is important in the prevention and management of T2D, many with this chronic disease do not become or remain regularly active. exercise improves blood glucose control and can prevent or delay T2D, exercise will positively affecting lipids, blood pressure, cardiovascular events, mortality, and quality of life. exercise also has effect on weight loss which have been shown to lower T2D risk by up to 58% in high-risk populations
Moderate to vigorous exercise improves sleep for many people. it can increase sleep quality for adults by reducing sleep onset or the time it takes to fall asleep and decrease the amount of time they lie awake in bed during the night. Stress and anxiety are sleep's worst enemies. But exercise can relax you and fight off the things that keep patient worry. many studies have concluded that people with poor sleep are less active than people with healthy sleep cycles
Combining both PFMT and ABD exercises has agreat effect in decreasing nocturia and here we will discuss the effect of each.
PFMT is among the types of conservative treatment for urinary symptoms. This is a low-cost efficient treatment. There is insufficient evidence to support PFMT in treating

nocturia, since it is unclear how PFM contraction can inhibit detrusor contractions. PFMT involves the contraction of the puborectalis muscles, as well as the anal and external urethral sphincters. Studies have shown that con-traction of these muscles leads to suppression of detrusor contraction. The studies published in the literature that use PFMT for nocturia are scarce, and most of them rely on the association of different treatment modalities.

The pelvic floor consists of levator ani muscles including puborectalis, pubococcygeus and iliococcygeus muscles, and coccygeus muscles. PFME is defined as exercise to improve pelvic floor muscle strength, power, endurance, relaxation, or a combination of these parameters. PFME strengthens the pelvic floor muscles to provide urethral support to prevent urine leakage and suppress urgency.

Adequacy of pelvic floor muscle contraction can be assessed during the pelvic examination. Pelvic floor muscle function is assessed by several methods, including visual observation, digital palpation, electromyography (EMG), manometry, or ultrasound. Prior to PFME, an evaluation of the pelvic floor muscle can provide valuable baseline standard about strength, coordination, and control. Visual observation can be used to assess a correct pelvic floor muscle contraction, which is seen by perineal elevation, or an incorrect contraction observed by perineal descent in women Digital palpation, such as the Brink score and the Laycock power, endurance, repetitions, fast, every, contraction, timed assessment scheme is the most used method in clinical practice.

When assessing pelvic floor muscle strength, clinicians should use three criteria. Pressure, duration, and alteration in position. Note the results of the amount of pressure or strength of the muscle contraction and the number of seconds that the examiner feels the muscle contraction. If the patient has an overactive pelvic floor muscle, the degree should be noted. Overactive pelvic floor muscle is defined as no relaxing or contracting when relaxation is needed, such as micturition.

All the abdominal muscles are linked together and they have different muscle fibers orientation and act in all planes during movements. a single muscle mostly does not work alone but in a harmony with the other muscles of the abdominal wall.

weakness of one of those muscles will affect the great action of the abdominal muscles and this has a bad effect on the body as the abdominal muscles contribute in main action of body.

The rectus muscles are found in the midline as there is no separation between them more than 1-2 fingers. The most common problem we found in abdominal muscles is the Rectus diastasis as it is a stretching of the linea alba with abnormal widening of the gap between the two medial sides of the rectus abdominis muscle, often seen during pregnancy, or post-menopausal women

When checking for diastasis recti, note both the width and the depth of the distance between the abdominal muscles. To accurately measure the gap, lift head off the floor to trigger a spontaneous activation of the abdominal muscles. try lifting head higher a couple of times until feeling the difference between the engaged muscles (firm tissue) and the connective tissue (softer) that lies between them. Once identified the muscles and that fingers are aligned vertically between them (pointing downward towards the pelvis), lift head about an inch off the floor and record the width and depth of the we must understand the importance of strengthening abdominal muscles as it has a good effect in control voiding. strengthening rectus muscles as to decrease the separation between them has a good impact in well abdominal muscles and so in control voiding.

Strengthening abdominal muscles alone or strengthening pelvic floor muscles alone is not a good idea as it does not get the optimal result we need in helping control voiding during night in T2D patients.

So here in this study strengthening both abdominal and pelvic floor muscles as to get an optimal result and helping in control nocturia and increasing quality of sleep in T2D women patients.

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Conflict of interest

The authors confirmed that this article content has no conflict of interest

Abbreviations

ABD: abdominal **DM:** diabetes mellitus **T2D:** type 2 diabetes

PFME: pelvic floor muscle exercise

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