Original Article

INVESTIGATING THE EFFECT OF MEDICAL AND NURSING SERVICES ON PATIENTS WITH FRACTURES, DIABETES AND HYPERTENSION IN THE HOSPITAL (OPERATING ROOM& ICU)

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Abstract

A bone fracture in any part of the body can be very painful and cause a lot of pain to the patient. Especially if a fracture occurs in the pelvis, considering that the pelvis is an important part of the human body, it causes many problems for people. One of the factors that cause fractures in the body of patients is diabetes and high blood pressure in these people. Diabetes and high blood pressure do not cause each other, but people with diabetes are usually prone to other diseases such as high blood pressure and high blood cholesterol. Each of these things alone can cause damage to blood vessels and the occurrence of heart disease, stroke, kidney disease and other problems. Having all these diseases at the same time multiplies the probability of these injuries and disorders. High blood pressure increases the risk of diabetes-related complications, such as serious damage to the eyes, kidneys, and feet. If you have diabetes, try to control blood pressure to prevent heart attack or stroke. High blood pressure is very common in diabetic patients, especially type 2 diabetes, as more than half of type 2 diabetic patients also have high blood pressure. Having diabetes and high blood pressure at the same time doubles the patient's problems. Such patients are more prone to cardiovascular diseases, kidney disorders and strokes than others. Keeping the blood pressure of a diabetic patient in the range of 80/120 mmHg reduces the risk of diseases and heart attacks by 50% and the risk of kidney, eye and nerve damage by 33%. As a rule, the blood pressure of patients with diabetes should be lower than other people.

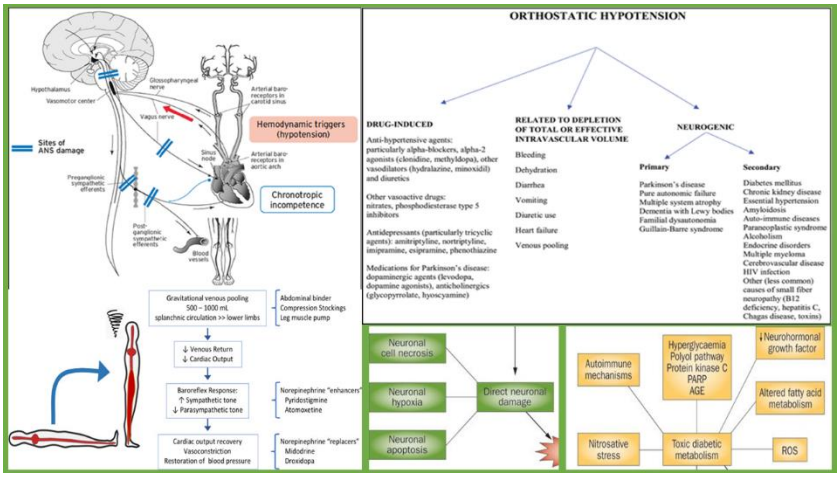
Keywords: Medical and Nursing Services, Patients, Diabetes, Hypertension, Hospital.

Introduction

A hip fracture is a general term to cover a bone fracture in the human pelvis. The human pelvis is made up of different parts and this fracture can occur in any part of it, including the pelvic ring, the acetabulum bone, or the

bone around the hip joint [1-3]. Factors such as accidents, falls from a height, and accidents during work or sports can cause this fracture. If a person has osteoporosis, this fracture can also occur with a small blow [4-6]. Studies have shown that the occurrence of this problem in old age can lead to the death of the patient [7]. One of the problems that occur as a result of a hip fracture is a bed sore. Because the patient must be lying down and completely still. This causes this wound to occur. Other problems of this disease include urinary infection. Due to the fact that a person drinks less water to prevent urination, as a result, the probability of urinary infection increases. Also, these patients are usually lying down. As a result, they cannot breathe deeply and may suffer from lung problems [8-10]. Diabetes or silent death is a dangerous disease that causes many problems for affected people. People who have diabetes, if they have a hip fracture, usually their bones heal later. For this reason, it is very important to try to control this disease during this period and it helps the patient to recover [11-13]. On the other hand, diabetes can affect the results of hip replacement surgery with several mechanisms. Diabetes has an adverse effect on almost every body. If heart or kidney function is impaired in a diabetic patient, this disorder can have an adverse effect on the body's ability to tolerate anesthesia or anesthesia or the entire surgery [14]. On the other hand, it has been shown that the immune defense system is weak in diabetic patients (Figure 1). This weakness can increase the possibility of surgical site infections. On the other hand, the possibility of pulmonary and urinary infections in these people is higher than the average of the society [15-17].

Figure 1. Autonomic neuropathy

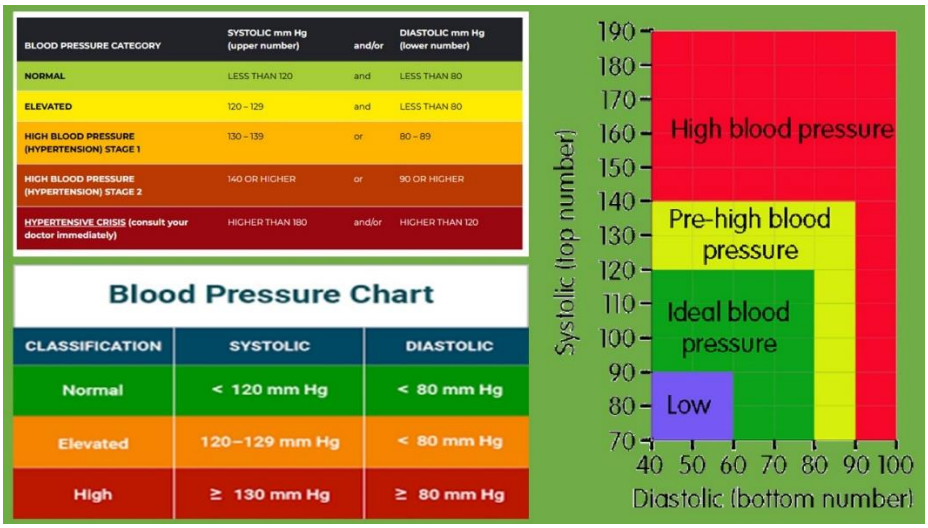


Many studies have shown that the probability of artificial joint loosening is higher in diabetic patients than in other people. This causes the life of the artificial joint to be shorter in diabetics [18].

Effect of blood pressure on fracture

The English word "break" is usually used among common people. Among doctors, especially bone and joint specialists such as orthopedic surgeons, this term is much less commonly used. A crack (not just a fracture) in a bone is known as a fracture [19-21]. Bone fractures can occur in any bone in the body (Figure 2). There are different ways that can lead to bone fracture; For example, a bone fracture that does not damage nearby tissues or break the skin is called a "closed fracture". On the other hand, as mentioned, an injury and fracture that causes damage to the skin around the bone and penetrates the skin is called an open fracture [22-24]. Open fractures are generally more serious than simple fractures because they are infected. Most human bones are surprisingly strong and generally withstand relatively strong stresses and forces. However, if the force is too strong, or the bone has a problem, the bone will break [25].

Figure 2. Effect of blood pressure on fracture



As we age, our bones show less resistance to pressure. Children have bone growth plates at the ends of bones (bone growth areas) that can sometimes be damaged. Pelvic fracture is a fracture of the bony structure of the pelvis, which includes any fracture of the sacrum, femur (ischium, pubis, ilium) or coccyx. Symptoms include pain, especially with movement. Possible complications of pelvic fractures may include internal bleeding, bladder injury, or vaginal trauma. Pelvic fractures can be simple or complex and can involve any bony part of the pelvis [26-28]. Pelvic fractures due to pelvic bleeding can be fatal, and an unstable pelvis requires immediate treatment. In most cases, the cause of high blood pressure is not known, but there are factors that put a person at risk of developing this disease. These risk factors are divided into two categories:

A) Uncontrollable risk factors

There are factors that contribute to high blood pressure and cannot be changed or controlled. These factors include:

- **Age:** As a person's age increases, the risk of high blood pressure increases.
- **Sex:** In middle age, men are more likely to suffer from high blood pressure than women, but after menopause, women are slightly more at risk than men.
- **Heredity:** High blood pressure is one of the diseases that is inherited, people whose parents and close relatives have high blood pressure are more at risk.
- **Race:** Statistics show that blacks are more at risk of developing high blood pressure than whites [29].

B) Controllable risk factors: There are other factors that increase the risk of high blood pressure, but they can be fixed. Such as: Obesity, inactivity, smoking, alcohol consumption, excessive salt consumption, mental stress, diabetes.

Complications of diabetes and blood pressure on patients' fractures

Diabetic neuropathy is a disease of the family of nerve problems that occurs as a result of diabetes. Over time, people with diabetes suffer nerve damage throughout the body. In some people, nerve damage is asymptomatic, while in others, symptoms such as pain, burning, or numbness in the hands, arms, legs, and soles of the feet are

observed. In addition, neurological problems can affect all organs of the body such as the digestive system, heart, and sexual organs.

About 60 to 70 percent of people with diabetes suffer from neuropathy. In fact, diabetes causes nerve damage over time, but the risk of developing neuropathy increases with age and the duration of diabetes. The highest rate of neuropathy is among people who have had diabetes for at least 25 years. Diabetic neuropathy can also be seen more among people who have problems with controlling their blood glucose (which is called blood sugar) and have high fat and blood pressure levels and are overweight. Over time, high blood sugar can cause damage to the body's nerves, which we call neuropathy. 70% of diabetic patients have some kind of nerve damage.

Peripheral neuropathy can cause pain, burning or loss of sensation in your legs.

This condition usually starts from the toes and then reaches the hands and other parts of the body.

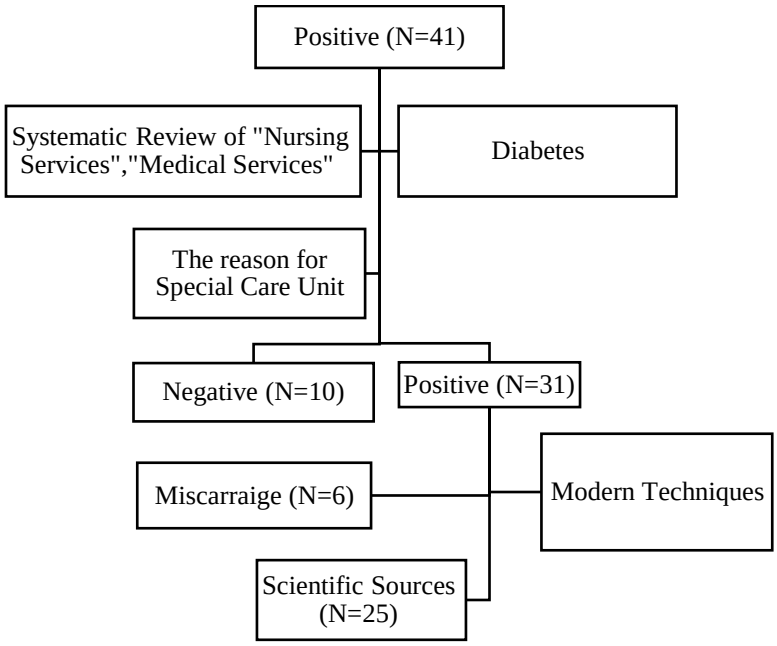
Autonomic neuropathy is caused by the destruction of the nerves that are responsible for controlling the body's internal organs. Its symptoms include sexual problems, digestive discomfort (due to slow stomach movements), an annoying feeling after the bladder is full, dizziness and fainting. There are many solutions to treat these problems. In this situation, doctors prescribe various anticonvulsant or antidepressant drugs, topical creams or patches.

Diabetes and brain tumors have a two-way effect. On the one hand, brain tumors, especially in the hypothalamus and pituitary regions, can disturb the regulation of the pancreas activity in the body, which can lead to diabetes mellitus. At the same time, diabetes insipidus is quite possible if the hormones regulating kidney function are disturbed. On the other hand, diabetes, by changing the process of healthy glucose metabolism and creating a faulty cycle, leads to an increase in the toxic substances of incomplete glucose fuel, beta amyloid plaques, and phosphorylated tau fibers in the brain, which leads to the destruction of brain tissues, neurodegenerative diseases, and in some cases or exacerbation of brain tumors.

Search strategy and selection of articles

Search in Scopus, Google scholar, PubMed databases and by searching with keywords such as "Nursing Services"," Medical Services", " Diabetes" and “High Blood Pressure” to obtain articles related to the selected keywords [15-17]. Case report articles, editorials, and articles that were not published or only an introduction of them were available, as well as summaries of congresses and meetings that were in languages other than English, were ignored. Only the original research articles that evaluated the effectiveness of different drugs in the treatment of COVID-19 using standard methods were studied (figure 3) [18].

Figure 3. Flow chart of included subjects



Symptoms of high blood pressure

High blood pressure is usually asymptomatic until the end stages. Sometimes when a person's blood pressure rises critically, the following symptoms are seen: Headache, sleepiness, confusion, numbness and tingling of the hands and feet, bleeding from the nose, severe shortness of breath. Many factors that increase blood pressure can be corrected [30].

Diagnosis of high blood pressure

Diagnosing high blood pressure is done easily by using a medical sphygmomanometer, performing other clinical examinations and checking the patient's records [31-33]. Diagnosing this disease is the first and most basic step in controlling it. There are very simple ways to control high blood pressure and reduce the risk of heart disease that you can follow after diagnosis. In the continuation of the article diabetes and blood pressure; Tips on facilitating the treatment of blood pressure are discussed [34-36].

Complications of high blood pressure

An increase in blood pressure damages your blood vessels, and as a result of damage to the blood vessels in the body, the risk of kidney failure, heart failure, heart attack, and stroke increases. Stroke, heart attack, heart failure, pulmonary edema, kidney failure, eye damage and vision problems are the main complications of high blood pressure. It should be known that the higher the blood pressure, the shorter the lifespan of a person. People with high blood pressure have a higher risk of stroke and heart attack. If high blood pressure remains untreated for a long time, kidney failure may occur or vision may be damaged [37-39].

At the same time, it is possible that the heart is enlarged abnormally and its efficiency decreases, which can lead to heart failure and impaired blood pumping by the heart. If high blood pressure is treated, the risk of heart attacks

will decrease. High blood pressure is one of the most important risk factors for heart disease and stroke. According to global statistics, 3 out of every 5 cases of heart failure in women are caused by high blood pressure. People who have diabetes in addition to high blood pressure suffer from kidney failure and stroke far more than others [40-42].

Important points about blood pressure measurement

Blood pressure measurement is an easy, painless and inexpensive way to find out about high blood pressure.

- Under normal conditions, check your blood pressure at least once every 6 months.
- If you have high blood pressure, the frequency of blood pressure control should be increased.
- You can measure your blood pressure at the doctor's office or even at home [43].
- If you have diabetes, ask your doctor to measure your blood pressure at regular visits.

Diabetes is a complex disease and has many types. Below we will examine the cause of diabetes

Insulin is one of the hormones that control our blood sugar levels. Diabetes occurs when our body does not produce enough insulin or the insulin produced does not work, resulting in high blood sugar. In another type of diabetes (type 1 diabetes), insulin is generally not produced in the body. It should be noted that high blood sugar may be due to the lack of production of the insulin hormone in the body or the cells' resistance to it. If diabetes is not controlled, over time, high blood sugar levels can damage blood vessels and nerves and cause heart disease, stroke, kidney problems, eye damage, and leg ulcers [44-46]. Blood pressure is the pressure exerted by our heart to pump blood against the walls of the vessels. Blood pressure is measured in millimeters of mercury (mmHg) and two numbers are used to describe it. These numbers are written as 80/130 mmHg and read as "130 over 80" or "13 over 8".

The first number is called systolic pressure. This number is the maximum pressure that the heart uses when it contracts and beats to pump blood throughout the body. The second number, diastolic pressure, is the lowest pressure the heart uses when it is resting between beats. In the example, 80/130mmHg, systolic pressure is 130mmHg and diastolic pressure is 80mmHg. It is better to check blood pressure in people with diabetes regularly by members of the health service provider team (doctor, nurse, health care provider in homes and health centers). Blood pressure in people with diabetes should be evaluated by a doctor at least once a year [4].

Blood pressure kills more than 1,300 people in America every day, that is, one person every minute. In addition, it causes the occurrence of two common and fatal diseases among the dying, namely heart attacks and strokes. It also increases the risk of kidney failure and dementia. It is interesting that all diseases caused by blood pressure can be prevented. By observing the following three points, you can reduce your pressure and return to life [18].

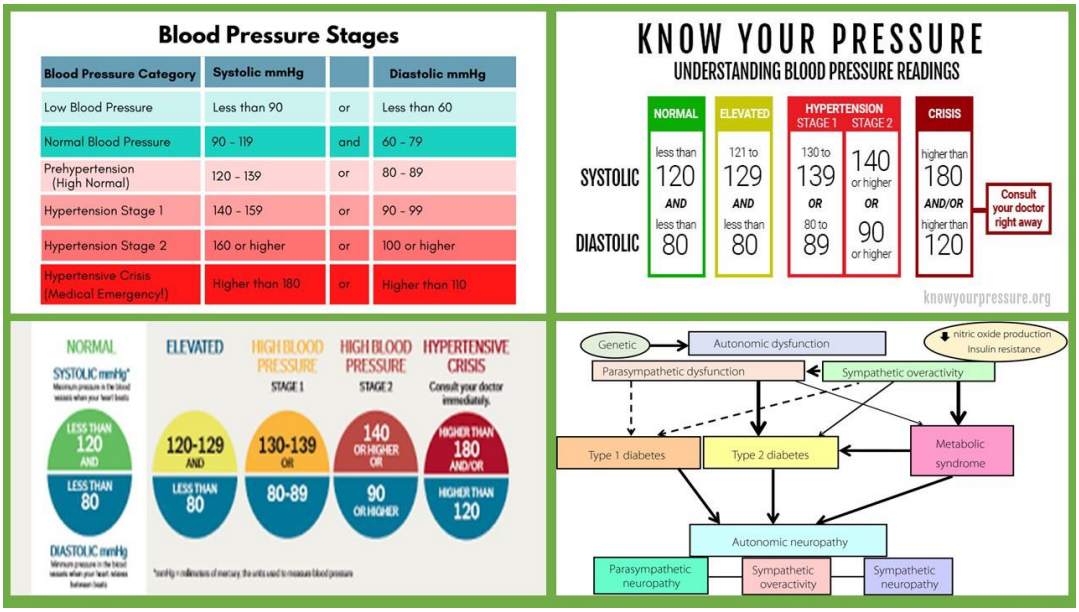
1. Know your blood pressure number: If possible, check your blood pressure at home. Although it is easier to trust the blood pressure that is done in medical examinations, but in practice these examinations are not accurate. Sit at home for 5 minutes and do no activity, then check your blood pressure. This number helps the doctor in providing the best treatment. Talk to your doctor about how often to check your blood pressure. Empty the bladder before taking blood pressure and do not do this for at least 30 minutes after exercise, smoking and drinking coffee [42].

2. Treat the cause of your high blood pressure: You can't stop a broken pipe with a piece of cork. The same is true about blood pressure, if you have this disease, you must find the cause and treat it [12].

The most important causes of high blood pressure are

- **Sedentary lifestyle:** Any physical activity can reduce blood pressure and minimize the need for medication.
- **Eating processed foods:** Especially foods that contain large amounts of sodium.
- **Having high weight:** 10-50% weight loss lowers blood pressure better than any medicine
- **Excessive consumption of alcohol:** Drinking more than one glass of alcoholic beverage per day increases blood pressure.
- **Not treating sleep apnea:** 30-50% of people with high blood pressure suffer from untreated sleep apnea. In case of snoring, tiredness after sleep and shortness of breath during sleep, you should check the sleep apnea by a doctor.
- **Primary aldosteronism (excessive secretion of aldosterone by the adrenal glands):** This is a hormonal problem that was rare in the past but is now accelerating. If blood pressure is not effectively controlled, check your aldosterone level. Ask your doctor about the cause of your high blood pressure. Of course, genetics plays an important role in this, but according to experts, it can control more than half of blood pressure cases [5].

Figure 4. The most important causes of high blood pressure are



3. Regular use of drugs: No one likes the use of drugs and everyone should be more selective about the use of drugs and be informed about its benefits and risks. However, if your blood pressure is still above 80/130 after the necessary treatments, failure to use medications can cause a heart attack and even death. Primary recommended blood pressure medications are effective and have fewer side effects. For the effective treatment of blood pressure, it is very important to have a strategy defined by the doctor. In this way, blood pressure can be controlled at different stages. People are able to control the factors affecting blood pressure more than they think. So, by observing the three points mentioned above, bring the disease under your control.

Complications from diabetes and high blood pressure

Over time, high blood sugar can damage the blood vessels and nerves that control the heart. People with diabetes are twice as likely to have disorders that increase the risk of heart disease than other people.

These disorders include

- High blood pressure can damage the walls of arteries (the vessels that carry blood from the heart to the organs). Having high blood pressure and diabetes can greatly increase the risk of heart disease.

- Excessive amounts of bad cholesterol (LDL) in the bloodstream can accumulate in the walls of damaged arteries, causing narrowing of arteries and impaired blood supply to organs, including the heart and brain.

- High triglycerides (a type of fat in the blood), low good cholesterol (HDL) or high bad cholesterol (LDL) cause hardening of the artery walls and, as a result, increase the risk of high blood pressure, heart attack and stroke.

High blood pressure can damage blood vessels, making it harder for blood to reach different parts of the body, including vital organs like the heart, and putting a person at greater risk of heart attack or stroke. Also, the presence of high blood pressure and diabetes increases the risk of complications caused by diabetes. It is important to know that many people with high blood pressure may not have symptoms and feel healthy. Even then, it is important to control high blood pressure because it damages the blood vessels in the body. This is why you should never forget to measure your blood pressure. Blood pressure measurement is a painless examination and takes only two minutes.

Discuss

Diabetes is high levels of sugar in the blood. A person with diabetes either does not have enough insulin to process glucose or their insulin does not work effectively. Insulin is a hormone that enables the body to process glucose from food and use it as energy. As a result of these insulin problems, glucose cannot enter cells for energy and instead accumulates in the bloodstream. When blood with high levels of glucose flows through the body, it can cause widespread damage, including to blood vessels and kidneys. These organs play an essential role in maintaining healthy blood pressure. If these organs are damaged, blood pressure increases and increases the risk of further damage and complications. People with high blood pressure have a higher risk of developing type 2 diabetes. This connection may be due to processes in the body that affect both conditions, such as inflammation. The combined effect of diabetes and high blood pressure can increase a person's risk of cardiovascular disease, kidney disease, and other health problems. High blood glucose levels can increase blood pressure in three ways:

- Blood vessels lose the ability to stretch.

- Increased fluid in the body, especially if diabetes already affects the kidneys.

- Insulin resistance may be a process that increases the risk of high blood pressure.

Controlling blood sugar and blood pressure can help prevent these complications. In addition, healthy people should check their blood pressure several times a year, but diabetic patients need to check their blood pressure more regularly, and in addition to visiting a doctor at least 4 times a year, they should also check it at home [14]. The American Diabetes Association warns that the combination of high blood pressure and type 2 diabetes can potentially increase the risk of heart attack or stroke. In addition, the coexistence of these two diseases increases the risk of diabetes-related diseases, including kidney disease, diabetic retinopathy, and even blindness. Considerable evidence shows that chronic hypertension can gradually lead to an increase in age-related cognitive problems, such as Alzheimer's disease and dementia. High blood pressure is also an important risk factor for strokes [4]. Among these, risk factors include family history of heart disease, high fat, high sodium diet, obesity, age, smoking, low levels of potassium and vitamin D, excessive alcohol consumption, chronic diseases such as kidney disease and sleep apnea. Risk factors for high blood pressure in people with diabetes. Before every hip replacement surgery, the doctor conducts examinations for all patients. One of these tests is the measurement of blood sugar. If it is determined that a person has diabetes, the doctor will be more careful to check the cardiovascular and renal system of the patient [6]. If a problem is found in these systems, we will try to control them. The doctor also checks the presence of any infection in the lungs or urinary system and, if any, treats them

before the surgery. On the other hand, he checks the amount of this substance in the patient's blood by performing an A1c test [7].

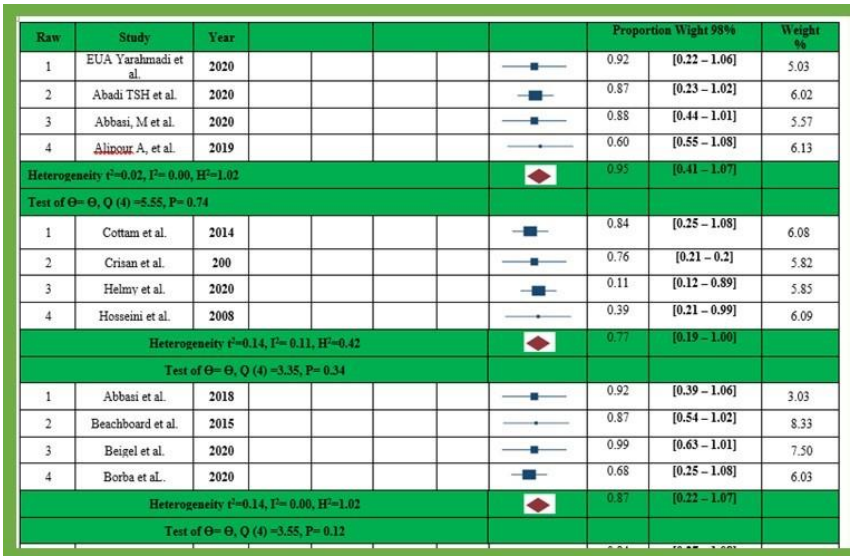
This article shows whether the patient was successful in controlling his blood sugar in the month before the test. The most important thing that the patient should pay attention to is blood sugar control. The better the blood sugar level is controlled in one or two months before the surgery and three or four months after being discharged from the hospital, the less the possibility of surgical site infections and pulmonary and urinary infections [1]. Also, accurate control of blood sugar in the long term can reduce the possibility of joint loosening and increase the life of the patient's artificial joint. Another point is that most diabetic patients are overweight. Trying to lose weight in these people can control their diabetes better and put less pressure on the artificial joint. The result of both of these is to increase the life of the artificial joint.

A Canadian expert in his new studies found that patients who use blood pressure drugs have a 43% higher risk of hip fracture in the first 45 days of using the drug. A Canadian expert in his new studies found that patients who use blood pressure drugs have a 43% higher risk of hip fracture in the first 45 days of using the drug. According to the Health Service of Iran Student News Agency (ISNA), Dr. Debra Butt, assistant professor and member of the Department of Family and Community Medicine at the University of Toronto and a family physician at Oscar Borough Hospital, noted in this study: Patients should start taking blood pressure medications. They should be aware of the possible side effects of these drugs on the pelvic bone (Figure 5 & 6).

Figure 6. Forest plot showed Nursing Services in Patients with Diabetes and High Blood Pressure

Raw	Study	Year	Severe COVID-19		non- Severe COVID-19			Proportion Wight 98%		Weight %
			Yes	No	Yes	No				
1	Wang et al.	2021						0.85	[0.39 – 1.02]	6.02
2	Kragholm et al.	2021						0.83	[0.42 – 1.01]	5.92
3	Papadopoulos et al	2021						0.74	[0.55 – 1.02]	5.65
4	Team	2020						0.91	[0.48 – 1.08]	6.03
Heterogeneity t^2=0.00, I^2= 0.00, H^2=1.00								0.98	[0.20 – 1.08]	
Test of Θ= Θ, Q (4) =3.99, P= 0.66										
1	Hafeez et al.	2020						0.68	[0.52 – 1.06]	6.02
2	Wang et al.	2020						0.74	[0.31 – 1.08]	5.92
3	Guan et al	2020						0.89	[0.19 – 1.01]	5.65
4	Zhang et al	2020						0.90	[0.29 – 1.02]	6.03
Heterogeneity t^2=0.00, I^2= 0.00, H^2=1.00								0.98	[0.20 – 1.06]	
Test of Θ= Θ, Q (4) =4.44, P= 0.71										

Figure 7. Forest plot showed Medical Services in Patients with Diabetes and High Blood Pressure



Raw	Study	Year						Proportion Wight 98%		Weight %
1	EUA Yarahmadi et al.	2020						0.92	[0.22 – 1.06]	5.03
2	Abadi TSH et al.	2020						0.87	[0.23 – 1.02]	6.02
3	Abbasi, M et al.	2020						0.88	[0.44 – 1.01]	5.57
4	Alipour A, et al.	2019						0.60	[0.55 – 1.08]	6.13
Heterogeneity t^2=0.02, I^2= 0.00, H^2=1.02								0.95	[0.41 – 1.07]	
Test of Θ= Θ, Q (4) =5.55, P= 0.74										
1	Cottam et al.	2014						0.84	[0.25 – 1.08]	6.08
2	Crisan et al.	200						0.76	[0.21 – 0.2]	5.82
3	Helmy et al.	2020						0.11	[0.12 – 0.89]	5.85
4	Hosseini et al.	2008						0.39	[0.21 – 0.99]	6.09
Heterogeneity t^2=0.14, I^2= 0.11, H^2=0.42								0.77	[0.19 – 1.00]	
Test of Θ= Θ, Q (4) =3.35, P= 0.34										
1	Abbasi et al.	2018						0.92	[0.39 – 1.06]	3.03
2	Beachboard et al.	2015						0.87	[0.54 – 1.02]	8.33
3	Beigel et al.	2020						0.99	[0.63 – 1.01]	7.50
4	Borba et aL.	2020						0.68	[0.25 – 1.08]	6.03
Heterogeneity t^2=0.14, I^2= 0.00, H^2=1.02								0.87	[0.22 – 1.07]	
Test of Θ= Θ, Q (4) =3.55, P= 0.12										

According to CBC News, Dr. Butt emphasized: These patients should be more careful. If you feel weak and dizzy, be sure to inform your doctor about it, and you should not participate in activities and work that are at risk of tripping and falling from a height.

Conclusion

A patient with diabetes can have a successful hip and hip replacement surgery and get relief from hip pain caused by its damage, but to get the best results, the doctor and the patient must follow some principles, the most important of which is better and more accurate control of the amount it is blood sugar. Researchers evaluated more than 1000 people in a 3-year period. Researchers found that elderly people with type 2 diabetes have bone weakness that cannot be measured by standard bone density tests. These findings indicate skeletal defects that may lead to an increased risk of bone fractures in elderly people with diabetes. These findings can eventually lead to the emergence of new approaches to prevent and treat these events. Fractures are a concern among seniors with osteoporosis (thinning of the bones that occurs with age). Fractures can lead to reduced quality of life, disability, and even death, as well as increased health care costs. It has been determined that even in those with normal or high bone density, if they have type 2 diabetes, the risk of fracture increases. The findings show that the probability of hip fracture is 40-50% higher in these people. Also, with the help of special bone scans in more than 1000 elderly people, researchers found that in those with type 2 diabetes, the bones become weak and brittle, and this change in bone strength cannot be detected with the help of standard bone density measurement methods. This decrease in bone density in elderly people with diabetes can increase the risk of fractures in them. Hip fractures are one of the most complicated risks that are more likely to occur in people with osteoporosis. These fractures not only cause a lot of expenses to the individual and his family and the health system of the country, but the possibility of disability and even the risk of death afterwards is also high. Researchers say that the risk of hip fracture is 40-50% higher in elderly people with diabetes, even in those who are reported to have normal bone strength in common bone density tests.

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