# Impact Of Diabetes Mellitus Upon The Physical Activity Of Patients Post Coronary Artery Bypass Graft Surgery In Baghdad City.

## اثر داء السكري على النشاط البدني للمرضى بعد عملية زرع الشرايين التاجية في مدينة بغداد

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**الخلاصة**

**الخلفية العلمية :** يعد السكري من أهم عوامل الخطورة للإصابة بإمراض الشرايين التاجية في كلا الجنسين بالإضافة إلى دوره في ارتفاع نسبة المضاعفات بعد عملية زرع الشرايين التاجية والتأثير على نوعية حياة المريض.

**أهداف الدراسة :** تهدف الدراسة إلى معرفة اثر داء السكري على النشاط البدني للمرضى بعد عملية زرع الشرايين التاجية وإيجاد الفروق المعنوية بين النشاط الجسماني من جهة و المعلومات الديموغرافية والسريرية (الجنس ، العمر، الحالة الزوجية، المستوى التعليمي، مستوى الكولسترول، كتلة الجسم ) لمرضى السكري من جهة أخرى.

**إجراءات البحث** : أجريت دراسة وصفية لمعرفة اثر داء السكري على النشاط البدني للمرضى بعد ثلاثة أشهر على الأقل من عملية زرع الشرايين التاجية بدأت الدراسة من ٢٠١٢/١١/١٠ ولغاية ٢٠١٣/٧/١٠ وقد تم جمع العينة ١٠٠ مريض من ثلاثة مراكز ومستشفيات (مركز ابن البيطار لجراحة القلب والأوعية الدموية ، المركز العراقي لإمراض القلب، مستشفى ابن النفيس لإمراض القلب) وتكونت أداة الدراسة من محورين هي أولا الخصائص الديموغرافية والسريرية وثانيا مقياس النشاط البدني ( الجسماني) ؛بالنسبة للخصائص الديموغرافية والسريرية فتكونت من ستة فقرات وهي الجنس،العمر،الحالة الزوجية ، المستوى التعليمي، مستوى الكولسترول، كتلة الجسم أما بالنسبة لمقياس النشاط البدني فيتكون من ثمانية فقرات تقيس النشاطات قليلة الجهد ومتوسطة الجهد للحياة اليومية ، وتم قياس ثبات الفقرات من خلال إجراء الاختبار وإعادة الاختبار = ٠.٩٣ ولستخدم الباحث الإحصاء الوصفي والاستدلالي لتحليل البيانات.

**النتائج** : أظهرت نتائج الدراسة إن (٥٧%) من المرضى يعانون من الإصابة بمرض السكري بالمقارنة مع (٤٣%) غير مصابين بالسكري وان نسبة (٤٦%) من المرضى المصابين بالسكر هم رجال وان نسبة ( ٢٨%)منهم ضمن الفئة العمرية ٥١-٦٠ سنه، (٤٦%) متزوجون ،(١٣%) هم أميين (لا يعرفون القراءة والكتابة ) ، (٣١%) يعانون من ارتفاع الكولسترول، (٢٦%) يعانون من زيادة الوزن فوق المستوى الطبيعي . بالإضافةإلى هذا أظهرت الدراسة إلى وجود فروق ذات مستوى معنوية عالية بين المرضى المصابين وغير المصابين بالسكري فيما يخص النشاط البدني بعد العملية وان هناك علاقة بمستوى معنوية عالية بين الجنس، العمر، ارتفاع الكولسترول، وكتلة الجسم مع النشاط البدني للمرضى المصابين بالسكري .

**الاستنتاجات** : لستنتجت الدراسة إلى إن النشاط البدني(الجسماني) للمرضى المصابين بالسكري هي اقل من المرضى الغير مصابين وان الجنس و العمر وارتفاع مستوى الكولسترول وكتلة الجسم للمرضى المصابين بالسكري تؤثر على نشاطهم البدني بعد عملية زرع الشرايين التاجية .

**التوصيات** : بناء على نتائج الدراسة أوصى الباحثان على تحضير برامج وكتيبات خاصة تشجع المرضى على تحسين نشاطهم البدني بعد عملية زرع الشرايين التاجية وذلك من خلال إجراء تعديل على النظام الغذائي، الالتزام بالعلاج، ممارسة التمارين الرياضية بانتظام، وغيره من تغيير نمط الحياة.

**Abstract**

**Background**: Diabetes mellitus is considered a major risk factor for developing coronary artery disease, and is associated with a marked increase in the complications post cardiac revascularization in both women and men in addition to its impact on the patients Quality of life.

**Objectives:** the study aims to assess the impact of diabetes mellitus upon the physical activity for patients post coronary artery bypass graft surgery and to find out the relationship between the physical activity and socio-demographic and clinical data of the diabetic patients.

**Methods:** descriptive study was conducted to identify the impact of diabetes mellitus upon the physical activity of patients who undergoing CABG surgery at least three months ago. The study starting from November 10th 2012 to the July 10th 2013 on the 100 patients in three centers and hospitals in Baghdad city (Ibn Al-bittar center for cardiac surgery, Iben Al-Naffes Hospital and Al-Iraqi Center for Cardiac Disease), the instrument was consist of two part which of clinical- demographic data( gender, age group, marital status, educational level, cholesterol, BMI) and physical activities instrument that consist of eight items that measure the basic and moderate activities of daily living, the reliability of the study was measured through test retest method =0.93, the researcher use the descriptive and inferential statistics to analyze data .

**Results: t**he result of the study shows that (57%) of the study samples have diabetic in comparison (43%) with Non-diabetic patients , (46%) of the diabetic patients were males, (28%) of the subject were at the age group 51- 60 years, (46%) were married, (13%) illiterate . (31%) have high cholesterol level and (26%) were overweight. Added to that the study shows a highly statistical difference in the physical activity between diabetic and non-diabetic patients , a highly statistical association between physical activity and clinical-demographic data (gender, age group, cholesterol level and BMI) of the diabetic patients were also found .

**Conclusions** : the study conclude that the physical activity of the diabetic patients is less than non- diabetic patients and the clinical - demographic data ( gender, age group, cholesterol level and BMI) of the diabetic patient affect with highly significant association ($p \leq 0.01$) on their physical activity post CABG surgery.

**Recommendations** : according to the findings of the study the researchers recommend to Prepare a special programs and guide booklet that encourage patients to improve their physical activity post CABG surgery which include diet modification, adherence to treatment, regular exercise, and other life style modification.

**Keywords**: Impact, diabetes mellitus, Physical activity, Coronary artery bypass graft surgery.

## INTRODUCTION:

Coronary artery bypass graft: Abbreviated CABG. A form of bypass surgery that can create new routes around narrowed and blocked coronary arteries, permitting increased blood flow to deliver oxygen and nutrients to the heart muscle.Coronary artery bypass graft is an option for selected groups of patients with significant narrowing and blockages of the heart arteries. The bypass graft for a CABG can be a vein from the leg or an inner chest-wall artery. CABG surgery is one of the most commonly performed major operations[(1)].

Approximately 600,000 coronary artery bypass graft (CABG) operation are performed worldwide every year. Coronary artery bypass surgery has, over the years, proven its efficacy in terms of improved patient survival and improved quality of life in terms of pain-free survival. The general indications for coronary revascularization include improvement in survival, both overall survival as well as increase in angina free survival, The specific indications for coronary artery bypass grafting are as follows[(2)]:

In asymptomatic patients, class I indications for CABG include significant left main stenosis, Triple vessel disease with or without decrease in ejection fraction (but particularly with a decrease in ejection fraction). Patients with reduced ejection fraction with coronary artery disease have a 5 year survival of approximately 75%, this increases to 90% in patients undergoing coronary artery bypass grafting, Angina refractory to triple vessel therapy including nitrates, beta blockers and calcium channel blockers[(3)].

Measuring the outcomes for cardiac surgical patients following hospitalization is essential in determining cardiac surgery efficacy as a treatment of coronary artery disease (CAD). Measuring patient outcomes after cardiac surgery is a complex process that continues to evolve as clinicians and researchers refine outcome measurement methods. studies that are more recent have shifted toward examining the impact of coronary artery bypass grafting (CABG) surgery on functional status and resumption of daily activities [(4)].

Physical activity was reported as a measurement of individual ability to perform self-care activities (basic and moderate activities of daily living) indicates the individual s physical independence within his or her own environment. Indeed, it has been systemically shown to predict optimal of the procedures [(5)] .

Not enough is known about the physical activity during the first few weeks following CABG surgery. A better understanding of the trajectory of functional recovery following CAB surgery would help health care professionals optimize perioperative care for this patient population. Therefore, the purpose of this study was to examine patient physical function during the first 3 months following CAB surgery [(6)].

**OBJECTIVES OF THE STUDY:** the study aims to assess the impact of diabetes mellitus upon the physical activity for patients post coronary artery bypass graft surgery and to find out the relationship between the physical activity and socio-demographic and clinical data of the diabetic patients.

## MATERIALS AND METHODS

**Design of the Study**: descriptive design study the physical activity of the patients at least three month post CABG surgery , the study starting from November 10th 2012 to the 10thJuly 2013

**Setting of the Study:** The present study was carried out in the three hospital (Ibn Al-bittar center for cardiac surgery, Iben Al-Naffes Hospital and Al-Iraqi Center for Cardiac Disease)

**Sample of the study:** A non- probability purposive sample of 100 patients who undergoing coronary artery bypass graft surgery were attending to the hospitals.

The sample was collected according to the following criteria:

1- Adult patients at 20 years age and above 70 .
2- Undergoing coronary artery bypass graft surgery at least 3 months ago.
3- The patients does not diagnose with renal disease
4- Received care and follow up.

**Study Instrument:** It consist of clinical – demographic data that composed of 6 items which included: age, gender, Marital status**,** Level of education, cholesterol level and BMI, added to that physical activity instrument which consist of eight items that measures basic and moderate activities of daily living, these items rated and scored by appointment each response an ordinal value, four level types options scale as {severely limited (1), moderately limited (2), a slightly limited (3), not limited (4)}.

**Rating of the Scale** : relative sufficiency method was used to describe the physical activity grade ( Low, Moderate, High ) as the following :

$$= \frac{\textbf{cut of point}}{\textbf{no.of scale}} \times \mathbf{100}$$

$$= \frac{2.5}{4} \times \mathbf{100} = 62.5$$

So interval had ranged between (62.5-100) that represented the rate of functional Status effects

$$= \frac{100-62.5}{2} = \mathbf{18.75}$$

Less than 62.5 = Low physical activity

62.5 + 18.75 = 81.25 = ( 62.5 – 81.25) Moderate physical activity

81.3 +18.75 = 100 = ( 81.3 – 100) High physical activity

**Reliability of the Questionnaire:** Determination the reliability of the items scale was based upon the test retest of the questionnaire= 0.93

**Statistical analysis:** The researcher used the appropriate statistical methods in the data analysis which included descriptive data analysis and inferential data analysis.

## RESULTS:

**Table 1: Clinical -demographic Characteristics of the Study Samples**

| Socio-demographic and clinical data | | Diabetic patients | | Non-diabetic patients | |
|---|---|---|---|---|---|
| | | **F** | **%** | **F** | **%** |
| Gender | | | | | |
| | Male | **46** | **46.0%** | **34** | **34.0%** |
| | Female | 11 | 11.0% | 9 | 9.0% |
| | Total | 57 | 57% | 43 | 43% |
| Age group | | | | | |
| | 41-50 yrs | 10 | 10.0% | 15 | 15.0% |
| | 51-60yrs | **28** | **28.0%** | **16** | **16.0%** |
| | 61-70 yrs | 10 | 10.0% | 12 | 12.0% |
| | above 70 yrs | 9 | 9.0% | 0 | 0% |
| Marital status | | | | | |
| | married | **46** | **46.0%** | **40** | **40.0%** |
| | widowed | 7 | 7.0% | 2 | 2.0% |
| | divorced | 4 | 4.0% | 1 | 1.0% |
| Educational level | | | | | |
| | cannot read and write | **13** | **13.0%** | **12** | **12.0%** |
| | read and write | 4 | 4.0% | 0% | 0% |
| | primary school | 10 | 10.0% | 4 | 4.0% |
| | intermediate school | 10 | 10.0% | 7 | 7.0% |
| | secondary school | 10 | 10.0% | 8 | 8.0% |
| | diploma | 8 | 8.0% | 10 | 10.0% |
| | college and above | 2 | 2.0% | 2 | 2.0% |
| Cholesterol | | | | | |
| | Yes | **31** | **31.0%** | 17 | 17.0% |
| | No | 26 | 26.0% | **26** | **26.0%** |
| BMI | | | | | |
| | Normal | 10 | 10.0% | 12 | 12.0% |
| | overweight | **26** | **26.0%** | **14** | **14.0%** |
| | Obese class 1 | 15 | 15.0% | 10 | 10.0% |
| | Obese class 2 | 6 | 6.0% | 7 | 7.0% |

F = Frequency, % = percentage.

Table 1 presented that the majority (46%) of the diabetic patients were males of 26% of them were at age 51-60 years old , 46 % were married, 13 % were illiterate (not read and write) , 31% have high level of cholesterol and 26% of the diabetic patients have overweight.

**Table 2: comparison of physical activity between diabetic and non-diabetic of the study sample**

| Physical activity items | Diabetic patients | | Non-diabetic patients | | T test | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | P value | sig |
| Dressing yourself | 3.438 | 0.50 | 3.95 | .213 | 0.000 | **HS** |
| Walking indoors on level ground | 2.842 | 0.819 | 3.90 | .426 | 0.001 | **HS** |
| Showering | 3.263 | 0.44 | 3.95 | .213 | 0.000 | **HS** |
| Climbing a hill or a flight of stairs without stopping | 1.947 | 1.076 | 3.48 | .855 | .0043 | **HS** |
| Gardening, vacuuming or carrying groceries | 2.052 | 1.02 | 3.44 | .765 | 0.001 | **HS** |
| Walking more than a block at a brisk pace | 1.405 | 0.728 | 2.65 | .841 | 0.01 | **HS** |
| Running or jogging | 1.210 | 0.490 | 2.13 | .774 | 0.003 | **HS** |
| Lifting or moving heavy objects (Furniture, children) | 1.175 | 0.383 | 2.02 | .801 | 0.004 | **HS** |
| **Total physical activity score** | 17.33 | 4.914 | 25.55 | 4.07 | 0.001 | **HS** |

SD= standard deviation, sig= significant HS= Highly significant

This table shows a highly significant difference between diabetic and non-diabetic patients in the physical activity items in addition to total physical activity score (p value ≤ 0.01).

**Table 3: Association between physical activity and socio-demographic and clinical data of the diabetic patients**

| Physical activity | | | | | | T test / ANOVAs ( F ) test | | | |
|---|---|---|---|---|---|---|---|---|---|
| Gender | | F | % | Mean | SD | T test | df | p | sig |
| | Male | 46 | 46.0 | 16.5217 | 4.75973 | -2.68 | 55 | 0.01 | HS |
| | Female | 11 | 11.0 | 20.7273 | 4.19740 | | | | |
| Age Group | | F | % | Mean | SD | F test | df | p | sig |
| | 41 – 50 years | 10 | 10.0 | 14.6000 | 1.42984 | 3.901 | 56 | .014 | |
| | 51 – 60 years | 28 | 28.0 | 16.6429 | 4.58027 | | | | |
| | 61 – 70 years | 10 | 10.0 | 21.2000 | 6.33859 | | | | HS |
| | Above 70 years | 9 | 9.0 | 18.2222 | 4.49382 | | | | |
| | total | 57 | 57.0 | 17.3333 | 4.91475 | | | | |
| Marital Status | | F | % | Mean | SD | F test | df | p | sig |
| | Married | 46 | 46.0 | 16.7174 | 4.82430 | 2.037 | 56 | 0.140 | NS |
| | Widowed | 7 | 7.0 | 19.4286 | 4.39155 | | | | |
| | Divorced | 4 | 4.0 | 20.7500 | 5.61991 | | | | |
| | Total | 57 | 57.0 | 17.3333 | 4.91475 | | | | |
| Educational Level | | F | % | Mean | SD | F test | | p | sig |
| | Not read and write | 13 | 13.0 | 19.3846 | 4.94197 | 1.295 | 56 | 0.277 | NS |
| | Read and write | 4 | 4.0 | 15.5000 | .57735 | | | | |
| | Primary school | 10 | 10.0 | 17.0000 | 5.37484 | | | | |
| | Intermediate school | 10 | 10.0 | 18.8000 | 5.90292 | | | | |
| | Secondary school | 10 | 10.0 | 17.2000 | 5.71159 | | | | |
| | Diploma | 8 | 8.0 | 14.7500 | 1.16496 | | | | |
| | College and above | 2 | 2.0 | 13.0000 | .00000 | | | | |
| Total | | 57 | 57% | 17.3333 | 4.91475 | | | | |
| Cholesterol | | F | % | Mean | SD | T test | df | p | sig |
| | **yes** | 31 | 31.0 | 15.3846 | 3.58973 | 3.019- | 56 | 0.004 | HS |
| | **No** | 26 | 26.0 | 18.9677 | 5.31967 | | | | |
| BMI | | F | % | Mean | SD | F test | df | p | sig |
| | Normal weight | 10 | 10.0 | 20.6000 | 5.94792 | 4.128 | 56 | .011 | HS |
| | Overweight | 26 | 26.0 | 16.4615 | 4.65816 | | | | |
| | Obese class 1 | 15 | 15.0 | 18.4000 | 4.10226 | | | | |
| | Obese class 2 | 6 | 6.0 | 13.0000 | .00000 | | | | |
| | Total | 57 | 57.0 | 17.3333 | 4.91475 | | | | |

This table show a highly significant statistical association between physical activity and gender, age group, cholesterol , BMI of the diabetic patients.

## DISCUSSION

The results reveal that the majority of diabetic patients 46% of the patients post CABG surgery were males, (28%) at age group (51 – 60) years old, (46%) of them were married, (13%) were not read and write, (31%) have high cholesterol level and (26%) were overweight.

This results comes along with the study[7] of the impact of diabetes mellitus on outcomes in Japanese patients undergoing coronary artery bypass grafting which present that the majority (78%) of the study were males,( 43%) with mean age 58 ± 8.46 years old and most of them (38%) were married. The results of the study further supported by [8] study which evaluated the hospital outcomes of diabetic and non-diabetic patients aged over 70 years after isolated coronary artery bypass grafting (CABG) and mention that (9 %) of the diabetic patients post CABG were illiterate, (42%) with high cholesterol level and most of them (22.7%) were overweight with Mean body mass index (SD) = 26.3±3.3.

The study shows that a highly statistical differences were found between the diabetic and non-diabetic patients in relation to physical activity post CABG surgery. In a study[9] of Impact of Diabetes Mellitus on the Treatment Effect of Surgical Revascularization for Patients With Unprotected Left Main Coronary Artery Disease confirm that diabetic patients had worse physical activity, higher incidence of infection, and higher mortality than non-DM patients.

The data of the study reveal that the gender, age group, cholesterol level and the BMI of the diabetic patients affect on their physical activity post CABG surgery with a highly significant association. In a study of the potential Risk Factors in Coronary ArteryDisease associated with Diabetes Mellitus, the study confirm that these variables (gender, age group, cholesterol level and BMI) affect on the physical activity and the Poor outcomes after CABG have been described due to increased incidence of wound infection, cognitive decline, stroke, poor quality of life and high 12 month incidence of death or Saphenous Vein graft stenosis [10] .

## CONCLUSIONS:

The study conclude that the physical activity of the diabetic patients is less than non-diabetic patients and the clinical - demographic data ( gender, age group, cholesterol level and BMI) of the diabetic patient affect with highly significant association ($p \leq 0.01$) on their physical activity post CABG surgery.

## RECOMMENDATIONS:

According to the findings of the study the researchers recommend to Prepare a special programs and guide booklet that encourage patients to improve their physical activity post CABG surgery which include diet modification, adherence to treatment, regular exercise, and other life style modification.

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