#  Level of Physical Activity among Diabetic Patients of Rural and Urban Areas

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## ABSTRACT

 **Background:** Developments in the developing world over the last two decades have dramatically increased diabetes worldwide .Diabetes mellitus (DM) is an important public health problem. The presence of obesity, sedentary lifestyle and physical problems among the patients may increase the effect of diabetes.

 **Objective:** To compare the level of physical activity among patients with diabetes living in rural and urban areas of Pakistan.

 **Material and Methods:** It was comparative cross sectional study. It was performed at Chaudhary Mohammad Akram Teaching and Research Hospital Lahore, Sialkot Medical Complex, Civil Hospital Sialkot, CMH Sialkot; Kashmir Hospital Sialkot Sameena Nisaar Hospital Sialkot was completed in 06 months. Convenient sampling (Non-Probability) was used for data collection. Sample size calculated from formula and sample size was 400.

 **Results:** Out of 400 patients with diabetes mellitus, 156(39%) were rural and 244 (61%) were urban. The mean age of the participants was 46.53±12.31. Among participants from rural area 103(66%) were males and 53(34%) were females and among participants from urban areas 119(48.8%) were males and 125(51.2%) were females. The mean age of participants from rural area was 45.48±12.44 and from urban areas was 47.21±12.2. Out of total 156 participants from rural areas, 2(1.3%) were sedentary, 13(8.3%) were under active, 12(7.7%) were under active regular light activity, 26(16.7%) were under active irregular, and 103(66%) were active. Out of 244 participants from urban areas 9(3.7%) were sedentary, 8(3.3%) were under active, 15(6.1%) were under active regular light activity, 58(23.8%) were under active irregular, and 154(63.1%) were active. P value calculated through chi square test show that there is difference in the level of aerobic activity level and people from rural areas had increased aerobic activity. Out of total 156 participants from rural areas, 140(89.7%) were not performing strength and flexibility. Out of total 244 participants from urban areas, 214(87.7%) were not performing strength and flexibility. The mean score of aerobic activity in rural participants was 5.51±1.63 and in urban participants was 5.17±1.55. P value ((0.05) calculated through independent sample t test show that there is significant difference in the level of physical activity. The mean score of Strength and Flexibility in rural participants was 0.22±0.71 and in urban participants was 0.28±0.81. P value ((0.8) calculated through independent sample t test show that there is no significant difference in the level of physical activity. The mean score of total physical activity in rural participants was 5.73±1.93 and in urban participants was 5.75±1.98. P value ((0.88) calculated through independent sample t test show that there is no significant difference in the level of physical activity.

## CONCLUSION

Although, participants from rural areas are physical more active than participants from urban areas in terms of aerobic activity but there is no difference in the strength and flexibility among both groups and as a whole participants from both group had equal level of physical activity.

**Keywords:** Physical Activity; Exercise; Diabetes Mellitus

## Introduction and Literature Review

## Introduction

Diabetes has tremendously increased worldwide in the last two decades especially in developing countries. Due to rapid progress in prevalence, adults should be screened out for early detection and care. Approximately there are more than 451 millions people suffering from diabetes globally and number increasing. 60% diabetes patient live in Asia. Current prevalence in Pakistan is 16.98% with 33.5 millions peoples suffering from it. The urban population is about 34%. Prevalance of diabetes in urban areas of Pakistan is 14.81% and in rural areas 11.44%. (13). Over weight and obesity is about 25% and over 10% respectively, while prevalance of physical activity is 33% to 44%.

According to a study, limited research available on diagnosis and prevalence of diabetes in rural areas (1). A study shows Diabetes is the sixth leading cause of death with approximately 210,000 deaths in the year 1999, Diabetes leads to long-term complications and hence becomes major public health issue . The presence of obesity, sedentary lifestyle or physical inactivity among the patients may increase the impact of diabetes.(2) Another study shows that physical activity leads to physical fitness and endurance results in optimal control of diabetes, as well as regular aerobics help in its treatment(3)

Physical activity is usually recommended for people with diabetes. However in some studies in addition to physical activity a diet plan or behavior or both were considered helpful in diabetic patients.(4) Diabetes mellitus is usually associated with its complications. Due to lack of awareness about diabetes over the years, there has been an increase in its complications. This resulted in decrease effective work force and imparting economic burden on developing Pakistan. Studies have been conducted to determine the level of awareness of diabetic patients in rural and urban areas in Pakistan. The objective of one of such studies was to find areas that require more attention in the field of resources and planning(5). The lifestyle of today's population is being changed especially among the youth as a result of rapid modernization and increase in urbanization rates, habits and fast foods factors. A strong genetic predisposition to metabolic diseases like diabetes the health related problems are more severe in Asian countries population.

 Data on the level of awareness and the prevalence of diabetes in developing countries is suboptimal. This is important information for planning of public health programs. This study helps to identify happening, investigate and evaluate with the help of science and research in the research based trial.(1) Most patients with diabetes or at risk of developing diabetes do not perform physical activity regularly according to the national standard rate. There is a need to make efforts in order to increase the physical activity among these people (6).

## Literature Review

 A prospective cohort study is conducted by Rich Edwards et al, 1986, in which they examine physical activity of diabetics and benefits. The data is collected by quintiles of MET score for walking. A study shows that the age, smoking, alcohol consumption, history of hypertension, high cholesterol, family history and other common variables are closely related to diabetes. The data indicated that a higher level of physical activity is associated with a significant reduction in the risk of type 2 diabetes, including the physical activity of moderate intensity and duration.(8) Lindstrom J et al conducted a study to determine physical activity, BMI, risk of type2 diabetes with glucose regulation. The result concluded that there is still a good relationship between BMI and diabetes. The risk of diabetes could be reduced by increasing physical activity. The effects of physical activity were observed in patients with high BMI and high level of glucose. Regular physical activity, weight reduction and controlled blood glucose levels in patients with diabetes, are the important factors to prevent complications[8].

 Another comparative study evaluated and compared physical activity patterns in relation to hypertension and diabetes in urban and rural areas by Unwin NC et al. The data collection was done by random sampling of households. Urban patients had lower physical activity (P <0.001) with high prevalence of diabetes while rural patients had higher physical activity levels with low prevalence of diabetes. Physical disability is linked with these diseases.(9) Another study was conducted by Ananth Samith Shetty et al. to evaluate trends in prevalence of diabetes in Asia especially in India and China. The research justified that, most of the countries in Asia especially India and China were at risk of diabetes. In the growing number of people there is a significant problem of diseases and their complications. The lifestyle of the population has changed especially among the youth due to the rapid modernization and urbanization rates, habits and readily fast foods factors, moreover there is strong genetic predisposition to metabolic diseases like diabetes. The health related problems are more severe in Asian countries population. By modification of risk factors like physical inactivity that leads to obesity can prevent the diabetes primarily. In the health care agenda the national programs should be implemented from the young ages among the population for the healthy lifestyle (10).

**Objective**

To determine and compare the level of physical activity among diabetes patients of rural and urban areas of Sialkot and Lahore cities .

## Rationale

This study is conducted to assess the level of physical activity performed by diabetes patients in rural and urban areas and to compare them. To narrow the knowledge gap in terms of level of physical activity engaged in by diabetics as a part of their lifestyle modification to control the disease and to see its pattern in rural and urban areas for use as an input for possible education and other related interventions.

## Operational Definition Rapid Assessment of Physical Activity

This scale is reliable to check the level of physical activity. It has three parts Aerobic, flexibility and strength level. The scale is used here as mostly patients were above 50 yrs of age. Physical activity level of that group of age was even lacking in younger ones. This questionnaire consists of nine questions, if the scoring is less than 6 then the activity level will be suboptimal and if scoring is greater than 6 then the activity level will be optimal. Specificity and sensitivity of this scale is 0.75 and 0.73 respectively (7)(12).

**Material and Method** **Study Design**

 It was comparative cross-sectional study.

## Study Setting

Lahore is second populous city of Pakistan with population of 11126285 and Sialkot is 13th populous city with population of 655852 according to census 2017. Urban population of Pakistan is 34%, which is about 40% in Lahore and 30% in Sialkot.

 Following centers selected for research work

* Chaudhry Muhammad Akram Teaching and Research Hospital

Lahore

* Sialkot Medical Complex
* Civil Hospital Sialkot
* CMH Sialkot
* Kashmir Hospital Sialkot
* Sameena Nisaar Hospital Sialkot

**Study Duration**

6 months from 3-1-18 to 30-8-18

## Inclusion Criteria

* 400 Male and female diabetic patients otherwise physically fit ages from 21 to 71 years or above were included after written informed consent.

**Exclusion Criteria**

* Patients suffering from respiratory, gastrointestinal, cardiovascular, neurological, hepatic or other infectious disorders.
* Patients suffering from autonomic neuropathy.
* Patients with any musculoskeletal disorders.
* Patients with diabetes complications like peripheral neuropathy, nephropathy or retinopathy.

Rationale of inclusion and exclusion criteria was to include adults diabetes patients, as more comm comorbid on in old age who are otherwise fit having no conditions or physical disabilities that may hinder in performing physical activity.

## Sample size



p1, p2 = proportion (incidence) of groups #1 and #2 Δ = |p2-p1| = absolute difference between two proportions n1 = sample size for group #1 n2 = sample size for group #2 α = probability of type I error (usually 0.05) β = probability of type

II error (usually 0.2) z = critical Z value for a given α or β

K = ratio of sample size for group #2 to group #1

Z1-α/2 (Z score for level of significance in two sided test) = 1.96 Z1-β (Z score for power of the test) = 0.84 (80% power) Estimated proportion derived from literature is

Proportion in urban (P1) = 16.1%. (11) Proportion in rural (P2) =

7.1%(12)

Sample size through above mentioned formula is 400. (14)

**Sampling Technique**

 Convenient Sampling (Non-Probability) was used.

## Sample Collection Procedure

Sample was collected from government & private hospitals of Lahore and Sialkot. Informed consent was taken before collection of data. Subjects were selected according to inclusion criteria. Physical activity was determined through RAPA questionnaire. Participants were divided into two groups, 1st group included the rural area with diabetes mellitus while 2nd group include urban area with diabetes mellitus. The two groups were interviewed on basis of rapid assessment of physical activity questionnaire in the language they understood. This questionnaire was helpful in providing required information regarding the physical activity of both groups with diabetes mellitus. Data was collected after taking an informed consent by participant. Both groups have total independency of leaving the study at any time.

 Data Collection : In this study rapid assessment of physical activity was used.

## Statistical Analysis

Data was analyzed by using SPSS 12.0 version. Mean±SD was calculated for numeric variables. Chi squared test was used.

## Ethical Consideration

Permission was taken from patient by using consent form with assurance of privacy, Permission was taken from Hospital Administration for this research work with ethical considerations taken into account by same office.

## RESULTS

Table 1: Comparison of Age and Gender

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Rural n=156 | Urban n=244 | Total n=400 |
| Gender | Male | 103(66%) | 119(48.8%) | 222(55.5%) |
| Female |  53(34%) | 125(51.2%) | 178(44.5%) |
| Age | 45.48±12.44 | 47.21±12.2 | 46.53±12.31 |

Table 2: Comparison of Aerobic Activity

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A e r o b i c Activity |  | Residence |  | p value |
| R u r a l n=156 | U r b a n n=244 | Total n=400 |
| Sedentary | 2(1.3%) | 9(3.7%) | 11(2.8%) | 0.05 |
| Under Active | 13(8.3%) | 8(3.3%) | 21(5.3%) |
| Under Active Regular light Activity | 12(7.7%) | 15(6.1%) | 27(6.8%) |
| Under Active Regu-lar | 26(16.7%) | 257(64.3%) | 84(21%) |
| Active | 103(66%) | 154(63.1%) | 257(64.3%) |

**Table 3:** Comparison of Strength and Flexibility

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strength & Flexibility Activity |  | Residence |  | p value |
| Rural n=156 | U r b a n n=244 | Total n=400 |
| None | 140(89.7%) | 214(87.7%) | 354(88.5%) | 0.8 |
| Strength Activity | 6(3.8%) | 10(4.1%) | 16(4%) |
| Flexibility Activity | 2(1.3%) | 2(0.8%) | 4(1%) |
| Both | 8(5.1%) | 18(7.4%) | 26(6.5%) |

**Table 4:** Comparison of score of activity

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Rural n=156 | Urban n=244 | p value |
| Aerobic Activity | 5.51±1.63 | 5.17±1.55 | 0.05 |
| Strength and Flexibility | 0.22±0.71 | 0.28±0.81 | 0.8 |
| Total Activity Score | 5.73±1.93 | 5.75±1.98 | 0.88 |

 400 patients (n=400) included. The minimum age of participants in socio demographic profile is 21 and maximum age is 71.

 Out of total 156 participants were from rural area and 244 were from urban area. Among participants from rural area 103(66%) were males and 53(34%) were females and among participants from urban areas 119(48.8%) were males and 125(51.2%) were females.

The aerobic activity in rural participants was higher as compare to urban participants. The Strength and Flexibility in rural participants were almost equal to urban participants. The mean score of total physical activity in rural participants was 5.73±1.93 and in urban participants was 5.75±1.98. P value ((0.88) calculated through independent sample t test show that there is no significant difference in the level of physical activity.

## Discussion

 Diabetes is the sixth leading cause of death. Approximately estimated 210,000 deaths in the year 1999, Diabetic patients have longterm complications. Although, participants from rural area more physically active than participants from urban area in terms of aerobic activity but there is no difference in the strength and flexibility among both groups and as a whole participants from both group had equal level of physical activity.

 A study shows that a higher level of physical activity is associated with a significant reduction in the risk of type 2 diabetes, including the physical activity of moderate intensity and duration.(8) Another study shows that risk of diabetes could be reduced by increasing physical activity. The effects of physical activity were observed in patients with excessive BMI and high levels of glucose. It shows regular physical activity, weight control and normal blood glucose levels in diabetes patients are the important factors to prevent complications[8]. It was taken into account that the diabetes patients showed a decrease level of motivation. The patients were more reluctant in doing physical activity as they had complaints of pain and swelling of feet whenever they started physical activity. In addition patients with DM had to face socioeconomic issues from the society that leads them more depressed and early fatigue. All that results in very less motivation towards physical activity or continuing any sort of exercise program. The patients with diabetes mellitus should be motivated to promote their level of physical activity and should be informed of the beneficial effects of physical exercise program. The treating physicians must have an effective direct two way communication between the patients and themselves to motivate the patients thus eliminating the risk factors leading to complications and educating the patients about the beneficiary effects of the regular physical activity program. Thus our study intends to highlight the awareness gap between developing low socioeconomic countries and globally especially in developed countries regarding benefits of physical activity of diabetes patients to overcome complications and progression of disease.

## CONCLUSION

Although, participants from rural are physical more active than participants from urban area in terms of aerobic activity but there is no difference in the strength and flexibility among both groups and as a whole participants from both group had equal level of physical activity.

 The time for our study to be carried out limited. The patients had a difficulty in reading out the questionnaire as their education was not enough to sort it out. Patients with diabetes mellitus were difficult to isolate as they did not visited the hospitals regularly in our community. The male and female ratio may be equal in urban and rural groups. **DECLARATIONS**

We acknowledge this study to our parents and teachers.

The contribution from both authors almost same.

No financial assistance or fund taken in this research.

There is neither any conflict of interest nor any ethical issue.

Informed consent taken from all participants and data collected on performa. Identity kept secret.

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 **Consent Form**

The study you are about to participate is **“LEVEL OF PHYSICAL ACTIVITY AMONG DIABETIC PATIENTS OF RURAL AND URBAN AREAS”**. The study has no potential harm to participants. All data collected from you will be coded in order to protect your identity, and should not be disclosed to anyone. Following the study there will be no way to connect your name with your data. Any additional information about the study results will be provided to you at its conclusion, upon your request.

You are free to withdraw from the study at any time. You agree to participate, indicating that you have read and understood the nature of the study, and that all your inquiries concerning the activities have been answered to your satisfaction.

Signature:

