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Impact Of Physical Activity On Blood Sugar Values In Diabetic Patients

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Abstract

Background: Diabetes is a chronic, costly condition that causes early death and high rates of use of medical services due to its complications, including cardiovascular disease, retinopathy, renal failure, and neuropathy. Objective: To evaluate the impact of lifestyle intervention Program on quality of life in diabetic Patients. Material and Method: It was Quasi Experimental study, multicenter study conducted in Department of Medicine, University of Lahore, Teaching Hospital Lahore. Duration of was 18 months after the approval of synopsis from research ethical committee, The University of Lahore. Informed consent was taken from each participant. Data was collected according to the data collection sheets. Total 60 individuals were included. All diabetic patients age group 20- 30 Years. The quality of lifestyle interventions, either alone or in combination was included. Results: The mean age was 25.22 ± 6.78 years. The average heights of the individuals were 5.42 ± 0.47 feet. The average weight of the individuals was 64.77 ± 14.81 kilograms. There was 46 % female and 54% male Among Participants. The blood sugar random on baseline was 175.82 ± 62.062. The highest blood sugar level observed at baseline was 375. Blood Sugar Random on 4 week was 162.99 ± 57.381. The highest blood sugar level observed at 4 weeks was 402. Blood sugar random on 8 weeks 148.43 ± 46.763. The highest blood sugar level observed at 8 weeks is 324. Blood Sugar Fast on baseline was 90.56 ± 22.372. The highest blood sugar level observed in the fasting state at baseline is 200. Blood Sugar Fast on 4 week was 84.04 ± 21.186. The highest blood sugar level observed in the fasting state at 4 weeks is 175. Blood Sugar Fast on 8 week was 76.93 ± 18.417. Between baseline, 4 and 8 month clinical tests small but statistically significant improvements were observed in both fast and random glucose level. Conclusion: This study provides evidence that diabetes prevention programme using

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lifestyle intervention is feasible for reduction of diabetes. From baseline, 4 and 8 month clinical tests small but statistically significant improvements were observed in both fast and random glucose level.

Keywords | Diabetes, Exercise, Glucose, Physical activity, Sugar.

INTRODUCTION

It is widely recognized that the incidence of diabetes is high and increasing both in Pakistan. and throughout the world. Azeem S et al,. (2020) with an increasing disease trend, diabetes is a serious public health issue on a global scale. Asia's developing nations is experiencing a greater diabetes epidemic. Because of their changing lifestyles and consumption of white rice, Asians are significantly more likely than people in western societies to develop diabetes. Balducci S, et al,. (2014) Diabetes is a chronic condition that can have multiple adverse short- and long-term effects on both health and quality of life (QOL). Boulé NG, et al,. (2001) Most of the risk factors for the onset of diabetes can be avoided. Bujnowska-Fedak MM,. et al (2011) Compared to people without diabetes, people with diabetes have lower quality of life and may experience more depressive symptoms, which may be detrimental to their quality of life. Cuff DJ, et al,. (2007) Changes in lifestyle, especially weight loss and exercise, can significantly decrease the risk of diabetes. Church TS, et al,. (2010) Trials on preventing diabetes have shown that modifying person's lifestyle is successful in reducing the risk of diabetes. Chung JO, et al,. (2013) Due to the high cost of professional care, patients must be encouraged to practice the best health management practices to prevent complications and dependence on the health care system. Scientific studies demonstrate the positive effects of patient monitoring and education. E. McAuley, et al,. (2011) Improving self-efficacy would make it easier for patients to manage the difficulties associated with physical activity. In order to increase patients' physical activation, patient counselors, educators, and other practitioners could create programs that are more effective. Fagour C, et al,. (2013) there is not enough literature review and critical appraisal interpreting the findings of those studies, despite the fact that several educational interventions based on the theory of self-efficacy have been conducted to improve self-management and glycemic control in diabetic patients. In order to more accurately assess the efficacy of physical activity-based educational strategies, this study may be helpful. The goal of this study was to determine how physical activity affected diabetic patients -related glycemic control.

MATERIALS & METHODS

It was Quasi Experimental study, the duration of study was 18 months, and data was collected after the approval of synopsis from research ethical committee, Faculty of Allied Health Sciences, The University of Lahore. Stratified sampling technique was used. Total 60 participants were included, the Control group (n=20), Diet group (n=20) diet plan was applied, Physical Activity (n=20) physical activity plan applied. Diabetic patients of age (20-30 years) were included. General Health SF-36 questionnaire was filled by all the participants on baseline, 4th and 8th week. Data was analyzed using SPSS (Statistical package for the social science) version 25. The main contents which are to be presented:

- *60Participants*
- *Wilcoxon Signed Ranks Test, Friedman test Chi-Square*

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- *Quasi Experimental study, multicenter study*

RESULTS

The mean age was 25.22 ± 6.78 years. The average heights of the individuals were 5.42 ± 0.47 feet. The average weight of the individuals was 64.77 ± 14.81 kilograms. There was 46 % female and 54% male Among Participants. There were 4% who worked as Government Employee, 30 % are doing Private Job, 45 % were Students and 16% Housewife. There were 46 % Participants who did not participate in any game, 30% were in indoor games and 24% were Outdoor Games.

TABLE 1: ***DESCRIPTIVE STATISTICS OF BLOOD SUGAR RANDOM MEASUREMENT.***

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25th	50th (Median)	75th
Blood Sugar Random – No Physical activity	100	175.82	62.062	100	375	136.25	168.00	189.75
Blood Sugar Random - After 4 weeks of physical activity	100	162.99	57.381	98	402	125.50	149.00	175.50
Blood Sugar Random - After 8 weeks of physical activity	100	148.43	46.763	87	324	114.25	141.00	164.75

Note. On baseline the mean blood sugar random was 175.8 ± 62.0. After 4 week and intervention the mean blood sugar random was 162.9 ± 57.3 and after 8 week blood sugar random means was 148.43 ± 46.7.

TABLE 2: ***MEAN RANK OF BLOOD SUGAR RANDOM MEASUREMENTS.***

	Mean Rank	Sig.
Blood Sugar Random – no physical activity	2.96	.000
Blood Sugar Random - After 4 weeks of physical activity	2.03	
Blood Sugar Random - After 8 weeks of physical activity	1.01	

Note. Above table suggests that, on average, the blood sugar levels at 8 weeks have the lowest ranking among the three variables, indicating that they are the lowest on average compared to the other time points.

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TABLE 3: ***WILCOXON SIGNED RANKS TEST FOR BLOOD SUGAR RANDOM MEASUREMENTS.***

	Blood Sugar Random - 4 week - Blood Sugar Random - Baseline	Blood Sugar Random - 8 week - Blood Sugar Random - Baseline	Blood Sugar Random - 8 week - Blood Sugar Random - 4 week
Z	-7.848[a]	-8.683[a]	-8.637[a]
Asymp. Sig. (2-tailed)	.000	.000	.000

Note. Overall, the Wilcoxon Signed Ranks Test results indicate that all three pairwise comparisons have statistically significant differences between the variables, with Blood Sugar Random - 4 week, Blood Sugar Random - 8 week, and Blood Sugar Random - 8 week all showing significantly different values compared to Blood Sugar Random - Baseline.

TABLE 4: ***DESCRIPTIVE STATISTICS FOR BLOOD SUGAR FAST MEASUREMENTS.***

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25th	50th (Median)	75th
Blood Sugar Fast - Baseline	100	90.56	22.372	60	200	74.25	90.00	96.75
Blood Sugar Fast - After 4 weeks of physical activity	100	84.04	21.186	60	175	71.00	80.00	90.75
Blood Sugar Fast - After 8 weeks of physical activity	100	76.93	18.417	54	167	65.00	72.00	84.00

Note. This table provides descriptive statistics for three variables: Blood Sugar Fast - Baseline, Blood Sugar Fast - 4 week, and Blood Sugar Fast - 8 week. The average mean of Blood Sugar Fast - Baseline was 90.56 ± 22.372. The mean of blood sugar fast on 4 week was 84.04 ± 21.18. Mean of blood sugar fast on 8 week was 76.9 ± 18.41.

TABLE 5: ***MEAN RANKS FOR BLOOD SUGAR FAST MEASUREMENTS.***

	Mean Rank	Sig.
Blood Sugar Fast - Baseline	2.87	.000
Blood Sugar Fast - After 4 weeks of physical activity	1.99	
Blood Sugar Fast - After 8 weeks of physical activity	1.14	

Note. According to the table the blood sugar fast on baseline has a mean rank of 2.87. The Blood Sugar Fast on 4 week has a mean rank of 1.99. The variable Blood Sugar Fast on 8 week has the lowest mean rank of 1.14. The Friedman test Chi-Square value showed significant value, which is 0.000. Therefore, based on the Friedman test

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results, there are statistically significant differences among the groups under consideration.

TABLE 6: ***WILCOXON SIGNED RANKS TEST FOR BLOOD SUGAR FAST COMPARISON***

	Blood Sugar Fast - 4 week - Blood Sugar Fast - Baseline	Blood Sugar Fast - 8 week - Blood Sugar Fast - Baseline	Blood Sugar Fast - 8 week - Blood Sugar Fast - 4 week
Z	-7.174[a]	-8.150[a]	-7.296[a]
Asymp. Sig. (2-tailed)	.000	.000	.000

Note. The comparisons are made between different time points for blood sugar levels (baseline, 4 weeks, and 8 weeks). The statistically significant p-values suggest that there are significant differences in blood sugar levels between the compared time points.

DISCUSSION

Diabetes significantly affects Quality of life, morbidity, mortality, and overall health status. Uncontrolled diabetes makes it more likely for people to experience serious health issues like peripheral vascular disease, kidney disease, heart attack, and stroke. Kidney disease is highly likely in people with diabetes.

Another interesting finding is that 50% of those who have tuberculosis are said to have diabetes or be pre-diabetic. Akinshipe, B. O., et al (2019) all these health conditions result in reduced quality of life. Current study provides evidence that diabetes prevention programme using lifestyle intervention is feasible for reduction of diabetes. Previous studies have proven that a weekly activity of at least 150 minutes can reduce diabetes risk. the planned ILI will conform to the American College of Sports Medicine and American Diabetes Association position stand regarding physical activity. Minimum of 150 min/week of exercise of at least moderate intensity. 2. Aerobic exercise 3 days/week with no more than two consecutive days between bouts. 3. Resistance exercise at least twice weekly on non-consecutive days. 4. Gradual rate of progression. Based on previous studies as well as many randomized controlled trials and large number meta-analysis physical activities plays very important role in management of diabetes However, because they have a lower physical performance threshold than their non-diabetic counterparts, diabetics find it challenging to engage in the recommended physical activity. Studies have revealed that they show lower levels of cardiorespiratory fitness, energy expenditure, steps taken, and physical activity duration than the average person and it demonstrated that the degree of diabetic complications is inversely correlated with muscle strength. Therefore, it is clear that the progression of diabetes can lead to a person becoming physically inactive. Perry, B. D., et al (2016) In a meta-analysis of exercise-related interventions, prevalence, fasting blood sugar, weight, and triglyceride levels all decreased significantly, and improvements in waist circumference, systolic blood pressure, and quality of life were more prominent. Ostman, C., et al (2017) In current study from baseline, 4 and 8 month clinical tests small but statistically significant improvements were observed in both fast and random glucose level. The most important aspects of life are diet and exercise; managing diabetes is primarily done through weight loss, eating the right foods, and regular exercise rather than through medical intervention.) According to observational studies, greater fitness is associated

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to a lower risk of diabetes. A study conducted in China, reported that even 20 minutes of exercise reduced the risk of diabetes 46%. Although weight loss was the main factor associated with a lower incidence of diabetes, increased PA also decreased the risk of the disease even when weight loss goals were not met. Colberg, S. R., et al (2010). Physical activities plays important role in preventing diabetes in both genders. Living an active lifestyle is essential for both preventing and managing diabetes. Physical activity has many advantages, including helping people lose weight and its maintenance, improving their insulin/glucose profile if they have pre-diabetes, their glycemic control if they have type 2 diabetes, and generally improving their quality of life.

CONCLUSION

Physical activity/exercise plays important role in the control of diabetes. This study provides evidence that diabetes prevention programme using lifestyle intervention is feasible for reduction of diabetes. From baseline, 4 and 8 month clinical tests small but statistically significant improvements were observed in both fast and random glucose level.

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