

Effect of Swimming, Cycling, Walking and Yoga Exercise on Blood Glucose in Diabetes Mellitus

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Abstract: *This study was observing the effect of swimming, Cycling, Walking and yoga Exercise on Blood Glucose with diabetes mellitus patients. The Method Used: The blood samples were collected from the diabetic patients, after separation of plasma the samples tested for Blood glucose before and after Exercise after Suggestion of exercise for three months of patients we found the result GOD – POD colorimetric method (Glucose kit method) and the result confirmed by Automatic Analyzer and pooled Statistically. The Principle Result: All exercises shown to have significant impact on Blood glucose for diabetes mellitus the four methods employed for patients under study table 1,2,3,4. Equal number of healthy controls age matched is also shown in table 1,2,3,4. Swimming is 0.75% Cycling is 0.77% Walking is 0.85% and Yoga is 0.92 % Walking and yoga Exercise are more significant as compared to the swimming and cycling Exercise and lead to develop proper glucose control*

Keywords: Exercise, Diabetes Mellitus, Swimming, Cycling, Walking, Yoga

1. Introductions

Exercise is the activity requiring physical effort carried out to sustain health and fitness. This activity carried out for a specific purpose. It is the physical exertion of the body which result in a health level of fitness and both physical and mental health. (Stampfer MJ *et al.*, 2000) Blood glucose refer to sugar that is transported through the blood stream to supply energy to all the cells in our bodies. The sugar is made from the food eat. (Christian Nordquist, 2014). Diabetes is a disorder of the metabolism causing excessive thirst and the production of large amounts of urine. When pancreas does not produce insulin is a type 1 diabetes and when the body does not produce enough insulin or when the cells are unable to use insulin properly which is called insulin resistance and Type 2 diabetes. (Thomas M delvin, 2006)

Swimming is the sport or activity of propelling oneself through water using the limbs. Cycling is the activity of riding a bicycle walking is the move at regular place by lifting and seating down Each foot in turn, never having both food in turn, of the ground at once and yoga is a Hindu spiritual and ascetic disciplines a part of which including breath control, and the adoption of specific postures is widely practiced for health and relaxation. (Shilpa S. Gupta & Manish V. Sawane, 2012)

Exercises in different forms if performed regularly have a beneficial effect on the various systems of the body. (Shim to H *et al* 1998) showed low impact aerobic dance as useful exercise mode for reducing body mass in mildly obese middle aged women.

2. Literature Survey

The literature survey are carried out by databases mesh turns, pmc, merecold, pvebmed, IJES pubchem and google scholar.

Method: In our study 80 diabetic patients were included and divided in to four group there patients were regularly doing different exercise such as Swimming Cycling, Walking and Yoga. The used blood samples collected from diabetic association and observed the result of blood glucose before and after the experiment After Exercise for 3 months regularly. We found the result of blood glucose by GOD/POD method (Glucose kit method) and confirmed by Automatic Analyzer.

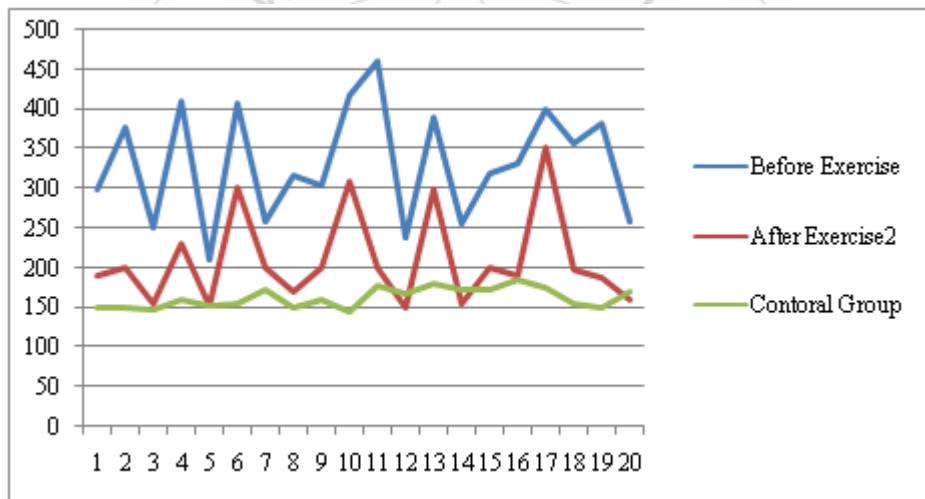
This study was conducted using a single center in diabetic camp in Amravati (India) practice such as Swimming, Cycling, Walking, and Yoga are taken into consideration for 80 selected patients of Diabetes Collected sample testing for blood glucose The data tabulated statistically Analyzed for student “+” test the graph plotted along with for swimming, Cycling, Walking and Yoga the data were express as “t” value compare with table value.

Result: All parameters showed statistically Significant improvements in the Swimming, Cycling, Walking and Yoga the study was verified through observation of Blood sugar readings with diabetic patients before and after exercise (Swimming, Cycling, Walking and Yoga) the exercise interventation are shown in table 1,2,3,4 Swimming, Cycling, Walking and Yoga respectively. First of all we measured the Blood glucose with diabetic patients in diabetic camp three month of exercise was recommended to diabetic patients and again observe the result and compare before exercise and after exercise reading.

Blood glucose values were collected before to the Initiation of the swimming Exercise program (pre Intervention) and completion of the three months (Program post Intervention) there was significant reduction in Blood glucose during the exercise interventions as swimming is 0.75 % diabetic persons receiving the exercise had significant lower blood glucose level at the end of months as 0.75 % level As per the Aagapee blood glucose kit normal range of post meal sugar – 150 – 200 mg/dl

Observation Table 1 Swimming

No. of persons	Before Exercise Blood glucose readings	After Exercise Blood glucose reading	Control group
1	300 mg/dl	190 mg/dl	150 mg/dl
2	377 mg/dl	200mg/dl	150 mg/dl
3	252 mg/dl	155 mg/dl	147 mg/dl
4	410 mg/dl	230 mg/dl	160 mg/dl
5	211 mg/dl	152 mg/dl	153 mg/dl
6	407mg/dl	301 mg/dl	155 mg/dl
7	258 mg/dl	200 mg/dl	173 mg/dl
8	317 mg/dl	169 mg/dl	151 mg/dl
9	304 mg/dl	200 mg/dl	160 mg/dl
10	416 mg/dl	310 mg/dl	145 mg/dl
11	460 mg/dl	201 mg/dl	177 mg/dl
12	239 mg/dl	150 mg/dl	167 mg/dl
13	390 mg/dl	300 mg/dl	150mg/dl
14	256 mg/dl	154 mg/dl	180 mg/dl
15	318 mg/dl	200 mg/dl	173 mg/dl
16	331 mg/dl	190 mg/dl	185 mg/dl
17	400 mg/dl	352 mg/dl	176 mg/dl
18	357 mg/dl	197 mg/dl	155 mg/dl
19	381 mg/dl	188 mg/dl	158 mg/dl
20	259 mg/dl	161 mg/dl	169 mg/dl



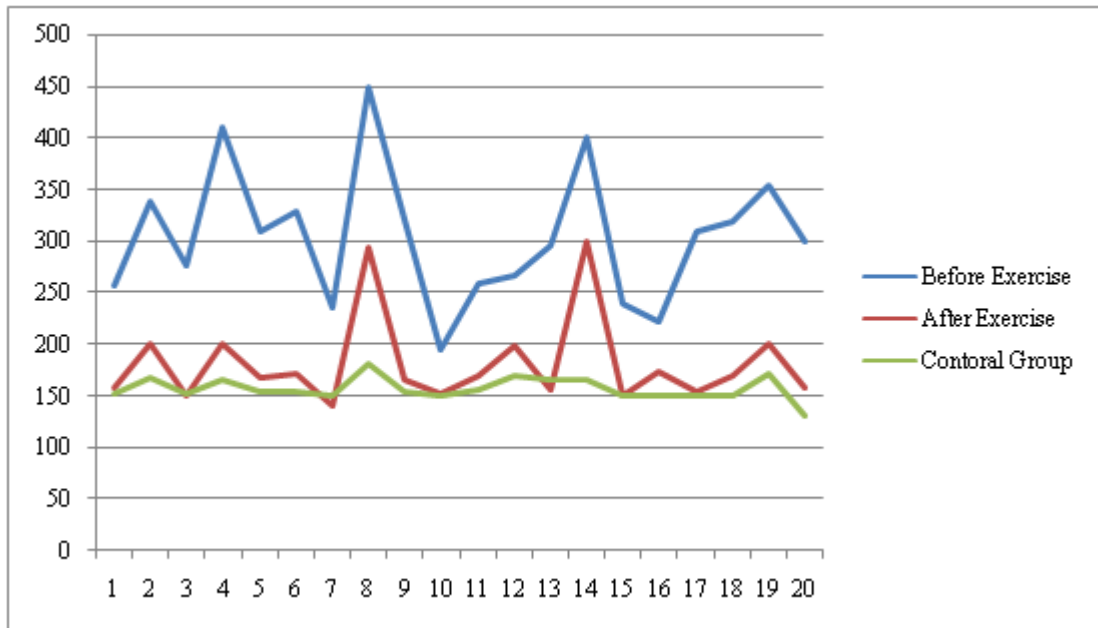
Graph: Blood glucose level of diabetes patient and control age group persons during the swimming exercise

Blood glucose level of Diabetes during the swimming Exercise In the table 2 we use the two tail test calculate the significant difference in the range of Blood glucose level for al diabetic person during the cycling Exercise the patients assigned to exercise showed 0.77% reduction in blood glucose the result is significant statistically different showed beneficial effects on the lowering the blood glucose.

No. of persons	Before Exercise Blood glucose readings	After Exercise Blood glucose reading	Control group
1	257 mg/dl	157mg/dl	152 mg/dl
2	339 mg/dl	200mg/dl	167 mg/dl
3	278 mg/dl	150 mg/dl	153 mg/dl
4	411 mg/dl	200 mg/dl	166mg/dl
5	310 mg/dl	167mg/dl	155 mg/dl
6	330mg/dl	171mg/dl	166 mg/dl

7	237 mg/dl	140 mg/dl	150 mg/dl
8	449mg/dl	295 mg/dl	181 mg/dl
9	270mg/dl	166 mg/dl	154 mg/dl
10	377mg/dl	190 mg/dl	160 mg/dl
11	196 mg/dl	152 mg/dl	150 mg/dl
12	259 mg/dl	169 mg/dl	157 mg/dl
13	268 mg/dl	198 mg/dl	170mg/dl
14	296 mg/dl	155 mg/dl	166mg/dl
15	401mg/dl	300mg/dl	162 mg/dl
16	240 mg/dl	150 mg/dl	150 mg/dl
17	408 mg/dl	257mg/dl	160 mg/dl
18	224 mg/dl	178 mg/dl	150mg/dl
19	309mg/dl	153mg/dl	150 mg/dl
20	330mg/dl	187mg/dl	152mg/dl

Observation Table – 2 Cycling

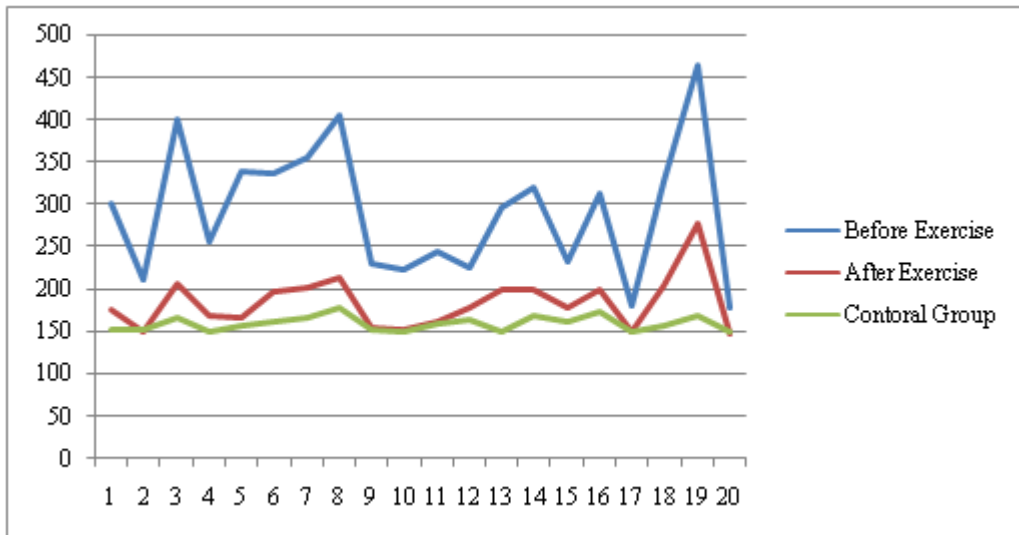


Graph: Blood glucose level of diabetes patient and control age group persons during the Cycling exercise

No. of persons	Before Exercise Blood glucose Value Mg/dl	After Exercise Blood glucose mg/dl	Control group - 150-200 mg/dl
1	302mg/dl	157mg/dl	153 mg/dl
2	212 mg/dl	150mg/dl	152mg/dl
3	402mg/dl	207 mg/dl	166 mg/dl
4	257 mg/dl	168 mg/dl	150mg/dl
5	340 mg/dl	165mg/dl	158 mg/dl
6	339mg/dl	197mg/dl	161 mg/dl
7	356 mg/dl	201 mg/dl	167 mg/dl
8	407mg/dl	212 mg/dl	178 mg/dl
9	231mg/dl	155 mg/dl	152 mg/dl
10	224mg/dl	152 mg/dl	150 mg/dl
11	246 mg/dl	161 mg/dl	159 mg/dl
12	227 mg/dl	177 mg/dl	164mg/dl
13	298 mg/dl	198 mg/dl	151mg/dl
14	322 mg/dl	200 mg/dl	169mg/dl
15	233mg/dl	178mg/dl	162 mg/dl
16	315 mg/dl	198 mg/dl	173 mg/dl
17	182 mg/dl	150mg/dl	150 mg/dl
18	328 mg/dl	204 mg/dl	157mg/dl
19	466mg/dl	277mg/dl	169 mg/dl
20	179mg/dl	147mg/dl	150 mg/dl

In the table 3 walking showed 0.85% reduction in blood glucose the result is significant statistically difference showed beneficial effects on the lowering blood glucose.

Observation table 3 Walking

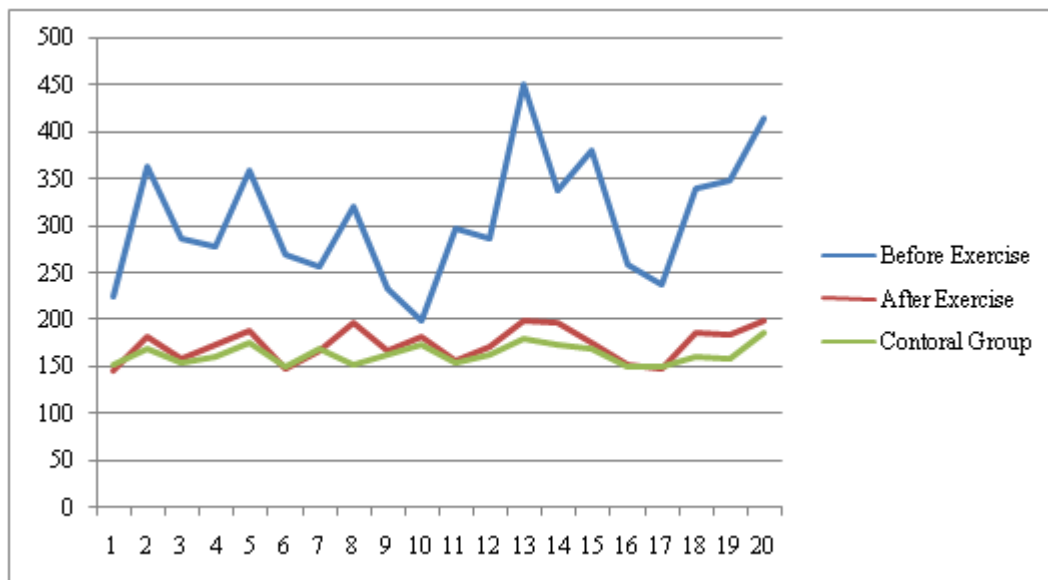


Graph: Blood glucose level of diabetes patient and control age group persons during the Walking exercise

In table 3 yoga showed 0.92% reduction in blood glucose the result is significant statistically difference showed benefited effect on the lowering blood glucose.

Observation table 4 Yoga

No. of persons	Before Exercise Blood glucose mg/ dreading	After Exercise Blood glucose mg/dl reading	Control 150 to 200 mg/dl group
1	225	147mg/dl	150 mg/dl
2	364	182mg/dl	161 mg/dl
3	288	160 mg/dl	152 mg/dl
4	280	157 mg/dl	153 mg/dl
5	360	190mg/dl	162 mg/dl
6	270	150mg/dl	151 mg/dl
7	258	168 mg/dl	160 mg/dl
8	322	198 mg/dl	165 mg/dl
9	234	155 mg/dl	150 mg/dl
10	364	169 mg/dl	160 mg/dl
11	200	182 mg/dl	173 mg/dl
12	298	158 mg/dl	177 mg/dl
13	287	172 mg/dl	163 mg/dl
14	339	169mg/dl	161 mg/dl
15	452	197mg/dl	155 mg/dl
16	381	200 mg/dl	167 mg/dl
17	441	177mg/dl	154 mg/dl
18	259	154 mg/dl	159 mg/dl
19	238	149mg/dl	150 mg/dl
20	341	187mg/dl	156 mg/dl



Graph: Blood glucose level of diabetes patient and control age group persons during the Yoga exercise

3. Discussion

Regular exercise as swimming, cycling, walking and yoga All parameter showed statistically significant improvements and reduction in the blood glucose with Diabetic patients walking and yoga statistically better improvement was seen as compared to swimming and cycling.

The work of other investigator showed the similar results with our present study Exercise can maintain your blood glucose up to 24 hours or more after your work out by making your body more sensitive to insulin.

Physical exercise has been conceded as one of the cornerstones in the treatment of diabetes mellitus along with nutrition and medication since from the past 100 yr ago Studied by Zarchi Thent *et al;* (2014)

Cycling and swimming are low- impact exercise. Water supports you while swimming; and during a bike ride your weight is taken by the seat and handles bars which are good news for your joints. Weight bearing exercises are best for preventing osteoporosis. Studied by Siski green (2015)

Ten week if resistance exercise were associated with a significantly better glycolic control in adult with diabetes compared to treadmill exercise .7

Salemen Bweir *et. al;* (2009)

It has long been know that exercise have substantial benefits for people with Diabetes it can increase insulin sensitivity improve cardiovascular fitness and help sustain weight less A common and desired outcome of exercise program is a lower blood glucose level for diabetes. Studied by Siga RJ *et. al;* (2004)

4. Conclusion

Exercise swimming, cycling, Walking and yoga were associated with significantly reduction in blood glucose with diabetes mellitus

5. Future Scope

The present study will focus on exercise activity and try to search and establish a relationship between exercise and blood glucose.

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