World Wide Journal of Multidisciplinary Research and Development

WWJMRD 2015; 2(9): 29-31
www.wwjmrd.com
Impact Factor MJIF: 4.25
e-ISSN: 2454-6615

S.S.Subramanian
Principal, Sree Balaji College Of physiotherapy, Chennai, India

Correspondence:
S.S.Subramanian
Principal, Sree Balaji College Of physiotherapy, Chennai, India

Efficacy of Aerobic Exercise Training on PPBG and Obesity among Type II Diabetic Mellitus

S.S.Subramanian

Abstract
Aerobic exercises performed in scientific way in this research study among 100 known type II diabetic mellitus subjects were shown to improve glycemic control by lowering experimental subjects PPBG (P<.005) along with that a drop in BMI as recorded are major outcome of this study.

Keywords: WHO – World Health Organization, ADA – American Diabetic Association PPBG – Post Prandial Blood Glucose, NCD – Non Communicable Diseases

Introduction
70% of global deaths before 70 years of age are due to NCD in 2010 (WHO). Diabetes mellitus is one of the most prevalent non communicable diseases and has become a modern epidemic (Wild etal 2004).Patients with diabetes mellitus are at higher risk to develop both micro vascular and macro vascular complications (Fowler 2008).Being one of the most extensively investigated human diseases, it often remains under diagnosed (Burtis 1999). Asian Indian, Phenotype is more prone to diabetes mellitus than the rest of the world's population, (Sicree etal 2010) and most of the people with diabetes are between 40-50 years of age (Mohan etal 2004). (Donahue etal 1987), The honolulu heart study have demonstrated an increased risk of fatal coronary disease events are related to increased PPBG levels. PPBG as diagnostic criteria by ADA (Rosediani etal 2006). PP hyper glycemia is also one of the earliest abnormalities of glucose homeostasis associated with type II diabetes (Edward etal 2000), and increased risk of micro vascular and macro vascular complications (Lowe etal 1997).Diabeted related health care costs were estimated to account for 11% of the global health care expenditure in 2013 (WHO 2013) And 30 million Indian are obese (Lancet 2013). Ostergard etal 2006 have established that AE are able to enhance glycemic control in type II diabetic patients. ADA (2002) has recommended that type II diabetic patients perform 150 minutes of moderate intensity aerobic exercises per week. This original research study was aimed at to analyze the effectiveness of AE on PPBG and obesity among Indian type II diabetic subjects.

Materials & Methodology
100 type II diabetic mellitus subjects were selected to be included in this original research study conducted at Chennai during the period 2010-2014. Special diabetic camps were conducted in 2010 for this purpose. After obtaining institutional ethical committee clearance and subject's consent, Exclusion Criteria was medically untreated type II diabetes, haemodynamically unstable diabetic subjects. Inclusion criteria were medically diagnosed type II diabetic and on medication subjects of both sex between 30-60 years.
All the recruited subjects were at random allotted in two groups with control (n=50) and experimental (n=50) respectively. While all the subjects have continued their daily activities and prescribed medication by their physician. Experimental group subjects were alone prescribed and have performed brisk walking of aerobic activities for 12 weeks period. All the subjects BMI and PPBG were measured and recorded twice once at the beginning and after 12 weeks completion of the study. ADA and ACSM guidelines for aerobic exercises to type II diabetic mellitus were adhered with for exercise testing and prescription (ACSM 1991). Aerobic exercises techniques (Horn Berger 1993) and principles of progression (Cooper and Cooper 1998) were adhered with.
Obtained data were analyzed with due statistical means as presented in the results below:

Table: 1 Results of pre and post mean values, paired't' tests of group I and group II of PPBG and BMI

		Group Mean Values of PPBG				Group	Paired	't' Test	
	Test	I		II			SD	SE	Level of Significance
PPBG	Pre	190		200		I	5.5	.78	P>.1 X
	Post	193	Increase by 1.5	178	Decrease by 11%	II	6.56	.93	P<.001 XXX
BMI	Pre	28		27	Decrease by		.44	.06	P>.1 X
	Post	28	-	25	7%		1.13	.16	P<.05 XX

X – Insignificant
XX – significant
XXX – Highly Significant

Discussion

1. PPBG is good index of glycemic control in type II diabetic patients with high levels of hba_1c (SomtharPun etal 1999). The exercise induced increase in glucose clearance in post abortive state is due to an increased blood flow, glucose transport and oxidation in the working muscles (ADA 1999). The risk of cardiovascular disease and all cause mortality increases with increasing PPBG (Lowe etal 1997). Aerobic subjects in group II have with a reduction of PPBG by 11% have apart from an improved glycemic control have benefited against risk for cardiovascular disease.
2. Weight loss in obese individuals has been shown to improve or prevent arthrosclerosis, diabeted mellitus, ischemic heart disease and stroke (Klein etal 2004) and improve left ventricular diastolic function (Hug etal 2004). These beneficial modifications begin to manifest with as little as a 5% drop in body weight and they continue to improve with further weight loss (Klein etal 2004). Exercise alone tends to produce only modest weight loss of 2 kgs (Sigal and Warren 1996).

In this study where, Group II subjects who have performed aerobic exercises with a mean body weight reduction by $2Kg/m^2$ (7%). The benefit of endurance exercise training in reducing the risks of cardiovascular disease, including diabetes and obesity (Thampson etal 2003) and can improve insulin stimulated glucose uptake 2-3 fold in skeletal muscle (Anderson etal 2003). Walking is by or the most prevalent physical activity among adults and is feasible, accessible and relatively safe (Yusuf etal 1990). Possible mechanism with aerobic exercises among type II diabetic mellitus are evidenced with following studies.

Endurance exercise training can improve insulin stimulated glucose up to 2-3 fold in skeletal muscle (Anderson etal 2003). Adaptations that are responsible for the improvements in glucose regulations seen after EET include increases in capillary density, glucose transporter (GLUT4) protein kinase content and more insulin sensitive type II a muscle fibre (HUG etal 2004).

Limitations of the Study includes only PPBG was evaluated and hba_1c, lipid profile were not evaluated along with. Recommendations for further studies could be done with combined aerobic and resisted exercises on blood glucose parameters, and evaluation of other physical modalities among type II diabetics.

Conclusion

Structured walking a major tool as medicine towards diabetic care well reported and discussed with due evidence in this study using PPBG and BMI as measurable parameters.

Reference

1. WHO 2010. Global status report on noncommunicable diseases 2010
2. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care. 2004 May; 27(5):1047-53.
3. Fowler MJ. Micro vascular and macro vascular complications of diabetes. Clin diabetes 2008: 26: 77-82.
4. Burtis CA, Ashwood ER. Tietz Textbook of clinical chemistry. 3rd edition, New Delhi: W.B. Saunders Company 1999. P-790-1.
5. Sicree R, Jonathan Shaw, Paul Zimmet Baker. The Global Burden Diabetes and Impaired Glucose Tolerance. IDI Heart and Diabetes Institute 2010.
6. Mohan V. Why are Indians more prone to diabetes? J Assoc physicians India 2004: 52: 468-74.
7. Donahue AP, Abbott RD, Reed DM, Yano k. Post challenge Glucose Concentration and Coronary Heart Disease in Men of Japanese Ancestry. Honolulu Heart Program. Diabetes. 1987 Jun; 36(6):689-92.
8. Rosediani M, Azidah AK, Mafauzy M. Correlation between fasting plasma glucose, postprandial glucose and glycated hemoglobin and fructosamine. Med J Malaysia 2006: 61:67-71.
9. Edward J Bastyr, Charles A, Stuart, Robert G. Brodows, Sherwyn Schwartz etal 2000. Therapy

Focused on Lowering PP Glucose, Not Fasting Glucose, May be Superior for Lowering HBA_1C, Diabetes Care; Volume–23, Number-9.
10. Lowe LP, Liuk, Greenland P, Metzger BE, Dyer AR, Stamler. The Chicago Heart Association Detection Project in Industry Study. Diabetes Care 1997 Feb; 20(2): 163-169.
11. WHO fact sheet 2013. Available at www. Who.int/media centre 2014
12. Global Burden of Disease Study Lancet 2013.
13. Osteogard T, Anderson JL and Nyholm 2006. Impact of exercise training an insulin sensitivity physical fitness on type II diabetes. AMJ of physiology 290: E 998-E1005.
14. ADA 2002, position statement on type II diabetic mellitus, Diabetes care 25:564-568.
15. ACSM (1991: Guidelines for exercise testing and prescription, 4yh edition les and febiger, philedel phia.
16. Horn Berger J.P 1993: Protocol Manual: Exercise Screening, Testing, prescription, Therapeutic Exercise. Horn Berger Publications.
17. Cooper and cooper (1998). The new aerobics for women. New York: banton Books: 115:27-29.
18. Soonthornpun S, Rattarasarn C, Leelawattana R, Setasuban W. Postprandial plasma glucose: a good index of glycemic control in type 2 diabetic patients having near-normal fasting glucose levels. Diabetes Res Clin Pract. 1999 Oct; 46(1):23-7.
19. ADA: Position Statement Diabetes Care 22 (Suppl-1): S32-S41, 1999.
20. Klein S, Burke LE, Bray GA etal. Clinical Implications of Obesity with Specific Focus on Cardiovascular Disease: A Statement for professionals from the AHA Council on Nutrition Physical Activity and Metabolism Circulation 2004: 110: 2952 – 296.
21. HUG, Lindstrom J, Valle TT etal, Physical Activity, BMI and Risk of Type II Diabetes in Patients with Normal and in paired Glucose Regulation. Arch Intern Med 2004: 164: 892 – 896.
22. Sigal R J, Warren J H. The Interaction between Obesity and Diabetes. Curr Opi Endrinol Diabetes 1996:3:3-9.
23. Thompson PD, Buchner D, Pina IL, Balady GJ, Williams MA, Marcus BH, Berra K, Blair SN, Costa F, Franklin B, Fletcher GF, Gordon NF, Pate RR, Rodriguez BL, Yancey AK, Wenger NK; American Heart Association Council on Clinical Cardiology Subcommittee on Exercise, Rehabilitation, and Prevention; American Heart Association Council on Nutrition, Physical Activity, and Metabolism Subcommittee on Physical Activity. Exercise and physical activity in the prevention and treatment of atherosclerotic cardiovascular disease: a statement from the Council on Clinical Cardiology (Subcommittee on Exercise, Rehabilitation, and Prevention) and the Council on Nutrition, Physical Activity, and Metabolism (Subcommittee on Physical Activity). Circulation. 2003 Jun 24; 107(24):3109-16.
24. J L Andersen, P Schjerling, L L Andersen, and F Dela. Resistance training and insulin action in humans: effects of de-training**.** J Physiol. 2003 Sep 15; 551(Pt 3): 1049–1058.
25. Yusuf H R, Croff J B, Giles W H etal. Leisure Time Physical Activity among Older Adults: US 1990 Arc Intern Med 1996: 156: 1321- 1326.