



RESEARCH ARTICLE

AEROBIC VERSUS RESISTED EXERCISES ON POST PRANDIAL BLOOD GLUCOSE AND  
QUALITY OF LIFE AMONG TYPE II DIABETES

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Key words:

CVD – cardio Vascular Disease,  
QOL – Quality of Life,  
PPBG – Post Prandial Blood Glucose,  
ADA- American Diabetic Association,  
AE – Aerobic Exercise,  
RET – Resisted Exercise Training.

ABSTRACT

An alarming increase in the prevalence of diabetes globally, this research study analysis the efficacy of aerobic (n=50) and resisted exercises (n=50) among Indian type II diabetic subjects. With control group (n=50) for a period of 24 weeks duration. Results were encouraging for RET subjects P<.001, aerobic subjects P<.05 and control groups have shown insignificant outcome. Quality of life RET was two times improved than aerobic subjects with their subjective rating score, with control group showing no betterment.

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INTRODUCTION

The 63 million Indians are suffering due to diabetes in 2013 (Anjana *et al* 2011). Diabetes related health care costs were estimated to account for 11% of the total global health care expenditure in 2013 (Charles *et al* 2014). Ensuring that blood glucose remains within normal limits is a key factor in preventing increased morbidity and mortality associated with diabetes (ACSM 2010). Postprandial glycemic level has been described as the main hba<sub>1c</sub> marker (Bonoral *et al* 2001) and more related to the development of macroangiopathy than fasting glycemia (Hanefeld *et al* 1996). An elevated PPBG concentrations may contribute to suboptimal glycemic control (ADA 2001).

- Hba<sub>1c</sub> has been the main indicator in the metabolic control and a guide in therapeutic intervention of diabetic patients (UKPD).
- Hba<sub>1c</sub> was better correlated to postprandial glucose levels than fasting plasma glucose as evidenced by (Avignon Bastyr *et al*).

An important role for PPBG monitoring with therapy aimed at achieving PPBG targets is suggested by teleological argument, biochemical information, epidemiological study and limited clinical data (Buse 1998). QOL chronic diabetes has an increased prevalence of depression (Naliboff and Rosenthal 1989). As with any chronic debilitating disease individual with diabetic mellitus faces series of challenges that affect all aspects of life (Egede and Zheng 2003) quality of life issues involve the patient's feelings of self worth satisfaction with life, functional status and level of symptom control. These areas are subjective involved individual values and when measured can be reported differently by the patient (Aaransm 1991). The benefits of AET in reducing the risks of CVD, including diabetes and obesity (Thompson *et al*) and RET as part of diabetic care (Albright 2000). This research study strives to analyze two modes of physical exercises aerobic and resisted exercises using Physioball, analyze their impact PPBG and quality of life of the subjects with type II diabetic mellitus.

MATERIALS AND METHODS

An experimental study with a sample size of 150 known type II diabetic subjects were included in this study. Subject's were included from exclusive diabetic camps conducted in 2010.

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After obtaining ethical committee clearance for this study and consent form all the subjects, this original research study was conducted during the period from 2010 to 2014, all the subject's hails from urban and Chennai metropolitan city. Inclusion Criteria was known type II diabetic subjects of both sex between 30-60 years while type I diabetic subjects, diabetic who were not medically treated, those on insulin therapy were excluded.

At random all the subjects were allotted in three groups,

**Group I** – Control group (n=50),

**Group II** – Experimental aerobic exercise (n=50) and group III experimental resisted exercise n=50. All the participants continued their physician prescribed medication and daily routines. Aerobic experimental group subjects were prescribed aerobic exercises (ADA and ACSM 1991)

**Group III** experimental resisted exercises subjects have performed specific activities using Physioball, thrice a week and ACSM guidelines were adhered (Albright 2000).

The subjects continued their prescribed specific activities, for a period of 24 weeks duration. Before and after 24 weeks of study period all the subjects PPBG and quality of life questionnaire were obtained, tabulated and analyzed with statistical means as presented in results below:

**Table 1. Results of paired 't' tests of Group I, II and III on PPBG**

Group	SD	SE	Level of Significance
I	5.5	.78	P>.1 X
II	8.58	.69	P<.005 XX
III	7.50	1.06	P<.001 XXX

**Table 2. Results of paired 't' tests of Group II and III**

Group	SD	SE	Level of Significance
II	10.68	3.14	P<.3 X
III	13.48		

**Table 3. Results of subjective scores of Group I, II and III on QOL**

Over All QOL			
	I	II	III
Better	0	34	60
Same	84	60	40
Worse	16	6	-

X – Insignificant

XX – significant

XXX – Highly Significant

## DISCUSSION

An important aspect of patient care involves an appreciation of patient's quality of life, a subjective assessment of what each patient values most such an assessment requires detailed, sometimes intimate knowledge of the patient, which can usually be obtained only through deliberate, unhurried and often repeated conversations. These interactions are important to understand and seek to fulfill the priorities of the patient (Fanui *et al.*, 2010). Yach *et al* 2006 have recorded that obese with diabetes diminishes quality of life and considerable

economic burden on health care systems. Subjective evaluation scores as displayed in table 3, where RET subjects have benefited with their improved quality of life by nearly twice than aerobic subjects, with no betterment recorded among the control subjects, hence the major outcome of this research study being that RET is two times effective than AET in improving glycemic control among Indian type II diabetic subjects. Recent research on PPBG measurements indicates that not only are they potentially more accurate reading of blood glucose concentrations but that high PPG levels may forecast CV risk (Rosdiant *et al.*, 2006). Minuk *et al.* 1981 have demonstrated PPBG reduction by 50 mg/dl during a 45 minute exercise while bout and Larson *et al* 1997 have demonstrated with recorded similar effect of lowering of PPBG in type II diabetic mellitus subjects with moderate or high intensity intermittent exercises. AE training among type II diabetic subjects improves insulin sensitively (Galbo *et al.*, 2007) can enhance the responsiveness of Skel *et al.* muscles to insulin (Holten *et al.*, 2004 and fat oxidation (Good poster *et al.*, 2003). Della *et al* 1995 has established AET is likely to induce capillary growth. AET can improve insulin – stimulated glucose uptake 2-3 fold in Skel *et al* muscle (Anderson 2003).

RET improves bone density, muscle mass, strength, balance, over all capacity for physical activity and potentially important for prevention of osteoporosis (Evans *et al* 2002), hence ACSM recommends RET to be included in exercises for type II diabetic mellitus (Albright 2000). Improved glycemic control was reported with RET (Eriksson *et al* 1998, Dunstan *et al* 2002). RET is probably very attractive to the typically overweight type II diabetic mellitus, who may be reluctant to take endurance exercise (Andersen *et al* 2003) RET in diabetic subjects increases protein kinase B and glycogen synthase content in the skeletal muscle (Della 1996) and an increased glucose uptake solely due to the increase in muscles mass (Takala 1999). As shown in table 1, aerobic subjects have statistically shown improved glycemic control and RET subjects have highly statistically significant results in improving glycemic control with lowering of PPBG, at the same time control group subjects had insignificant changes.

## Conclusion

Resisted means of exercises were twice effective than aerobic exercises in improving glycemic control as discussed with evidence in this study. However both aerobic exercises and resisted exercises needs to be learnt from a qualified professional and the techniques of progression, safety norms to be adhered with for the desired results to be achieved. Limitations of the study includes only one parameter of blood sugar was measured, recommendations for future studies include combined aerobic and resisted exercises effect on diabetic subjects, on obese individuals and the study could include more physical and bio chemical parameters for enriched research in this field.

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