Impact of Physioball Exercises among Type II Diabetes on Glycaemic Control and Hypertension

Subramanian. S. S.1, Venkatesan. P2, Deepa .S3
1the Principal Sree Balaji College Of Physiotherapy Chennai-100
2retired Professor Emeritus Department Of Advanced Zoology, Loyola College, Chennai -34.
3assistant Professor Sree Balaji College Of Physiotherapy

Abstract:
Background: Physical activities using Physioball among type II diabetes and its impact on glycaemic control and hypertension have not been studied before among Indian population

Methods: Known 100 type II diabetes mellitus patients with hypertension are allotted at random in two groups. Group I forms the control group, group II allotted with specific exercises using Physioball. Weekly thrice for 12 weeks duration. Pre and post HbA\textsubscript{1C} and blood pressure of all subjects are measured. Questionnaires related to diabetes and HTN are processed. Due ethical committee and consent forms from all subjects are obtained.

Results: A reduction of HbA\textsubscript{1C} by percentage by 0.75% Systolic blood pressure by 4 mm/Hg and Diastolic blood pressure by 2 mm/Hg while group I subjects remained insignificant changes in their HbA1C and blood pressure

Conclusion: Physical activities using Physioball among type II diabetes lowering their blood pressure and improving glycaemic control is effective in preventing cardiovascular complications and promote health care of type II diabetic patients.

Key Words: Hypertension, HbA\textsubscript{1C}

I. Introduction

Known diabetes type II mellitus among Indian population is 63 million (1) WHO predicted HTN in India is 32.5% (2) 21 % of Tamilnadu population are known hypertensive (3) moderate intensity physical activity have been demonstrated to have an effect on changes in arterial function and an improved arterial stiffness(4) . Reduction of HbA\textsubscript{1C} among type II diabetic was reported using Physioball (5). This non pharmacological means of treatment using specific Physioball exercises aims to evaluate the efficacy of this form of physical activity among type II diabetic patients who are hypertensive on glycaemic control and blood pressure

II. Materials

Baseline data are collected using questionnaires. Following ethical committee approval, getting consent forms from the subjects, this study was conducted between 2008- 2011 at Sree Balaji College of Physiotherapy Chennai -100. Fasting HbA\textsubscript{1C} and blood pressure of all the subjects were measured twice once at the beginning and after 12 weeks completion of study.

III. Methodology

100 known type II diabetic with hypertension subjects are recruited from special diabetic camp conducted following an advertisement in The Hindu, Indian national Newspaper in May 2010. They are allotted at random in two groups. Group I – control group, group II – experimental group. All the subjects continued their day to day routines. Group II subjects have performed specific exercises using Physioball in lying, side lying, prone, and sitting postures

Frequency: Thrice a week Duration: 12 weeks

Progression of exercises is based on FIT as recommended by ACSM

IV. Results

Pre and post HbA\textsubscript{1C}, systolic and diastolic blood pressure were tabulated for all subjects and due statistical analysis are applied

Table 1. Baseline details on age type of diabetic medication, CAD and lipidemia of all subjects

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>PERCENTAGE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE ( years )</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>21</td>
</tr>
<tr>
<td>41-50</td>
<td>38</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
<th>GROUP I</th>
<th>GROUP II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MEAN</strong></td>
<td>122</td>
<td>128</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>1.94</td>
<td>0.94</td>
</tr>
<tr>
<td><strong>SE</strong></td>
<td>0.27</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>LEVEL OF SIGNIFICANCE</strong></td>
<td>P&lt;0.1</td>
<td>P&lt;0.001</td>
</tr>
</tbody>
</table>

V. Discussion

Studies have reported 35% diabetic patients to have coronary artery disease (6). Findings of this study are similar with 41% of this study subject to be having known CAD. There are recordings with resisted exercises, which have reported to lowering the systolic blood pressure by 7 mm Hg and diastolic blood pressure by 4 mmHg among diabetic mellitus (7). In concurrent with the above study results of this study using physioball where subjects own body weight forms the resistance lowering of systolic blood pressure by 4 mm Hg and diastolic blood pressure by 2 mmHg.

Mechanism of an improved blood pressure with resisted exercises could be due to changes in vascular function, carotid artery intima, thickness can be reversed (8) and an increased exercise capacity any muscle (9).

Reduction of HbA1C by 7% as displayed in table 1 is similar to findings in the studies (10) have shown a reduction of HbA1C by 8% among diabetic subjects using resisted exercises. A reduction on HbA1C reduced the risk of diabetic complications such as myocardial ischemia (11). Mechanism of reduction are improved storage and utilization of glucose in muscle (12) and an increased capillary to muscle ratio, movement of glucose transporters (GLUT4) to the plasma membrane independent of insulin and loss of fat (13).

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Affiliations Limitations and Further Recommendations:

Type I diabetes are not included in this study. Study duration could be extended. Detraining of exercise training is not studied. Other parameters like obesity are not included in this study. This study could be extended among children and other physical parameters can be studied further.

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