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The 20th century witnessed a revolution in economy and the consequent demographic, nutritional and epidemiological transition has led inexorably to major changes in the pattern of various diseases, where, cause of death and disability have shifted from infectious diseases to Non Communicable Diseases (NCDs) both in developed and developing countries. The major risk factors attributed to the increased prevalence of NCDs are faulty dietary habits and physical inactivity; both are known to have a tremendous deleterious impact on the genesis, pathophysiology and prevalence of NCDs.

To assess the role of physical activity and its influence on the pathobiochemistry and development of secondary complications in diabetics, 212 type 2 diabetics were enrolled and their personal details, medical history, diet and activity pattern were elicited. Comprehensive anthropometric, biophysical and biochemical tests were undertaken to assess their metabolic, clinical status and development of secondary complications. The subject’s metabolic profile was assessed on the basis of performance of physical activity/exercise (≥ 20 minutes, 5-6 days/week). Dietary pattern of the subjects revealed fat and fried food intake was alarmingly high and low fruit and vegetable very intake. 80% of the subjects were overweight/obese while, 68% males and 85% females were abdominally obese. The common secondary complications of diabetes recorded were hypertension (79.2%), dyslipidemia (86%), CVD (63.7%), retinopathy (17.9%), neuropathy (19.8%), nephropathy (25.5%) and stroke (3.8%).

60% of the subjects in this study were found to be physically inactive (n=128). Physically active group (n=84) was found to have significantly lower WC, BMI, % fat (p< 0.05), FBS, PP2BS, HbA1c (p< 0.001), prevalence of secondary complications (p< 0.000) and lipid profile (p< 0.05). They also displayed a trend of lower weight, HC, SBP, LDL – C, MAU, Apo A1, Apo B and CRP levels. Anthropometric, biophysical, biochemical and clinical parameters were categorised based on different metabolic criteria (BMI, WC, HbA1c, duration of disease and number of complications) and further sub-categorized based on physical activity which revealed that the physically active groups had a better metabolic profile. However, the benefits were more pronounced in the groups with increased metabolic derangement. Irrespective of the
duration of the disease the physically active group was found to have better metabolic control along with lower incidence of complications.

In the present study, occurrence of secondary complications was found to be significantly influenced by physical activity (p< 0.005). Glycemic control deterioration was significantly related to increase prevalence of complications and at similar levels of glycemic control physically active individuals were found to suffer from fewer complications. Physically inactive diabetics were found to have higher odds of developing secondary complications. Occurrence of Retinopathy and Neuropathy were found to be significantly associated with physical inactivity and weak associations were observed between Dyslipidemia and Nephropathy. Hypertension, CVD and dyslipidemia that were weakly associated were significantly influence by confounding variables. Physical activity was also found to be inversely related and significantly influenced the occurrence of complications and various anthropometric, biophysical and biochemical parameters. Physically inactive individuals were at a higher risk of developing stroke (5%), nephropathy (16%), neuropathy (17%), retinopathy (27%) and dyslipidemia (88%). These observations seem to suggest that physical activity plays a vital role in improving metabolic control thereby delaying the development of secondary complications.

Ayurveda has promoted management of diabetes by regulating the carbohydrate metabolism using medicinal herbs, like *Gymnema sylvestre* (GS). A quasi-experimental study was planned to investigate the efficacy of the herb among type 2 diabetics. Patients enrolled from free-living population were purposively assigned to experimental or control groups, based on their willingness to participate in the study. The experimental group was supplemented with 500 mg of the herb/day (as a capsule) for a period of 3 months. The efficacy of the herb was assessed through a battery of clinical and biochemical tests. The average age and duration of disease in both the groups were comparable. Dietary intake and level of physical activity predominantly remained unaltered during the study period.

Post supplementation, fatigue and polyphagia were lower by 56.4% and 21% respectively in the experimental group. No change was observed in their clinical profile and 10.3% of the subjects were able to discontinue their OHA therapy. The group also displayed an improvement in the anthropometric profile with significant decrease in WC, SBP and DBP. Glycemic
control was significantly improved, consequently reducing in insulin resistance and improving β cell function. Kidney function was significantly improved and there was a significant decrease in the atherogenic lipid indices and CRP. The control group reported higher prevalence of complications and drug usage (37%). A significant increase in weight, BMI, % fat and SBP was observed. They also had a significantly higher FBS and HbA1c as compared to baseline levels, with no change in the insulin levels. All lipid indices except TG were found to be marginally lower during the post data collection with marginally higher MAU levels. These observations suggest the beneficial effects in maintaining euglycemia, but also, in controlling weight and blood pressure, lowering atherogenic lipid indices and inflammatory markers, improving metabolic control thereby, reducing the risk of development of secondary complications of diabetes.

For many years, diet and physical activity counselling have been used to tackle NCDs, but the results observed are short lived. Sustenance of adapted good lifestyle practices requires a behavioural modification, which can be achieved by a multifaceted approach. Where, information is imparted to create awareness that is constantly reinforced so that it translates into unceasing lifestyle practices. Thus, a study was designed using these approaches called the DEAR (Diet, Exercise, Awareness and Reinforcement) study.

Stage one of the study involved conduction of a comprehensive Health Promotion Program (HPP) that was devised for the non-executive staff and their spouses (n=39), where Nutrition Health Education (NHE) and advocacy was provided employing multiple counselling techniques like, group audio-visual counselling, practical sessions, supervised physical activity and capacity building in an industrial set up for a period of 3 months. Employees (males) performed focused physical activity for 30 min 6 days/week. The efficacy of the program was assessed using a series of clinico-biochemical tests. Subjects were predisposed to NCDs due to a strong family history. An increased prevalence of overweight/obesity, abdominal obesity, hypertension and dyslipidemia was observed among the subjects. Substance abuse came down substantially after intervention. Physical activity increased in terms of prevalence, duration, type and intensity, increasing EE among males significantly. A significant improvement was observed in the knowledge and reading practices. Post intervention, EI was significantly reduced among the subjects due to significant shifts in the food consumption pattern.
Post intervention, males had significantly lower weight, WC, HC and SBP along with a trend of reduced BMI, % fat and DBP. Females had significantly reduced WC and HC along with modestly lower weight, BMI, % fat, SBP, DBP. FBS was significantly lower in both males and females. Subjects also displayed a trend of lower insulin and atherogenic lipid indices, wherein LDL – C levels in males were significantly reduced. Insulin resistance and β cell function was significantly improved among males. The metabolic profile of males was reassessed 1 year after intervention revealed that a favourable anthropometric and biochemical profile was maintained. These findings suggest that a multifaceted approach was found to be favourable in bringing about a behavioural change as it involved support from family, peers and workplace.

Stage two of the DEAR study involved conduction of an exploratory HPP for the executive staff where, NHE was imparted using a custom made, user friendly website. Subjects (n=21) enrolled accessed the website to gather information about health and healthy lifestyle practices, to bring about a sustainable behavioural and lifestyle modifications. The efficacy of the program was assessed using a series of clinico-biochemical tests. Majority of the subjects were predisposed to NCDs due to a strong family history. The prevalence of overweight/obesity (71.4%), abdominal obesity (52.4%), hypertension (57.1%), dyslipidemia (85.7%) and cardiovascular anomalies (19%) was high in the study group. After intervention knowledge gained and retained was significantly improved along with increase in prevalence, duration, type and intensity of the physical activity performed. Dietary intake improved as fat and EI was significantly lower and fibre intake significantly higher along with an improved in food consumption patterns and dietary composition. A better anthropometric and biophysical profile was observed along with significantly lower HC and % fat. Improvements in glycemic control were recorded along with reduced insulin resistance and significantly lower atherogenic lipid indices.

Web-based intervention was found to bring about favourable changes in anthropometric, biophysical and biochemical profile of the subjects. The favourable response to this mode of intervention was due to its convenience and easy accessibility. Thus, this novel intervention can be used to reach out to the masses and spread awareness about health. These observations clearly demonstrate the significance of physical activity, dietary discipline and timely health awareness/education program on NCDs will eventually help in influencing the occurrence of health conditions of the subjects.