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EFFECT OF DIABETIC YOGA PROTOCOL ON GLYCEMIC, ANTHROPOMETRIC AND NEURO-PSYCHOLOGICAL PROFILE OF URBAN HIGH-RISK DIABETIC WOMEN: A PILOT STUDY

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ABSTRACT

The purpose of the present pilot study is to find out the effect of AYUSH approved Diabetic Yoga Protocol on glycemic, anthropometric and neuropsychological profile of high-risk women for Diabetes. The high-risk women for Diabetes were identified by using the Indian Diabetes Risk Score. Total ten high-risk women for Diabetes selected from urban area of Chandigarh were recruited in the study for 12 weeks. Single group experimental research design was used. The changes in glycemic, anthropometric and neuropsychological parameters were examined at baseline and after 12 weeks changes after DYP intervention. The result of the present study demonstrated that after 3 months of DYP intervention the statistically significant changes were seen on Fating blood glucose ($p=0.041$), hip circumference ($p=0.007$) and perceived stress ($p<0.001$) whereas no changes were seen on sustained attention, waist circumference and weight of the high risk women for Diabetes in urban area of Chandigarh.

KEYWORDS: Diabetic Yoga Protocol, Indian Diabetes Risk Score, Pre-diabetes, Risk factors.

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INTRODUCTION

Diabetes is the leading epidemic in the world with 72.9 million cases in India (International Diabetes Federation, 2017). Diabetes is the disease in which there is an inappropriate escalation in glycemic parameters in the body along with dysregulated insulin secretion. In the prediabetic condition, the blood glucose gradually started to increase but not up to the Diabetic threshold. In other words, prediabetes (FBG- 100- 125mg/dl, HbA1c-5.7-6.4%) (ADA, 2010) is an intermediary state between high blood glucose level and normal blood glucose levels (Anjana et al., 2011 and Anjana et al., 2015).

Diabetes is a metabolic disorder, which is associated with various type of micro and macro vascular complications (Chawla et al., 2016). The prediabetic stage is an alarming stage where one should can take the proper preventive measures for halting the conversion from prediabetes to Diabetes. In prediabetic stage lifestyle modification preventive strategies can play the prominent role regulating the normal glucose levels (FBG-80-100, HbA1c<5.7)(ADA, 2010).The life style modification methods like inclusion of healthy eating habits and regular physical activity helps to ameliorate the condition of prediabetes (Lindstrom et al., 2006).

Yoga is one of the most important life style modification tools for bringing the promising changes in the wholesome development of the individual. Various published researches in the past proved the beneficial and promising role of Yoga in improving the glycemic, anthropometric and neurocognitive profile of prediabetic women (Lakson et al., 2005 and Shiju et al., 2006).

Unfortunately, majority of people didn't know about their diabetic status. Indian Diabetes Risk Score, which was developed by Mohan et al.2005, predict the diabetes risk status of the individual based on the four criteria namely: Age, family history of Diabetes, level of physical activity and waist circumference. Those who scores above 60 considered as high risk for diabetes and timely preventive measures should be taken for reducing their diabetic risk.

OBJECTIVE

The objective of the present pilot study is stated as under:

To investigate the effect of Diabetic Yoga Protocol (DYP)on biochemical, anthropometric and neuropsychological parameters of urban high-riskdiabetic women.

METHOD AND PROCEDURE

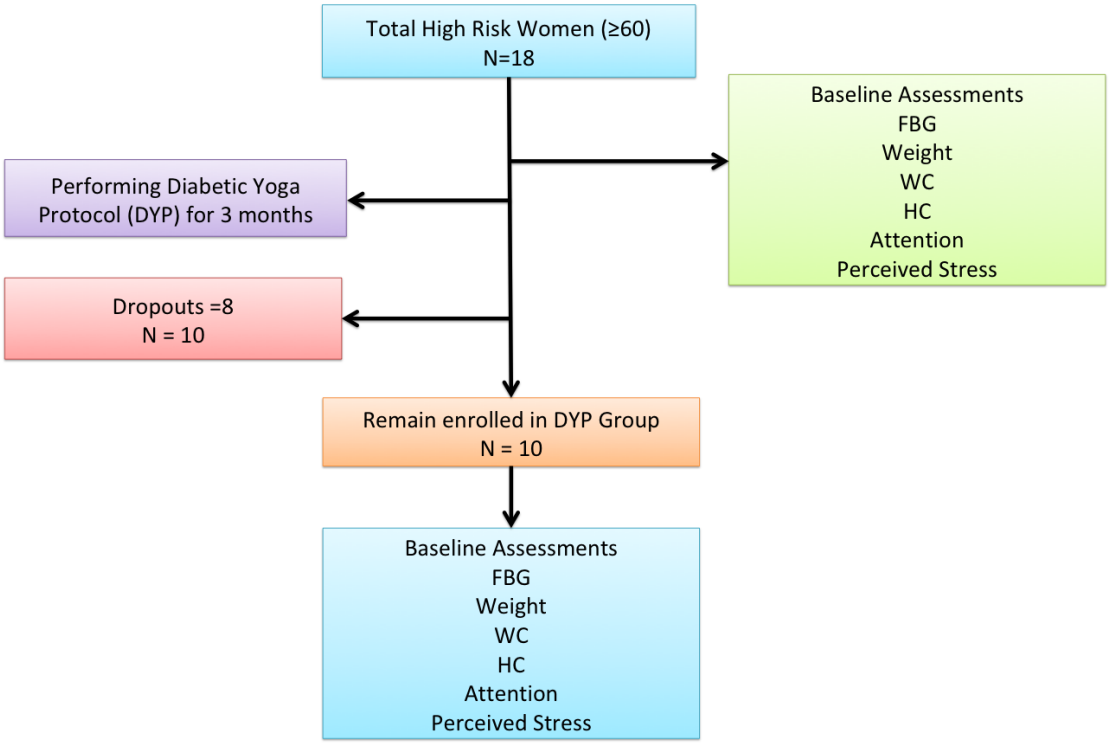

FIGURE 1: FLOW CHART OF STUDY DESIGN

In the present pilot study, single group pre-post experimental design was used. For attaining the objective of the study house to house survey was conducted in urban area i.e., Panjab University, residential area for detection of high-risk individuals for diabetes. The detail flow chart of the study design was also shown in Figure1. For pilot study, those females who had scored above 60 on the IDRS recruited in the present study. Total 18 high risk women for Diabetes were recruited in the study. The selected participant was underwent three months DYP intervention shown in Table 1. The assessmentsfor FBG, weight, waist circumference, hip circumference, attention and perceived stress were taken at baseline and after 3 months.

For estimation of Fasting Blood Glucose (FBG) the blood sample of the participants were taken early in the morning after 10-12 hours of fasting in the NABL compliant laboratory.The weight of the participants was measured by using electronic weighing machine.The attention and perceived stress of the participants were assessed using

Six letter cancellation tests (SLCT) constructed by Natu and Aggarwal (1997) and Perceived Stress Scale (PSS) made by Cohen, Kamarck, Mermelstein (1994)

respectively. The study is approved by the Panjab University Institutional Ethics Committee (PUIEC) vide letter no. PUIEC/2017/80/A-1/08/08.

STATISTICAL ANALYSIS

The Statistical Package for Social Sciences (SPSS) was used. Firstly, the normality of the data was checked through Kolmogorov-Smirnov (KS) test. All the selected variables found to be normally distributed ($p > 0.05$). The paired t-test was used to find out changes at baseline and after three months of DYP practice.

TABLE 1: DIABETIC YOGA PROTOCOL

S.NO.	NAME OF PRACTICE	DURATION
1	**Starting Prayer:** Asatoma Sat Gamaya	2 (Minutes)
2	**Preparatory SukshmaVyayamas and Shithililarna Practices** 1 Urdhavahastashvasan (Hand stretching breathing 3 rounds at 90°, 135° and 180° each) 2 Kati-Shakti Vikasaka (3 rounds) a) Forward and Backward Bending b) Twisting 3 Sarvangapushti (3 rounds clockwise, 3 rounds anticlockwise)	6 (Minutes)
3	**Surya Namaskara (SN)** 10 step fast Surya Namaskara 6 rounds 12 step slow Surya Namaskara 1 round **Modified version** Chair SN 7 rounds	9 (Minutes)
4	**Asanas (1min per Asana)** 1 **Standing Position (1 min per Asana)** Trikonasana, ParvrittaTrikonasana, PrasaritaPadhastasana 2 **Supine Position** JataraParivartanasana, Pawanmuktasana, Viparitakarani 3 **Prone Position** Bhujangasana, Dharuasana followed by Pawanmuktasana 4 **Sitting Position** Mandukasana, Vakrasana/ Ardhamatsayendrasana, Paschimatanasana, ArdhaUshtrasana At the end, relaxation with abdominal breathing in supine position (vishranti), 10-15 rounds (2 minutes)	15 (Minutes)
5	**Kriya** 1 **Agnisara:** 1 minute 2 **Kapalabhati:** (@60 breaths per minute for 1 minute followed by rest for 1 minute)	3 (Minutes)
6	**Pranayama** 1 **Nadishuddhi:** (for 6 minutes, with antarkumbhak and jalandhar bandh for 2 seconds) 2 **Bhamari:** 3 minutes	9 (Minutes)
7	**Meditation** (for Stress, for deep relaxation and silencing of mind) **Cyclic Meditation**	15 (Minutes)
8	**Resolve** (I am Completely Healthy)	1 (Minutes)
9	**Closing Prayer:** SarvebhavantuSukhina	1 (Minutes)
	TOTAL DURATION IN MINUTES	60

RESULTS

TABLE 2

Pre-Post test mean comparison in control and DYP group on selected variables i.e.FBG, Weight, WC, HC, attention and perceived stress in mean, SD, mean difference, and t- value with p- values.

Variables	Test Condition	Mean	SD	95% CI		t-value	p-value
				Lower	Upper		
FBG	Pre test	100.10	14.15	0.51	19.49	2.38	**0.041***
	Post test	90.10	6.98				
Weight	Pre test	69.41	13.15	-0.65	1.39	0.82	0.434
	Post test	69.04	13.59				
WC	Pre test	93.30	8.19	-3.76	4.16	0.11	0.912
	Post test	93.10	10.82				
HC	Pre test	104.40	11.19	1.30	6.30	3.44	**0.007****
	Post test	100.60	9.26				
Attention	Pre test	20.70	9.79	-14.32	0.92	-1.99	0.078
	Post test	27.40	10.88				
Perceived Stress	Pre test	22.80	2.66	4.46	8.34	7.45	**<0.001*****
	Post test	16.40	2.11				

Data is expressed in mean, SD, mean difference and statistical significance ***(p=0.041**, p=0.007*, p<0.001***)***, FBG- Fasting Blood Glucose, WC-Waist Circumference, HC-Hip Circumference, SD= Standard Deviation, CI- Confidence Interval, DYP- Diabetic Yoga Protocol.

The result revealed in the Table 2 shows that statistical significant improvement was shown on FBG (p=0.041), hip circumference (p=0.007) and perceived stress (p<0.001). However, no significant changes were seen on weight and waist circumference of the participants. The improvement in the attention of the participant was seen but not at the significant level.

DISCUSSION

Diabetes is a disorder, whichcan be controlled by dietary modifications, physical activity and anti diabetic drugs. A study done by Anjana et al., shows that on the basis of Indian Diabetes Risk Score the 18.7% people of Chandigarh had the risk of Diabetes Development in the near future (Anjana et al. 2011).The previous studies done on past shows that yoga practices shows beneficial effect on diabetic and prediabetic patients on different parameters like glycemic, lipid, cholesterol,stress etc.(Angadi et al., 2017; Cui et al.,2017; Rammorthi et al., 2019; Hegde et al., 2011 and Singh et al., 2001). In the present pilot study we want to check the efficacy of standardized DYP on some selected biochemical, anthropometric and psychological variables The result of the pilot study shows the statistically significant changes on FBG, Hip Circumference and perceived stress. However, the other parameters show no statistically significant improvement.

The similar results consistent with the present study were also found in some other studies which shows amelioration in glycemic parameters after Yoga intervention including FBG. Our study also shows improvements in psychological and some anthropometric parameters that are also well documented in the previous published literature Hegde et al., 2013; Kumar & Telles.2009; Hewett et al., 2018 and Sharma et al., 2013). Diabetes is a disease, which is related with many other co-morbidities like nephropathy, retinopathy, neuropathy etc. Prediabetes is a stage, which considered as the beginning of the various Diabetes related complications. Therefore, by applying preventive strategies like yoga, physical exercises,and dietary modifications are helpful in delay the conversion to Diabetes (Tuomilehto et al., 2001; Knowler et al., 2002; and Perreault et al., 2012).

Yoga includes various set of physical, breathing and meditative practices which helps to maintain the harmonious and wholesome development of the individual.The present pilot study paves the way to precede the study on larger sample size for better understanding and generalization of the results on larger population.

CONCLUSION

The present pilot study shows the efficacy of Diabetic Yoga protocol on glycemic, anthropometric and psychological profile of urban pre-diabetic women. The DYP helpful in preventing and controlling the various risk factors associated with progression from prediabetes to Diabetes.

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