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"A CLINICAL ASSESSMENT OF THE ROLE OF *PANCHAKARMA* THERAPY IN THE CARE OF YOUNG PREDIABETICS"

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ABSTRACT

Prediabetes is one of the major clinically entity, which have been vividly described in *Ayurvedic* classics in the context of *Prameha* striking resemblance with the available latest knowledge in this field.. Lifestyle and dietary errors are the major etiological categories described for *Prameha*, which is closely resemblance with the etiology of Prediabetes. When such clinical condition really established in the body for prolong duration, it may lead to *Madhumeha* vis a vis Diabetes mellitus. Due to wide spread pathogenic involvement this phase of disease is deeply rooted and it is difficult to be cure. Based on the above hypothesis the present study has been undertaken to evaluate the efficacy of certain *Panchakarma* measures (especially *Vamana* and *Virechana*) and avoidance of sugar cane products, newly rice & potato as remedial measures in a series of patients of Prediabetes. The present parallel study was conducted on 60 patients divided in three groups treated with *Panchakarma* (especially *Vamana* and *Virechana* measures) along with the diet group & control group treated with modern drug (Metformin). After completion of trial treatment the results were statistically analyzed on SPSS 16.0. The observation will be made in terms of clinical symptomatology, BMI, FBS, PPBS, serum cholesterol and serum TG. This study reveals that patients have good improvement and no unwanted effects were noted at the end of therapy.

KEYWORDS: Madhumeha, Panchakarma, Prameha, Prediabetes

INTODUCTION

Prediabetes is a serious medical condition and it is the early stage of Type-2 Diabetes mellitus. Worldwide more than 300 million people are at increased risk of developing Diabetes mellitus but they are unaware of it. It is the state in which some but not met all the diagnostic criteria for Diabetes. Such types of patients are at risk for not only developing Type-2 Diabetes mellitus, but also risk for macro & micro-vascular complications. The progression into Diabetes mellitus from Prediabetes is approximately 25% over 3 to 5 years. The *Ayurvedic* texts reflect two major categories of *Prameha* 1. *Sahaja Prameha* and 2. *Apathyanimittaja Prameha*, out of these two, *Apathyanimittaja Prameha* is closely resemblance with the contemporary concepts of Prediabetes/Type-2 Diabetes mellitus. On that basis, *Ayurveda* has described *Sthula Pramehi*, which clearly corresponds to the current concepts of obese and its role in the genesis of Diabetes mellitus. For the category of *Sthula Pramehi Ayurveda* advocates *ApatarpaÆa* approach for their management. The etiology, classification, pathogenesis, clinical features, prognosis, and management of *Apathyajanimittaja Prameha* are very near to contemporary concept of Prediabetes. Ayurveda has been claimed that the management *Sthula Pramehi* is based on *ApatarpaÆa* measures, which signifies the wisdom of ancient *Acharyas*.

The *Ayurvedic* lexicons scientifically conceived three major clinical category of *Prameha* namely *Kaphaja*, *Pittaja*, and *Vataja*. However, if these three clinical stages of *Prameha*/Prediabetes are not managed in due time it may lead to the chronic stage of *Madhumeha*/Type-2 Diabetes mellitus. It is the fact that conventional management of Prediabetes and Type-2 Diabetes mellitus is still not satisfactory. Therefore, the highly evolved description of *Ayurvedic* therapeutics in the line of prevention and management of *Prameha*/Prediabetes, it seems to explore the possibilities of developing an

Ayurveda- inspired line of dietary regimens and *Panchakarma* therapy in the management of Prediabetes and prevention of Type-2 Diabetes mellitus for contemporary use today. Such type of exercise through *Ayurvedic* approach not only provides a new dimension for the management of Prediabetics but up to some extent it also checks Prediabetics progression to Diabetics.

AIMS AND OBJECTIVES

- To study the hypoglycemic effect of *Panchakarma* therapy and avoidance of certain dietary intervention on subjective and objectives parameters.
- To develop *Panchakarma* therapy as preventive and/or curative measures in Prediabetics.

MATERIALS AND METHODS

Selection of Cases

A total of 60 cases of Prediabetics were selected from OPD and IPD of *Kayachikitsa*, S. S. Hospital, IMS, B.H.U., Varanasi after thorough history taking, clinical and laboratory examination and registered irrespective of their age, sex, religion, socio-economic status, etc.

Type of Study

Comparative parallel clinical study.

Inclusion Criteria

- Age 30-60 yrs.
- Family History of Diabetes, HTN, Dyslipidemia
- Plasma glucose level : Fasting : 100-125 mg/dl
  Postprandial : 140-199 mg/dl

Exclusion Criteria

- Age <30yrs. and >60yrs.
- Type ll Diabetes Mellitus (NIDDM) with and without complications.
- Type l Diabetes Mellitus (IDDM) associated with and without complications.
- Diabetes due to endocrinopathies e.g. Phaeochromocytoma, Acromegaly, Cushing's syndrome, hyperthyroidism etc.
- Drug or chemical induced diabetes mellitus e.g. Glucocorticoids, Thyroid hormone, Thiazides, Phenytoin etc.
- Certain genetic syndromes sometimes associated with diabetes mellitus e.g. Down's syndrome, Klinefelter's syndrome, Turner's syndrome etc.
- Patients suffering from any severe systemic disease.

Termination Criteria

- Sudden deterioration in patient's health status during the period of study.
- Non compliance of the patient.

Study Design and Treatment Schedule

All the 60 patients after ethical approval from ethical committee of IMS, BHU, were recruited into three groups based on given advice. Out of 60 Prediabetic patients, 6 patients were dropped out, 2 from each group.

Group A : Control group i.e. treated with modern drug (Metformin 500 mg BD) on Doctor's prescription.

Group B : Dietary measures (advocated-avoidance of sugarcane products, newly rice & potato) (No lifestyle intervention was enforced)

Group C : *Panchakarma* Therapy (*Vamana*, *Virechana Karma*) (No dietary & Lifestyle intervention was enforced)

Vamana & Virechana Karma Group (Group C)

20 patients fulfilling the criteria for of *Vamana* & *Virechana* were treated in this group. Before *Vamana Karma* patients were specially examined for E.C.G., Chest X-Ray and other systemic examination for suitability of *Vamana Karma*.

Preparation of Patients

The patients of Prediabetes ready to undergo *Vamana* therapy, the outset were prepared with *Snehana* and *Svedana karma*.

ABHYANTARA SNEHAPANA

For *Snehapana* 30 ml *Go-Ghrita* was given at 7.00 am on empty stomach. On the basis of this test dose, *Go-Ghrita* was gradually increased by 30 ml per day. After administering *Ghrita*, instructions were given to the patient not to take any type of food, until he feels hunger and only hot water was allowed to drunk. When patients were felt hunger, light diet was prescribed mainly *Chapati* of wheat along with some vegetables or *Dala* at the day time. In the evening mainly *Khichadi* was prescribed.

ABHYANGA AND SVEDANA

After ascertaining *Samyaka Snehana*, patients were subjected to *Abhyanga* and *Vashpa Sveda*. On the morning (at about 10 am) and in the evening (at about 4.30 pm) of the gap day i.e. the day after the day of completion of *Snehapana*. *Abhyanga* to the whole body was done for about 30 minutes in all the positions.

For this purpose warm *Narayana Taila* was used. Thereafter, *Vashpa Sveda* of 30 minutes was given to the whole up to profuse perspiration. Further patient was advised to sit on the chair for about 15 minutes. There after instruction were given to go to the bed covered with blanket and not to move in open area.

DIET THE EVENING OF GAP DAY

On the evening of gap day, *Kapha Vardhaka* diet was given, special *Krishara* (*Khichadi*) made of about 50 gms each of rice and *Maasha* (*Urada Dala*), 25 gm of each *Taila* and *Ghrita* was given along with 250 gms of curd. The salt was added as per requirement.

Vamana Karma

After *Samyaka Svedana* patient was shifted to *Vamana* chair where he/she was given 200 ml milk. After 5 minutes, the mixture of *Madanphala*, *Vacha Churna*, *Madhu* and *Saindhava* mixed in the quantity of 6 gms, 2 gms, 20 gms

and 1.5 gms respectively & it was given orally. After 10 minutes full stomach milk was given orally & waits for next 10 minutes & observed the pre features of *Vamana Karma* i. e. Horripilation & Nauseant feeling. The therapeutic emesis was started within 10 minutes. Intake of full stomach milk & *Vamana Vega* was noted at every step.

During the *Vega* the patient was helped by attendant, pressing the abdomen with palms. In between of two *Vega*, the back of the patient was gently massaged in upwards direction. When *Pitta* in vomitus was seen, 2 litres saline hot water was given for emesis. During this procedure after each *Vega*, pulse and blood pressure was monitored time to time.

After completion of *Vamana Karma* patient was transferred to the bed where again pulse, blood pressure and respiration were noted. In the room *Dhumpana* was done by *Nirdosha Ayurvedic* Ciggarate and patient was kept in keen observation for whole day.

Samsarjana Karma

Depend upon the type of *Shuddhi* (*Pravara, Madhyama* & *Avara*), *Samsarjana Krama* was followed. In case of *Avara, Madhyama* and *Pravara Shuddhi, Peya, Vilepi, Mudga Yusha* and rice with *Mudga Yusha* were given for one meal time, two meal times and three meal times respectively from the evening of *Vamana* day for 3, 5 & 7 days respectively.

Patients were instructed that this diet was taken as per appetite. *Peya* and *Vilepi* were prepared from 50 gms of the rice, as per standard methods. *Mudga Yusha* was obtained by cooking 50 gms of *Mudga* in the required quantity of water. In the last *Odana* (rice) prepared from 50 gms of rice along with *Mudga Yusha* (prepared from 50 gms of *Mudga*).

Virechana Karma

After the *Vamana* and *Samsarjana Karma*, *Virechana Karma* was administered in all the patients as per classical method in the following manner.

1. The *Trikatu Churna* (2-3 gms) was given to patients for *Ama* digestant, for *Dipana* and *Pachana*.
2. *Snehapana* with *Go- Ghrita* was given to the patients according to their *Koshtha* and *Agni*.
3. After obtaining the *Samyaka Snehana Lakshana*, the *Sarvanga Vashpa Sveda* of *Dashamoola Kvatha* was given once daily for 3 days. Prior to *Svedana Abhyanga* was also carried out with *Narayana Taila* in selected cases for *Virehcana* purpose.
4. On the next day of passing the 3 days gap following *Virechana* yoga was given on empty stomach at about 9.30 a.m. to all patients in the doses according to their *Koshtha* and *Bala*. *Triphala Kvatha*-100 ml approximately, *Trivrita Churna* - 20 gms, *Kutaki Churna* - 8 gms *Erand taila*- 20 ml; *Vegaki (Hina Shuddhi – 10 Vega, Madhyama Shuddhi – 20 Vega, Pravara Shuddhi – 30 Vega)* and *Manaki (Hina Shuddhi – 2 Prastha, Madhyama Shuddhi – 3 Prastha, Pravara Shuddhi – 4 Prastha)* were assessed at the end of *Virechana*.
5. *Samsarjana Karma* was followed according to the type of *Shuddhi* obtained as per directive of *Vamana Karma* for 3 to 7 days.

Both *Vamana Karma* & *Virechana Karma* were carried out in 20 cases of Prediabetes on every 6 month interval during study period (1½ years). All the patients were advised to take normal diet & life style, which they were routinely performed. No additional dietary & lifestyle intervention were enforced to these patients.

Assessment Criteria

The assessment of the treatment was based on both subjective and objective parameters.

Subjective Assessment

To assess the subjective features of Prediabetics, the clinical symptomatology was graded into four grades (0-3) scale on the basis of severity and duration. The changes in the gradations of each symptoms such as *Atitrishna* (excessive thirst), *Hastha-Pada Shunyata* (numbness in hands and feet), *Hastha-Pada Daha* (burning sensation in hands and feet), *Atisveda* (excessive sweating), *Alasya* (laziness), *Atinidra* (excessive sleep), *Shithilangata* (flabbiness of the body), *Atimutrata* (polyurea) & *Atikshudha* (polyphagia) were noted on a prepared protocol to assess the therapeutic response of trial treatment.

Following symptoms like *Mukha Shosha* (dryness in mouth) and *Sheeta Priyata* (Liking of cold things) were assessed on the basis of their absence and presence.

Grade 0 : Absent

1 : Present

Besides this, the degree of improvement was analyzed on the basis of clinical gradations of symptoms were as follows.

0 : Completely relieved.

1 : Mild symptoms present.

2 : Moderate symptoms present

3 : Severe symptoms present.

Objective Assessment

Objective assessment was done on the following basis

- BMI (body mass index)
- Fasting blood Glucose
- Postprandial blood Glucose
- Serum Cholesterol
- Serum Triglyceride

OBSERVATIONS & RESULTS

Incidence of clinical symptomatology of 60 patients of either sex of Prediabetes revealed that the maximum number of patients (51.67%) had Polydipsia followed by Polyurea (33.33%), Laziness (28.33%), Polyphagia (25%), Dryness in mouth (23.33%), Excessive Sweating (20%), Excessive Sleep (16.67%), Burning sensation (16.67%), Liking of Cold things (8.33%), Flabbiness (8.33%) and Numbness (6.67%). (See table -1).

EFFECT OF TRIAL TREATMENT ON CLINICAL SYMPTOMATOLOGY OF PREDIABETES

The shift of grades of clinical symptoms in different trial groups presented as below:

Statistically significant improvement ($p<0.05$) was observed in patients of group A only in the symptoms of polyurea, rest of the symptoms were found statistically insignificant ($p>0.05$). In symptoms like polydipsia, burning

sensation excessive sleep and polyphagia was statistically highly significant in Group-B ($p<0.01$); while in symptoms like dryness in mouth, liking of cold thing, numbness, excessive sweating and polyurea the result was statistically significant ($P<0.05$). In flabbiness no response were observed at the end of trial treatment ($p>0.05$). Patients of group C were responded statistically highly significant in symptoms like- polydipsia, dryness in mouth, burning sensation laziness & polyphagia ($p<0.001$); while significant response were noted in symptoms such as excessive sleep and polyurea and statistically insignificant for liking of cold things, excessive sweating, numbness & flabbiness.

EFFECT OF TRIAL TREATMENT ON LABORATORY PARAMETERS

BMI

The BMI study shows that the initial mean and SD for Group-A was 26.27 ± 1.78 which decreased to 24.59 ± 1.50 after trial treatment; the result was statistically highly significant ($p < 0.001$). In group B mean was decreased from 27.21 ± 2.07 to 23.63 ± 2.18 showing statistically highly significant result ($p < 0.001$). While in group C initial mean ± SD was 27.13 ± 2.12 it reduced to 23.64 ± 1.40, the result was statistically highly significant result ($p < 0.001$). Intergroup comparisons (One Way ANOVA) it can be concluded that results were statistically significant ($p<0.05$).

The difference in means was highest in group B (3.58) followed by group C (3.48) and A (1.68) respectively. Thus the efficacy of treatment given to different groups was in order of group B > group C > group A. (See table -2).

Fasting Blood Sugar

The blood sugar fasting in group A, the initial mean ± S.D. was 112.91± 10.73 which reduced to 95.48± 4.63 after complete follow-up, the improvement was statistically highly significant ($p<0.001$). In group B mean ± SD reduced from 113.3±7.31 to 91.12±8.62, showing statistically highly significant ($p< 0.001$) response in FBS. While in group C, the initial mean ± SD 110.27±8.96 reduced to 96.62±9.80, this fall was also statistically highly significant ($p < 0.001$). The reduction in means was highest in group B (22.18) followed by group A (17.43) and group C (13.65) respectively. (See table -3).

Postprandial Blood Sugar

The postprandial blood sugar estimations in group A, the initial mean ± S.D. was 182.94±12.80 which decreased to 148.12±12.89 after 3rd follow-up, the reduction was statistically significant ($p<0.001$). In group B, the mean ± SD was decreased from 159.24±16.68 to 135.17±12.36 showing statistically highly significant ($p<0.001$). While in group C, the initial mean ± SD was 179.84±12.14 decreased to 146.40±9.22, it was also statistically highly significant ($p < 0.001$). The difference in means was highest in group A (34.82) followed by group C (33.44) and B (24.08) respectively. (See table -4).

Mean Percentage Fall in FBS & PPBS in Different Trial Group

The Dietary group shows maximum fall (19.58%) in fasting blood sugar level followed by Control group (15.42%) and *Panchakarma* Therapy group (12.38%). The rate of fall in postprandial blood sugar in Control group was maximum (19.03%) followed by *Panchakarma* Therapy group (18.59%) and Dietary group (15.12%). (See table -5).

Percentage (%) of Non Responding Prediabetics in Different Trial Group

The Control group shows maximum number of non responders Prediabetics (16.67%) in fasting blood sugar level followed by Dietary group (11.11%) and *Panchakarma* therapy group (11.11%). In postprandial blood sugar, the non responding Prediabetics were maximum in Control group (11.11%) followed by Dietary group (15.12%) while in *Panchakarma* therapy group, there was no any non responder Prediabetic. (See table -6).

Serum Cholesterol

Serum Cholesterol values in group A, the initial mean ± S.D. was 195.29 ± 16.60 which decreased to 174.27 ± 18.00 after 3rd follow-up, the differences was statistically highly significant ($p<0.001$).

In group B, the mean ± S.D was decreased from 184.78 ± 36.01 to 180.22 ± 36.54, showing statistically significant ($p<0.01$) reduction in Sr. Cholesterol. In group C initial mean ± S.D was 205.35 ± 14.25 decreased to 173.58 ± 18.98, the changes in Sr. Cholesterol was also statistically highly significant ($p < 0.001$).

Intergroup comparison (One Way ANOVA) did not show a statistically significant ($p>0.05$) changes. But on the basis of mean reduction, maximum response goes in favour of Group C (31.77) followed by Group A (21.03) and Group B (4.56). (See table -7).

Serum Triglycerides

The Serum Triglycerides in group A, the initial mean ± S.D. was 155.57 ± 6.90 which was decreased to 142.85 ± 6.70 after 3rd follow-up, the changes being statistically highly significant ($t = 6.61$, $p < 0.001$).

In group B, the mean ± S.D was decreased from 166.02 ± 13.51 to 140.21 ± 4.48, showing statistically highly significant ($p < 0.001$) reduction in Sr. TG. While in group C, the initial mean ± S.D was 159.45 ± 13.50 which decreased to 135.92 ± 9.54, it was also statistically highly significant ($p < 0.001$).

On intergroup comparison (One Way ANOVA), the result was statistically significant in both BT and AT ($p<0.05$).

The difference in means was highest in group B (25.81) followed by group C (23.53) and A (12.72) respectively. Thus the efficacy of treatment given to different trial groups was in this order group B > group C > group A. (See table -8).

Table 1: Incidence of Clinical Symptomatology in 60 Cases of Prediabetes

Symptoms	No. of Patients	Percentage (%)
Polydipsia	31	51.67
Dryness in mouth	14	23.33
Liking of Cold things	5	8.33
Numbness	4	6.67
Burning sensation	10	16.67
Excessive Sweating	12	20
Laziness	17	28.33
Excessive Sleep	10	16.67
Flabbiness	5	8.33
Polyurea	20	33.33
Polyphagia	15	25

Table 2: Effect of Treatment on BMI (n=54)

Groups	BT	AT	t Test and P Value
Group A (n=18)	26.27±1.78	24.59± 1.50	$t = 4.47$, $p < 0.001$
Group B (n=18)	27.21±2.07	23.63± 2.18	$t = 6.46$, $p < 0.001$
Group C (n=18)	27.13±2.12	23.64± 1.40	$t = 9.28$, $P < 0.001$

Table 3: Effect of Treatment on Fasting Blood Sugar (n=54)

Groups	BT	F1	F2	F3	BT-AT	t Test and P Value
Group A (n=18)	112.91±10.73	109.71± 9.01	105.79± 6.42	95.48± 4.63	17.43 ±9.00	t = 8.21, p < 0.001
Group B (n=18)	113.3±7.31	106.36± 7.24	99.17±6.55	91.12± 8.62	22.18± 9.86	t = 9.54, p < 0.001
Group C (n=18)	110.27±8.96	106.65± 7.02	100.61± 4.57	96.62± 9.80	13.65 ±12.90	t = 4.49, P< 0.001

Table 4: Effect of Treatment on Post Prandial Blood Sugar (n=54)

Groups	BT	F1	F2	F3	BT-AT	t Test and P Value
Group A (n=18)	182.94± 12.80	148.21± 25.97	152.04± 15.57	148.12± 12.89	34.82 ± 12.10	t = 12.21,p<0.001
Group B (n=18)	159.24± 16.68	148.90± 14.05	140.94± 11.86	135.17± 12.36	24.08 ± 16.51	t = 6.19, p<0.001
Group C (n=18)	179.84± 12.14	162.70± 13.07	153.05± 11.39	146.40± 9.22	33.44 ± 12.79	t = 11.09, p <.001

Table 5: Mean Percentage Fall in FBS & PPBS in Different Trial Group

Group	% Age Fall in FBS	% Age Fall in PPBS
A	15.42	19.03
B	19.58	15.12
C	12.38	18.59

Table 6: Percentage (%) of Non Responding Prediabetics in Different Trial Group

Group	%Age in Terms of FBS	%Age in Terms of PPBS
A	16.67	11.11
B	11.11	5.56
C	11.11	Nil

Table 7: Effect of Treatment on Sr. Cholesterol (n=54)

Groups	BT	AT	t Test and P Value
Group A (n=18)	195.29±16.60	174.27± 18.00	t = 10.81, p < 0.001
Group B (n=18)	184.78±36.01	180.22±36.54	t = 3.06, p < 0.01
Group C (n=18)	205.35±14.25	173.58± 18.98	P < 0.001

Table 8: Effect of Treatment on Sr. Triglyceride (n=54)

Groups	BT	AT	t test and P value
Group A (n=18)	155.57 ± 6.90	142.85 ± 6.70	t = 6.61, p < 0.001
Group B (n=18)	166.02 ± 13.51	140.21 ± 4.48	p < 0.001
Group C (n=18)	159.45 ± 13.50	135.92 ± 9.54	t = 8.26, p < 0.001

DISCUSSIONS

The prediabetes is widely recognized as early stage of diabetes mellitus and it impart variety of metabolic disorders. The available therapeutic modalities in conventional system of medicine are not up to the mark for talking the cases of prediabetes to the normal one. Besides this it also have unwanted effects and in due course of time it may leads to diabetes mellitus and other life threatening consequences. The trial data is very small hence demographically the results did

not impart any new knowledge in the field of available data of prediabetes. So in this point of view the results are not finally conclusive.

The Body mass index (BMI) reveals that patients of group B i.e.- avoidance of dietary measures; shows greater reduction of BMI (3.58), followed by group C (3.48). While least reduction was observed in modern medicine treated group A (1.68). This signifies avoidance of certain food items play a significant role in the management of prediabetes and prevention of Type-2 DM, which proven the age old concept of Ayurveda i.e. *Ahara Sambhavo Vastu Rogashcha Ahara Sambhavah.* Besides this study also indicates that if biopurificatory measures are applied in due concentration it will not only check the gradual increase of BMI but helps in the management of prediabetes. Side by side it also checks the precipitating factors which play significant role in the pathophysiology of obesity, prediabetes, DM, and metabolic syndrome such as- *Amas*, *Malas*, and vitiated *Doshas*.

The selected *Panchakarma* measures have shown significant hypoglycemic effect in terms of reducing FBS by 12.38% and PPBS by 18.59%. While, dietary measures have shown significant reduction in FBS by 19.58%. This signifies that for attaining better response, both therapies incorporate together in the Prediabetics. Besides, in each group i.e. *Panchakarma* & Diatery measure, 11.11% Prediabetics have no therapeutic response. Where as in Group A (Control Group), 16.67% patients have not trial response. This indicates that non responders are more in Control Group A as compared to Group B & Group C. So such types Prediabetics are more prone to develop Type -2 DM in near future.

An effort were made to analyze the lipid profile in this series but except serum cholesterol and TG, rest other variants of lipid profile did not shows significant improvement during the course of treatment. The patients of group C showed greater reduction in serum cholesterol followed by group A & B. while patients of group B showed significant reduction in serum triglyceride followed by group C & A. This study signifies that both dietary measures and biopruificatory measures may be subjected jointly for better therapeutic response.

The investigator has not been able to demonstrate any significant impact of *Deha Prakriti, Manasa Prakriti, Sattvabala,* weight range and BMI on treatment response.

In this study, the selected *Panchakarma* measures (*Vamana* & *Virechana*) not only have encouraging results in terms of metabolic correction but also seems to be helpful to improve overall wellbeing in Prediabetes. Side by side it is also found safe regarding renal, hepatic, hematological and cardiac protection point of view because their values were fluctuated within the normal at BT & AT. Besides, this studies also overview that if Dietary measures & *Samshodhana* measures are jointly applying in Prediabetes, it will sure to normalizes the blood sugar and also cut off its progression to type-2 DM. Thus, these two approaches of *Ayurvedic* classics have significant preventive & curative role in type-2 DM and Prediabetes respectively.

CONCLUSIONS

The present study reveals that *Panchakarma* Therapy and Dietary measures have shown significant reduction in FBS & PPBS, besides noticeable trends of lipid correction. Basically it is a time bound educational research programme and as such it cannot be finally conclusive. The approach used in this study seems to be effective and completely safe because no unwanted effects were noted during the 1½ years trial periods.

The leads available from this work open new *Ayurveda*-inspired holistic approach to the management of Prediabetes & prevention of Type-2 Diabetes Mellitus on larger sample of population. This specific trend warrants further studies to throw light on its mode of action.

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