

**CHAPTER – 9**  
**APPRAISAL**

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## 9.0 APPRAISAL

This chapter summarizes the findings made during work on this PhD, and discusses different aspects stated in the Contents. Not least was the recognition of the great potential academic value of the data taken at the *Rasāhāra Kendra Clinics*, thanks to my good fortune in having no formal *Āyurveda* training, and therefore not predisposed to lack of medical record keeping by *Vaidyas* attending India's *Āyurveda* colleges, who fail to keep records and publish interesting cases. One good result of the clinics' records was the ground that they established for planning the trial reported here. Based on the data they contained, we obtained good response from senior medical scientists in Bhopal, hospital directors, oncologists, endocrinologists, gynaecologists, and GPs. Another benefit of the data has been publication of a pilot study on failure to observe *Āyurveda* and Yoga diet and lifestyle (*Āhāra-Vihāra*) as risk factors for disease (not reported here), which has proved encouraging, showing how to establish that NCD's are due to diet and lifestyle more than genetic problems, as the Human Genome project has deluded biomedicine into thinking.

### 9.1 SUMMARY OF FINDINGS

**9.1.1** The central finding of the study is that *Āyurveda* and Yoga Medicine practices can arrest pathogenesis of type 2 diabetes, preventing its further development. Increasing prevalence of T2DM in India among all social classes is a cause for national concern, especially its spiralling burden of direct and indirect costs. One approach to stopping its increase, Yoga medicine, has been implemented widely, finding popularity with all ages and strata of society. This thesis suggests that treatment with *Rasāhāra*, and / or a suitable *Yoga* therapy program, can improve levels of blood glucose and HbA1c, and parameters like elevated creatinine, blood pressure etc.

**9.1.2** The ancient texts say that onset of the monsoon aggravates *Vāta doṣa*. Despite that season change, members of Groups 1 and 2 moved towards states of equilibrium. Following the principles of *Āyurveda* and *Yoga*, one can achieve health without need for modern medication.

**9.1.3** Modern medicine takes the perspective that disease states can be assessed by values of key bio chemicals, or other measures, known as markers, which act as indicators of health or disease. Markers have accepted ranges of healthy values, departure from which is taken to indicate pathology. This study shows that season change can also be responsible for altering ambient marker values. Values falling on either side of the change of season were distinctly different.

**9.1.4** As an aspect of metabolic syndrome, elevated blood sugar levels are often associated with CVD, and increase fatality rates of those suffering myocardial infarction. The study identifies *Rasāhāra* and *Yoga* as a means to reduce hypertension (and pulse rate), and risk of CVD.

**9.1.5** Elevated creatinine levels are a well-known indicator of kidney dysfunction, and a criterion for dialysis, with its low life expectancy problem. Since nephropathy is a common complication in T2DM leading to fatality, the discovery that treating newly diagnosed T2DM patients with *Rasāhāra* and *Yoga* can lower creatinine levels, may help reduce numbers of diabetes fatalities.

**9.1.6** Anaemia is a disorder often associated with diabetes, especially in those whose regular diet contains little iron, and whose hard work raises levels of stress. The study suggests *Rasāhāra* and *Yoga* as important means to prevent anaemia during early stages of T2DM.

**9.1.7** BHT improves more with the help of herbal juices, possibly due to their antitussive effects.

**9.1.8** Acidity is a strong contributor to disease manifestation. The study shows how *Rasāhāra* helps normalize urine pH, reducing the amount of medicines needed to restore health.

## **9.2 CONCLUSIONS**

The study reported in this thesis concerns means of preventing T2DM development, on the grounds that T2DM's precursor stages (*prameha* in *Āyurveda*) can be reversed by maintaining correct mealtimes according to *Āyurveda*, together with daily practice of yoga. For the last 10 years, all incoming patients attending the *Rasāhāra Kendra* clinics in the city of Bhopal have been advised to modify their meal times in accordance with *Āyurveda*. Results obtained by those patients confirm the value of this advice, as do the results of the study reported here.

To this date, no study has been published using specified mealtimes in the treatment of pre-diabetes. Earlier studies have established the value of two large meals per day, rather than four or five small ones. The success of the present study suggests that the method of adhering to strict mealtimes combined with Yoga could now be studied when treating diseases other than *prameha* or *Madhumeha*, and also to achieve optimal health and complete well-being.

### **9.2.1 DIABETES PARAMETERS**

The trial confirms the results of previous studies establishing the efficacy of Yoga, combined with strict rules of diet and behaviour, including bed and meal times and exercise, for treatment of newly diagnosed T2DM, and their enhancement by Ayurveda *Rasahara*, herbal juice therapy. Together they represent a cost-effective alternative to long term prescription of palliative drugs that do not aim to improve underlying pathology. Further study of these

combined modalities of treatment is merited, particularly in rural areas of India, where they should be easy to implement.

### **9.2.2 SEASONAL CHANGES IN DIABETES MARKERS**

The study observed systematic shifts in blood sugar levels at season change, in agreement with Ayurveda predictions. Detailed investigation of possible seasonal shifts of other biochemical markers should now be considered. Studies should be undertaken at all season changes throughout the year to investigate this novel hypothesis. Medicine may then better understand states of patients' pathology when judging biochemical marker values.

### **9.2.3 LIPIDS**

Values of lipid parameters also tended to return to normal, confirming that treatment benefits when using Yoga and Ayurveda *Rasāhāra* should be understood in terms of restoring quality of regulation back to normal. Since this study observed smaller changes in lipid values than other recent S-VYASA studies, distinct effects of different Yoga treatment protocols, and even Yoga systems, merit further investigation.

### **9.2.4 CREATININE**

The spectacular results for Groups 1 and 2 indicate that Yoga practices combined with good diet and lifestyle programs are very beneficial for kidney function. Although no study participant had chronic kidney disease, they require follow-up studies with larger numbers of patients to confirm the trends seen in this study. Such studies could be carried out under leading nephrologists, possibly at the nationally funded AIIMS group of teaching hospitals, where the present Indian government is committed to encouraging practice of integrative medicine. If successful, similar treatments may be widely implemented.

### **9.2.5 BLOOD PRESSURE PARAMETERS**

The study found both that the interventions were effective for treatment of mild hypertension in newly diagnosed cases of type 2 diabetes; also, because of *reduced variances* in Groups 1 and 2, that it was safe for those with low blood pressure. It showed that three months practice of Yoga medicine including strict rules of diet and lifestyle improves regulation of blood pressure.

Such treatment offers a low-cost alternative to long term prescription of drugs merely palliating underlying pathology, with the advantage of also benefitting those with low blood pressure. A full-scale two arm trial is needed to confirm this finding with greater statistical power. Further studies of these modalities of treatment would then be merited, particularly in rural areas.

### **9.2.6 HAEMOGLOBIN AND ACIDITY (pH)**

Study results confirmed the ability of herbal juice treatment to improve Hb level in pre-diabetics, particularly in combination with rules of diet and behaviour, including bed and meal times and exercise. Such treatments represent a relatively cheap alternative to drug companies' chemical supplements. Further studies of *Rasāhāra* benefits for these parameters should be undertaken.

### **9.2.7 BREATH HOLDING TIME**

The study confirmed the accepted result that well-conceived and administered Yoga programs can improve BHT. Whether the antitussive effects of the chosen herbs did make any difference may be worth further study, but their effect size is clearly far smaller than that of Yoga. Longer intervention times should also be investigated, so that levelling off to maximum effects can be clearly delineated. The hypothesis of the study concerning BHT was strongly upheld.

### 9.2.8 CHANGES IN *VĀTA-PITTA-KAPHA BALAS*

This aspect of the study was revolutionary, because no previous controlled trial has assessed strengths of Ayurveda variables and their levels of balance. The study observed improvements in *Balas* of all three *Doṣas* in Groups 1 and 2, while the control group's *Doṣas* could be seen to be going further out of balance. These observations establish beyond all reasonable doubt that, when left to themselves, the medical condition of those in the initial stages of diabetes and pre-diabetes become worse, while those put on a strong regimen of diet and lifestyle preventative treatment, combined with Yoga, begin to improve, more so when beneficial *Āyurveda Rasāhāras* are added to their treatment.

### 9.3 STRENGTHS

**9.3.1** The study concerns means of preventing *prameha* developing further into Madhumeha.

It suggests that the process of *prameha* developing further can be reversed if one takes *Āyurveda* herbal juices, practices yoga daily, and maintains correct mealtimes and bed time. Results from the clinics running for the last 10 years in the city of Bhopal, where incoming patients of all kinds are advised to modify their meal time according to *Āyurveda*, strengthen this conclusion.

**9.3.2** The study reported good changes for most variables measured; the interventions show promise for further study and assessment on a larger scale.

**9.3.3** This article reports *post-hoc* observations of changes (blood sugar levels at onset of the monsoon), which were not part of the original study hypothesis, but seemed of sufficient significance to merit a separate report. Not being the main object of the study, some confounding factors may have been involved, but, as all subjects were eating uniform institutional food, the possibility of changes in diet affecting the results can be discounted.

**9.3.4** This is the first study of early diabetes testing fresh herbal juices on human subjects.

## 9.4 LIMITATIONS

**9.4.1** The misunderstanding with potential participants that caused high initial attrition, resulting in lower numbers of participants reduced the power of the study.

**9.4.2** The institutional setting in a jail is unusual. It represents a possible confounding factor in interpreting results.

**9.4.3** Failure to randomize the trial was cause for regret. There is no a priori reason for believing that results would have changed, but an RCT would have carried more scientific weight.

**9.4.4** Western diagnosis was used for subject selection, so *Āyurveda* treatments did not follow traditional practice, using the *Āyurvedic* imbalances of each participant as the basis for individual *Āyurveda* treatments. Future studies that do so will provide results of greater value for *Āyurveda*.

## 9.5 IMPLICATIONS

Indian Systems of Medicine offer cheap ways to prevent, control and possible cure, T2DM.

### RELEVANCE & BENEFITS

**9.5.1** The herbal juice study is based on *Āyurveda* recommendations on life style and fresh herbs.

**9.5.2** The medicinal value of herbs used in the study are clearly mentioned in *Āyurveda* texts.

**9.5.3** The study has great relevance to naturopathy treatments i.e. herbs, sprouts and uncooked food. According to naturopathy body fitness depends on proper ratio of alkaline and acidic food.

**9.5.4** All *Āyurveda* texts *āhāra-vihāra* state that eating and sleep patterns are equally important to keep fit. Study results strongly support *āhāra-vihāra* including food values to restore optimal health to those with *prameha*.

**9.5.5** According to yoga texts, *ādhiya Vyādhis* start at the level of *Manomaya kośa* and can be rectified through *Vijnyānamaya kośa* by adding yoga to the patient's routine. In this study, yoga practices were strictly advised to overcome *ādhiya Vyādhis*.

## **BENEFITS**

**9.5.6** The study strengthens the importance of *Āyurveda Āhāra-vihāra*.

**9.5.7** Herbs are easily available for Indian rural population, who need to learn to trust in using them for health care.

**9.5.8** By learning about the efficacy of herbs, people may take greater interest in growing them, and thereby improve the quality of their soil and environment.

**9.5.9** Yoga has multi-dimensional effects on the human personality. Prisoners have complexes due to life stress and aggressiveness. Three months daily yoga practice helped overcome them.

**9.5.10** Herbs have been researched world-wide. Most studies have used extracts of herbs, ethanolic or other. This study supports the idea that *Swarasa* is effective.

**9.5.11** Many previous studies tested herbs on animals. That is inhuman. This study challenges the scientific community to have the courage to test human subjects in such research.

## **9.6 RECOMMENDATIONS FOR FUTURE STUDIES**

**9.6.1** Current methods of treating T2DM and its complications remain inadequate, so their prevention is preferable. Both observational studies and clinical trials of dietary modification support the hypothesis that T2DM is preventable, so further studies of means to prevent T2DM and its complications like kidney failure are of high importance to public health.

**9.6.2** The decrease in Group 1 creatinine values was consistent with the research hypothesis, based on previous results obtained from patients attending the *Rasāhāra Kendra* clinics in the city of Bhopal. Among recent kidney patients who attended the clinics and were on dialysis at the start of treatment, two have been able to return to normal kidney function, while clinically significant improvements have been seen in most others (about 40). The decrease in Group 2 patients, though less, was also statistically significant  $p < 0.0001$ , consistent with reports from a private kidney hospital in the city of *Thrissur* in the state of *Kerala* in South-West India. There kidney patients are treated on a strict Yoga and life-style regime, and unpublished records show many successful cases of bringing kidney patients off dialysis. These results require follow-up studies with larger numbers of patients to confirm trends seen in pre-diabetic participants in this study. The Indian government is committed to encouraging practice of integrative medicine at its leading AIIMS group of hospitals, so further studies should be carried out under leading nephrologists. If successful, similar treatments might be widely implemented.

**9.6.3** Studies should be undertaken at all season changes throughout the year to investigate the novel hypothesis that. ‘Changes of season change levels of biochemical markers’.

The promising nature of the results justifies further follow up, particularly in light of the traditionally recognized ability of *Āyurveda* and Yoga to reverse imbalances in physiological function, and their consequent potential to cure cases of chronic disease. *Āyurveda* describes many kinds of *prameha* that precede diabetes. An important line of further investigation would be to assess each patient’s particular kind of *prameha* in detail, and the efficacy of different *Āyurveda* and / or *yoga* prescriptions for each kind.

**9.6.4** The present study is a unique study on prisoners. Up to now, no study has been conducted in pre-diabetic prisoners for haemoglobin by treating *Rasāhāra* and *Yoga* as

interventions. In Central Jail Bhopal, the jail authorities were keenly interested in prisoners' wellness. The need is to keep full records of FBS, PPBS and CBP because of their stressful lives, and to conduct further studies in jails.

**9.6.4** The efficacy of *Rasāhāra* treatment for low haemoglobin levels in early stages of diabetes is suggested by the study. Such treatments present low cost alternatives to chemical supplements. Further studies of this modality of treatment are merited.

**9.6.5** To this date, no study has been performed the modification of meal time for treating pre-diabetes. Previous studies have confirmed the effectiveness of two larger meals daily, rather than four or five small meals, in treating diabetes. The present study suggests that such methods of meal and meal time modification should now be attempted to treat diseases other than *prameha* or *madhumeha*, and also to achieve complete wellbeing and optimal health.

**9.6.6** Regarding change of season: A dedicated study of blood sugar levels as the hot season changes to monsoon should be made to confirm observations reported here, with full allowance for possible confounding factors. Assessment of insulin and glucagon levels should be included to present a full clinical picture. Studies of other biochemical markers at similar time periods should also be carried out. Of particular interest may be *Vasanta Ritu*, when *prameha* pathology and physiological conditions are matching. Blood glucose levels might show physiological or pathological shifts at that time in susceptible individuals. A one-year study would be able to assess medical parameters during transitions between all six seasons.

**9.6.7** Future studies of pre-diabetes should assess levels of gastric hormones like ghrelin and leptin, enzymes like lipase and pepsin should also be measured. Links to *Āyurveda* could correlated such changes to those when *pitta doṣa* becomes activated or aggravated.

**9.6.8** Studies should further investigate yoga's positive effect on prisoners' mental attitudes. They could prove invaluable to prisons, prisoners and their families; and to yoga itself. Several scales are available to measure mood swings, e.g. the Positive and Negative Affect Schedule (PANAS). Such scales are reasonably accurate ways to assess mental attitude, though use of Implicit Association Tests (Singh R., Ilavarasu et al, 2013; 2014) would improve accuracy.