

**CHAPTER – 8**  
**DISCUSSION**

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## 8.0 DISCUSSION

In India, TCAM systems are administered by the recently formed Ministry for AYUSH, permitting such systems to be taken into the equation and included in medical policy. An alternative strategy to treating each identified pathology as a chronic disease, and therefore as essentially incurable and a long-term health cost burden, would be to institute TCAM treatments known to improve overall health including all such parameters, rather than focusing on individual symptoms and attempting to treat each individually. The advantage of such an approach is that complementary systems of medicine assess levels of imbalance of underlying metabolic and regulatory conditions, and, by restoring them to normality, can prevent further pathologies arising from the same imbalances. Merely palliating symptoms of one disease leaves a patient with metabolic or regulatory imbalances, and open to further pathologies developing.

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.

As described in the Introduction in Chapter 1, *Āyurveda* strongly advocates lifestyle management requiring control over the mind. Ten years work with clients at the *Rasāhāra Kendra* Clinics have demonstrated that *Yoga* and *Rasāhāra* work hand in hand. Those who practice yoga regularly enjoy their *Rasāhāra* more; when patients with negative outlook start conscientiously taking *Rasāhāra*, their health psychology improves and they automatically start practicing yoga. All four herbs used in this study (Section 3.9) strengthen *Satva guṇa*. The prescribed lifestyle was predominantly *sātvika*, though that tended to be compromised in the Jail. Understanding speed of mind and managing it through stimulation and relaxation in

the yoga routine is another technique of increasing *Satva guṇa*. Also *Bhrāmari prāṇāyāma*, of which participants practiced 10 rounds daily, is a comparable way to stimulate and relax the mind.

The present study is a unique study on prisoners. Until now no study has been conducted in pre-diabetic prisoners by giving *Rasāhāra* and *Yoga* as interventions. In Bhopal Central Jail, the jail authorities are keenly concerned for prisoner's wellness, and the jail campus contains both a well organised clinic and pathology lab. Prisoners received many tests there when required, but routine blood sugar checks and complete blood picture (CBP) were not provided. These are needed because of prisoners' stressful lives. Addition of Yoga programs to federal and state programs of all kinds is now a national policy; follow-up studies should be done.

### **8.1 DIABETES MARKERS**

In this study of integrative treatments for T2DM, group-time interaction results indicated that both *Rasāhāra* and *Yoga*, and *Yoga* alone, are beneficial programs for controlling blood sugar levels. The HbA1c data indicates that regular ingestion of *Rasāhāra* is definitely helpful to prevent increase of standard markers of T2DM, especially compared to no treatment. This is particularly significant since HbA1c is considered a more stable and reliable marker for T2DM than FBS or PPBS. Indeed, study data showed greater fluctuations in blood sugar levels, with higher sensitivity to misbehaviour, corroborating this idea.

Generally, results agree with experimental hypotheses, namely that three months' participation in *Yoga* and *Rasāhāra* programs would have beneficial effects on diabetes markers, and that addition of *Rasāhāra* would increase effects. *Rasāhāra* seemed to work well for PPBS and HbA1c, but was less effective in the case of FBS assessments, for which both Groups 1 and 2 seemed to perform equally well.

Study results therefore lend weight to research on *Yoga* conducted over the past thirty years, starting with studies of asthma (Nagendra & Nagarathna, 1985), which established the efficacy of *Yoga* for that disease. Further comprehensive studies have established it for all types of disease (Gangadhar et al., 2013; Cramer et al., 2013; Cramer et al., 2014; Innes et al., 2016; Vaidya ADB, 2016; Sharma et al, 2015; Cramer et al, 2015; Cramer et al., 2016; Innes & Selfe, 2014-16, Kumar & Jagannathan, 2016; Murthy, 1991; Nagendra & Nagarathna, 2001) Systematic application to obesity (Murthy, 1991,). Diabetes (Innes & Selfe, 2014, 15 & 16; Kumar & Jagannathan, 2016), is a relatively recent development, and led to formation of the Stop Diabetes Movement in India see: <http://svyasa.edu.in/stop-diabetes-movement-sdm>. Initially motivated by cases of extreme success in a Yoga Medicine Health Centre inpatient setting, it seems that particular clients achieve extreme benefits, though averages may be lower.

**TABLE 8.1: COMPARISON OF INITIAL AND FINAL HBA1C LEVEL**

<b>Diabetes Status for Groups 1, 2 &amp; 3 Pre and Post Intervention</b>						
<b>Group</b>	<b>Group 1</b>		<b>Group 2</b>		<b>Group 3</b>	
<b>Status of disease</b>	Pre	Post	Pre	Post	Pre	Post
<b>Safe Zone (HbA1c &lt;6)</b>	33	32	26	27	32	22
<b>Pre-Diabetes (HbA1c 6-6.5)</b>	3	5	5	5	4	12
<b>Diabetes (HbA1c &gt;6.5)</b>	2	1	6	5	1	3

**TABLE 8.1 Caption:** Table 8.1 shows the shift of participants of Group 1 & 2 to safe zone compared to Group 3 who has increased HbA1c.

**Abbreviation:** HbA1c- Glycated Haemoglobin

**Groups:** Group 1- *Rasāhāra* and Yoga, Group 2- Yoga only, Group 3- Control

Results also support previous research on *Āyurveda* indicating useful applications of its herbal medicines to T2DM. (Angadi et al., 2016; Kothari et al., 2014; Grover et al., 2009; Mehta et al., 2010; Rao & Sakaguchi, 2005). Whether patients that would benefit most can be identified by *Āyurveda*'s rather different assessment of those at risk from T2DM has yet to be determined. It should definitely be investigated.

## 8.2 CHANGES IN DIABETES MARKERS ON CHANGE OF SEASON

A striking aspect of the data depicted in Figure 7.1 (FBS) and Figure 7.2 (PPBS) are the increases in values in all three Groups around Day 45 (23 June) just after cooler wet weather began at the beginning of Bhopal's 2015 monsoon on 20<sup>th</sup> June. This may well represent the natural physiological response to change in season, known to *Āyurveda*. Again, differences in behavior between Groups 1 and 2 suggest that *Rasāhāra* was playing a useful additional role. The study, centred on *Rasāhāra* and Yoga medicine must be considered in the following context: *Āyurveda*, known for its ability to restore health and prevent disease, holds that health requires a balanced state of *doṣas* (*Caraka Samhitā*, 2006), quantities now recognized to regulate principle systems functions. (Hankey A., 2001) Stress and strain on the organism create *doṣa* imbalances, driving regulatory processes away from states of optimal function. (Hankey A., 2015) *Āyurveda* regards *doṣa* imbalances listed in *Ṣaṭkriyākāla* as indicators of poor health, and etiological stages of disease development. (*Caraka Samhitā*, *Sutrasthana* 21.36; *Sushruta Samhitā*, *Sutrasthana* 6). For example, excess *Kapha* combined with mental stress (aggravated *Vāta doṣa*), leads to diseases associated with metabolic syndrome, such as T2DM, PCOS, or CVD.

Changes of season when the physiology must adapt to the demands of new climate conditions (*Charaka Samhita. Sutrasthana* 8.48,49) are times that can particularly cause *doṣa* imbalances. *Āyurveda* suggests taking rest to allow the shift to the new season to take place

more easily, so the change does not lead to disease. It recommends specific diet and lifestyle changes appropriate to the new season, so that the physiology adapts better to the change.

*Āyurveda* is clear about the importance of time of day and season. The middle of the day, when *Pitta doṣa* governing digestion is dominant, is a time of more efficient digestion, and the best time to eat the main meal. This agrees with the Circadian Rhythms Fact Sheet, given by the National Institute of General Medical Sciences, ([https://www.nigms.nih.gov/education/pages/Factsheet\\_CircadianRhythms.aspx](https://www.nigms.nih.gov/education/pages/Factsheet_CircadianRhythms.aspx)) at the US NIH. Similarly, in the hot season, *Abhyanga* massage with sesame oil, with its *uṣṇa* heating quality, is forbidden; cooling, *śīta*, coconut oil is preferred. Sesame is eaten in winter, but not summer, in contrast to the Middle East, where such distinctions are not recognized, and sesame is consumed all year round with bad consequences for health in the heat of summer. Modern Indian society no longer adheres to these simple rules. People report that seasonal diseases and pathologies are more common than in earlier times, like the 1820's when British visitors reported that Indian society enjoyed almost perfect health.

The ancient texts state that the onset of the monsoon aggravates *Vāta doṣa*, which may drive the physiology away from equilibrium. (*Caraka Samhitā Sutrasthāna* 6.8, & 6.33-34) Specifically the start of the monsoon increases the quality of sweetness (*Madhura rasa*). (Sharma, Tripathi & Shukla, 1998). Shifts of this kind were observed in FBS, Figure 7.1, and PPBS, Figure 7.2. Proof that onset of the monsoon really was the cause requires further studies to be performed.

Being in accordance with *Āyurveda* predictions, the reported observations suggest that levels of FBS and PPBS were influenced by the change of season at the time. If this is true, it has significant consequences for both *Āyurveda* and western medicine. First, it suggests that *Āyurveda* is correct to state that styles of physiological function alter with change of season.

Second, it means that levels of biochemical markers considered normal and healthy should make allowances for prevailing climate. In judging implications of any change in level of biochemical markers, climate and season should be taken into account.

### **8.3 LIPIDS**

For these variables changes did not reach significance, differences in standard deviations were seen suggesting that lipid values tended to normalize for Groups 1 and 2 but not for controls. Other Yoga programs for diabetes have shown better results; that may be due to choice of yoga postures, some of which have been directly linked to improvements in lipid metabolism. Certainly, recent studies have shown with specially developed and approved modules have shown better results than those obtained here, indicating that different Yoga postures and breathing exercises have different effects, and that care taken in their special selection can pay dividends. Nevertheless, results reported here suggest that Yoga practice has positive benefits for lipid levels. They agree with the understanding that Yoga practice improves organism regulation.

### **8.4 CREATININE**

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. Of the kidney patients who have 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 about 40 others. Decreases observed in Group 2 patients, though less, were also statistically significant  $p < 0.0001$ . They are consistent with reports from a Naturopathic hospital in the city of *Thrissur* in the state of Kerala, which treats kidney patients on a strict yoga and life-style regime, and has unpublished records of many successful cases of bringing kidney patients off dialysis; one such case being a personal friend of the author. These results require follow-up studies with larger numbers of patients to

confirm trends seen in pre-diabetic participants in this study. Since the present Indian government is committed to encouraging practice of integrative medicine at its leading nationally funded AIIMS group of hospitals, further studies should be carried out under leading nephrologists, and, if successful, similar treatments should be widely implemented.

### **8.5 BLOOD PRESSURE PARAMETERS**

Reported results were highly significant in that they show consistent narrowing of distributions into the normal range for each variable. While shifts in distribution means towards optimal values confirm previous findings of studies of *Yoga* for hypertension (Cramer et al., 2014), the really significant results were not changes in means, but reductions in standard deviation. In all six cases, these were  $p < 0.0001$ , except DBP for Group 2, which was only  $p < 0.0006$ .

Two points about these results need emphasis: 1. Study results add weight to research on medical applications of *Yoga* conducted over the past thirty years (Nagendra & Nagarathna, 2012). 2. Reductions of standard deviations (or variances) for blood pressure and pulse rate variables are new, and indicate that *Yoga* has an entirely different mode of action from other interventions. Drugs move targeted variables by average amounts in a given direction. This study found that *Yoga* can narrow distributions of blood pressure and pulse rate variables i.e. reduce variances and StDs, shifting both ends of distributions back towards the variable's normal range of values. *Yoga* practice thus seems to be normalising values of variables, rather than shifting distributions in particular directions. This is a new result, which requires further research, particularly corroboration by changes in other variables.

In the context of diabetes, a link between stress, obesity and metabolic syndrome has been acknowledged (Kyrou, Chrousos & Tsigos, 2006); stress coupled with diabetes can bring on depression (Golden, 2007; Atlantis, Fahey & Foster, 2014), which increases adverse

outcomes for the patient (Black, Markides & Ray, 2003) probably mediated by stress and stress hormones (McEwen, 2008), particularly as depression has itself been found to be a risk factor for diabetes. (Knol et al., 2006). A downward spiral of increasing pathology is created, but yoga studies provide evidence for a means to stop it (Naveen et al., 2013, Gangadhar et al., 2013): reducing levels of stress through yoga reverses downward trends. Similar epidemiological patterns may apply to hypertension.

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

Until now no haemoglobin study has been conducted using *Rasāhāra* and *Yoga* as interventions. Group 1 showed significant increases, indicating that the *Rasāhāra* program was effective in increasing blood haemoglobin. Group 2 also increased but not significantly, while the value for the control group decreased slightly. Group-time interaction differences between the groups suggested that further research would be worthwhile.

For the acidity measurements, which were obtained indirectly via the urine, Group 1, *Rasāhāra* and *Yoga*, clearly showed significant improvement, probably due to the known alkalising effect of wheatgrass extracts. Since acidity in the bloodstream is a known factor in causing pathology, these observations are worth following up and verifying in more detail, so that their health restoring potential can be properly assessed in patients suffering from a variety of pathologies. Cancer, in particular, has been said to thrive in acid conditions.

### **8.7 BREATH HOLDING TIME**

For BHT, Groups 1 and 2 both greatly increased their mean values, with excellent statistical significance ( $p < 0.0001$ ); Group 1 seemed to do slightly better than Group 2, though not significantly so. In general, BHT improves either from breathing practices or by improving lung capacity with the help of antitussives, a property which *Vāsā* and *Guḍuci* both possess.

BHT develops slowly, so it might have increased more if the intervention time had been longer.

### **8.8 VĀTA-PITTA-KAPHA BALAS**

This study of pre-post intervention values of *doṣa balas* is the first such published study as far as we know. The Vaidya, Bhopal's Dr Shailesh Mankar, performed the same *doṣa bala* assessments as in his personal clinic. However, the method has not been tested for repeatability, so it cannot be considered rigorous, but results (Tables 7.8.1-3) speak for effectiveness of treatment methods.

Herbal juices are normally formulated on an individual basis, prescribing herbs individually to correct each patient's imbalance. In the jail, this was not practical. A uniform herbal juice formula specifically aimed at reducing excess *Kapha* was administered daily to the whole of Group 1. *Kapha Prakopa* is the driving force behind high blood sugar values. Huge reductions in *Kapha bala* were seen in Group 1, notably its final value of 17 post intervention. The herbal juices seemed highly effective for that purpose, but in some cases may have been over effective, as initial *doṣa* imbalances were not taken into account.

Reductions in *Kapha Balas* are extremely important, because most T2DM patients are cases of *Kapha roga*, *Kapha* imbalance driven disorders. These include all pathologies associated with metabolic syndrome. Once a patient contracts one such disorder, although they may be 'cured' of it by surgery, as in PCOS, further related *Kapha roga* pathologies will inevitably develop every year or two, until their *Kapha doṣa* is brought back into balance.

Members of the International Society of Endocrinologists have discussed this at meetings in 2015<sup>1</sup>, but confess to not knowing what to do about it. The only solution is *Āyurveda*'s: to rectify lifestyle conditions driving the continuously increasing imbalances, described in Chapter 1 under *Ṣaṭkriyākāla*, so that they stop driving the aetiology, and further pathogenesis ceases.

High *Kapha* levels dominated *Doṣa Bala* pre-intervention scores. Thirty inmates had *Kapha* scores of 4 or 5, i.e. high; 24 had high *Pitta* scores, maybe due to hot season; only 10 had high *Vāta Bala* scores. In Group 1, numbers with high scores reduced for all *doṣas*: *Vāta* from 5 to 2; *Pitta* from 8 to 2; and *Kapha* from 13 to 1. In Group 2, numbers of participants with high scores also reduced: *Vāta* slightly, 1 four and 2 fives became 3 fours; for *Pitta*, 8 fours became 6 fours; But *Kapha* reduced high scores from 10 to 0! Group 3 controls were, by comparison, a disaster: 7 initial high scores increased to 12 high scores, all fours.

*Kapha* reducing effects of herbal juices are clearly shown by these results, which also show that *Kapha* aggravation can become seriously worse in subjects with tendencies in that direction. The study therefore indicates that early diagnosis of T2DM is important if the patient is to be kept free of disease by bringing it under control. The results suggest that *Āyurveda*'s *doṣa bala* assessment may be able to identify patients who will benefit most from herbal treatment. All this may also be true of other major life-threatening disorders like CVD and cancer.

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<sup>1</sup> Dr Manuj Sharma private communication.