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PRINT ISSN 0973-9777, WEBSITE ISSN 0973-9777
EFFECT OF “MANAHSHILADI LEPA, NIMBPATOL KASHAYA & TUTTHADI LEPA, KUSHTHAGHNA MAHAKASHAYA ALONG WITH VAMAN & VIRECHAN” IN CASES OF EKA-KUSHTHA (PSORIASIS)

DR. ANJANA*, DR. P.C.CHOUDHARY** AND DR. AJAY AGARWAL***

Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, Anjana, P.C.Choudhary and Ajay Agarwal the authors of the research paper entitled EFFECT OF “MANAHSHILADI LEPA, NIMBPATOL KASHAYA & TUTTHADI LEPA, KUSHTHAGHNA MAHAKASHAYA ALONG WITH VAMAN & VIRECHAN” IN CASES OF EKA-KUSHTHA (PSORIASIS) declare that, We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal, This research paper is our original work and no part of it or its similar version is published or has been sent for publication anywhere else. We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

In Ayurveda many skin disorders are described under the heading of Kusth and grouped into Mahakustha and Kshudrakushtha. The Eka-kushtha is enumerated first in the list of Kshudrakushtha.

The clinical features of Eka-kushtha are Aswedanam (loss of sweating), Mahavastu (spread of lesion) & Matshyashakalopamam (silvery scaling) as stated by Acharya Charak.

(Ch. Chi. 7/2)

The Eka-kushtha is nearly resemble with the psoriasis as described in Modern Medicine. Psoriasis is very common genetically determined chronic inflammatory and proliferative disorder of skin characterized by sharply demarcated erythematous plaques/patches/papules covered with silvery scaling.

It is one of the major cosmetic problem causing psychological stress. In Modern Medicine, no satisfactory permanent cure of psoriasis have been attained till today, but some presently available local applications (e.g. coat tar, dithranol etc.) and systemic treatment (eg methotrexate, PUVA therapy etc.) can only being possible to control the symptoms.

The shaman therapy with samshodhan have a very good result. Hence we have planned to evaluate the comparative response of shaman drugs with samshodhan therapy (Vaman & Virechan).

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Aim & Objective
1. To evaluate the comparative effect of shaman regimen with samshodhan therapy.
2. To develop a comparative economic safe & efficacious Ayurvedic regimen for the patients of Eka-Kushtha.

Material & Method: Patients are all randomly selected from the OPD of Department of Kaya Chikitsa, S.A.C Lucknow.

Inclusion Criteria
Patients having 50% or more of the following clinical symptomatology were selected for the trial:
1. Aswedanam (loss of sweating)
2. Mahavastu (spread of lesions)
3. Matshyashakalopamam (silvery scaling)
4. Krishna-arun varnate (Blackish red discoloration)

Exclusion Criteria
1. Complicated cases of Psoriasis with superadded infections.
2. Cases under high doses of corticosteroids.

Criteria of Diagnosis: Cases of Ekakushtha (psoriasis) diagnosed according to classical features of Eka-Kushtha i.e. Aswedanam (loss of sweating), Mahavastu (spread of lesions) & Matshyashakalopamam (silvery scaling).

Grading Of Symptoms: Symptoms are graded according to severity of disease as O (nil), + (mild), ++(moderate) & +++ (severe).
1. Aswedanam (loss of sweating):
   - Nil - O (normal sweating)
   - Mild - + (little sweating even in hot climate at the site of lesion)
   - Moderate - ++ (much less sweating even in hot climate at the site of lesion)
   - Severe - +++ (no sweating at all even in hot climate & skin becomes dry)

2. Mahavastu (spread of lesions):
   A. No of lesions:
      - Nil - O (Absent of lesion)
      - Mild - + (1-5 lesions)
      - Moderate - ++ (6-10 lesions)
      - Severe - +++ (>10 lesions)
   B. Size of lesions:
      - Nil - O (Absent of lesion)
      - Mild - + (<5 cm in size)
      - Moderate - ++ (5-10 cm in size)
      - Severe - +++ (>10 cm size)

3. Matshyashakalopamam (silvery scaling):
   - Nil - O (Absent of symptoms)
   - Mild - + (Scales sometime appear at the site of lesion)
   - Moderate - ++ (Scales does not remove on scraping)
   - Severe - +++ (Scales itself remove on lying)
4. Krishna-arun varnata (Blackish red discoloration):

<table>
<thead>
<tr>
<th>Symptom Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>O (Absent of symptoms)</td>
</tr>
<tr>
<td>Mild</td>
<td>+ (Redness at the site of lesion)</td>
</tr>
<tr>
<td>Moderate</td>
<td>++ (Blackness at the site of lesion)</td>
</tr>
<tr>
<td>Severe</td>
<td>+++ (Reddish blackness at the site of lesion)</td>
</tr>
</tbody>
</table>

**Grouping & Trail Regimen**

<table>
<thead>
<tr>
<th>Group</th>
<th>Samshodhan therapy</th>
<th>Internal use</th>
<th>Dose</th>
<th>External use</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Vaman 2 course of vaman at first virechan at 1 night interval</td>
<td>Nimba patol</td>
<td>40ml BD</td>
<td>Manaha shiladi lepa</td>
<td>QS</td>
</tr>
<tr>
<td></td>
<td>virechan at 1 month interval</td>
<td>kashaya</td>
<td>after meals</td>
<td>mustard oil at Bed time</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Vaman 2 course of vaman at first virechan at 1 night interval</td>
<td>Kashtaghna</td>
<td>40ml BD</td>
<td>Tutthadi lepe</td>
<td>QS</td>
</tr>
<tr>
<td></td>
<td>virechan at 1 month interval</td>
<td>Mahakashaya</td>
<td>after meals</td>
<td>mustard oil</td>
<td>at Bed time</td>
</tr>
</tbody>
</table>

**Follow Up**: Patients of Eka-kustha (psoriasis) have been called for 1 month interval for 4 month. Patients were also followed for further 2 month after completion of trail for to check the recurrence of the disease symptomatology.

**Assessment Criteria**

Assessment of clinical improvement was done according to severity of signs & symptoms. To assess the severity symptoms grading scales was used.

Difference in scaling before & after treatment and during follow up was tested for significantly bio-statistical methods.

**Lab Investigations**

Following routine & specific investigations were performed before & after the completion of trail.

**Routine**:
- Blood: Hb%, TLC, DLC, ESR
- Urine: Routine & microscopic
- Stool: Ova & cyst

**Specific**:
- Serum uric Acid
- Total serum Protein
- Serum Albumin, Serum Globulin, A/G ratio.

**Result**

The result was assessed on the basis of improvement in clinical feature in terms of Aarogya (Relieved), Kinchit Aarogya (Improved)& Anaarogya (Unchanged).

- Aarogya – More than 70% relief in clinical feature.
- (Relieved)
- Kinchit Aarogya (Improved) - 50-70% relief in clinical features
- Unaarogya (Unchanged) - less than 50% relief in clinical features.
**Table 1** showing the overall improvement after 4 month of treatment in group A & group B

<table>
<thead>
<tr>
<th>Result</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of patients</td>
<td>% age</td>
</tr>
<tr>
<td>Aarogya</td>
<td>15</td>
<td>71.43%</td>
</tr>
<tr>
<td>Kinchit Aarogya</td>
<td>5</td>
<td>12.8%</td>
</tr>
<tr>
<td>Anaarogya</td>
<td>1</td>
<td>4.76%</td>
</tr>
</tbody>
</table>

**Table 2** showing the response of drug on aswedanam (loss of sweating) in patients of Eka kushtha (Psoriasis)

<table>
<thead>
<tr>
<th>Severity</th>
<th>Severe</th>
<th>Mod</th>
<th>Mild</th>
<th>Nil</th>
<th>% age</th>
<th>No of cases improved</th>
<th>No of cases Relieved</th>
<th>% age Improvised</th>
<th>X²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT</td>
<td>13</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1 month</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>0+2</td>
<td>9.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>2nd month</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>0+5</td>
<td>23.80%</td>
<td>6</td>
<td>15</td>
<td>71.43%</td>
<td>55.18</td>
</tr>
<tr>
<td>GpB (n=20)</td>
<td>3rd month</td>
<td>0</td>
<td>4</td>
<td>9</td>
<td>0+8</td>
<td>38.09%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BT</td>
<td>14</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1 month</td>
<td>12</td>
<td>4</td>
<td>2</td>
<td>0+2</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>2nd month</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>0+4</td>
<td>20%</td>
<td>5</td>
<td>15</td>
<td>75%</td>
<td>63.84</td>
</tr>
<tr>
<td>GpB (n=20)</td>
<td>3rd month</td>
<td>0</td>
<td>2</td>
<td>9</td>
<td>0+9</td>
<td>45%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>4th month</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0+15</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A vs B Z=0.26 P=0.80 (NS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3A** Showing the response of drug on mahavastu (No of lesion) in patients of Eka-kushtha (Psoriasis)

<table>
<thead>
<tr>
<th>Severity</th>
<th>Severe</th>
<th>Mod</th>
<th>Mild</th>
<th>Nil</th>
<th>% age</th>
<th>No of class improved</th>
<th>No of class relieved</th>
<th>% age</th>
<th>X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT</td>
<td>4</td>
<td>14</td>
<td>3</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1 month</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>0+2</td>
<td>9.52%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>2nd month</td>
<td>2</td>
<td>9</td>
<td>6</td>
<td>0+4</td>
<td>19.04%</td>
<td>7</td>
<td>14</td>
<td>66.67%</td>
<td>43.53</td>
</tr>
<tr>
<td>GpB (n=20)</td>
<td>3rd month</td>
<td>0</td>
<td>5</td>
<td>8</td>
<td>0+8</td>
<td>38.09%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>4th month</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>0+14</td>
<td>66.67%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BT</td>
<td>3</td>
<td>15</td>
<td>2</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1 month</td>
<td>2</td>
<td>12</td>
<td>4</td>
<td>0+2</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpB (n=20)</td>
<td>2nd month</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>0+5</td>
<td>25%</td>
<td>6</td>
<td>14</td>
<td>70%</td>
<td>44.22</td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>3rd month</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>0+9</td>
<td>45%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpB (n=20)</td>
<td>4th month</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0+14</td>
<td>70%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A vs B Z= 0.23 P=0.82 (NS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3B** Showing the response of drug on mahavastu (size of lesion) in patients of Eka-kushtha (Psoriasis)

<table>
<thead>
<tr>
<th>Severity</th>
<th>Severe</th>
<th>Mod</th>
<th>Mid</th>
<th>Nil</th>
<th>% age</th>
<th>No case of improved</th>
<th>No cases of relieved</th>
<th>% age</th>
<th>X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT</td>
<td>3</td>
<td>14</td>
<td>4</td>
<td>0</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1 month</td>
<td>2</td>
<td>12</td>
<td>5</td>
<td>0+2</td>
<td>9.52%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>2nd month</td>
<td>1</td>
<td>9</td>
<td>7</td>
<td>0+4</td>
<td>19.04%</td>
<td>7</td>
<td>14</td>
<td>66.67%</td>
<td>41.10</td>
</tr>
<tr>
<td>GpB (n=20)</td>
<td>3rd month</td>
<td>0</td>
<td>5</td>
<td>8</td>
<td>0+8</td>
<td>38.09%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GpA (n=21)</td>
<td>4th month</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>0+14</td>
<td>66.67%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion

1. Samshaman therapy is highly effective after samshodhan therapy.
2. Samshodhan therapy helps to clean the channels & to rejuvenate them for ensuring a proper transportation of the metabolites.
3. Manahashiladi lepa have kandughna & kushthaghna properties.
4. Tutthadi lepa have kandughna krimighana, varna shodhan, sothhar & Kushthagna properties.
5. Nimba-patol kashaya have kandughna & kushahar properties.
6. Kushthaghna mahakashaya have krimighna, sothhar, varnaprasadan, Deepan & Raktashodhan properties.

**Conclusion**

1. No side effect have been observed except mild irritation with Tutthadi lepa in some cases.
2. Shaman drugs gives better result after shodhan karm.
3. The process of Vaman karm eliminates the vitiated kapha dosha & removes deepaply Seated toxins from upper GIT & Virechan karm remove the toxins loner GIT & eliminates vitiated pitta dosha.
4. Kushaghana Mahakashaya have Antibacterial Antifungal, Carminative, Appetizer, Mild laxative, Blood purifier & Immunomodulatory effect.
5. Nimba patol kashaya have Antibacterial, Antifungal Carminative & blood purifier effects.
6. Manahshiladi lepa have Antipruritic & Antibacterial effects.
7. Tutthadi lepa have Antipruritic, Antibacterial, Antifungal and Healing effects.

**REFERENCES**

_Astang Hriday, Vidhotini Hindi Commentary by Atiridev Gupt, Chaukhambha Samskrit Sansthan, Varanasi._


_Charak Samhita, Vidhyotini Hindi Commentary by K. N. Shastri and C.N. Chaturvedi, Chaukhambha Bharti Academy, Varanasi._


_Christophar Haslett et. al. Davidson’s Principles and Practice of Medicine, 19th edition Churchill Livingstone Saunders._


_Eugene Braunwld et. al. Harrison’s principles of Internal Medicine, Ed. 16th vol. I, New York, Mc GrawHill, New Delhi._

_Indian Medicinal Plants, Kritikar and Basu, 2nd Ed. 1976 Pub, Bishan Singh and M. P. Singh, Dehradun._

_Rasa Ratna Samucchaya, Vidhyotini Commentary by Duttatreya Anantkulkarni, Pub. Meharchand Publication, New Delhi._

_Ras Trangini, Rasvigyana Commentary of Dharmanand Shastri Ed. 2004, Motilal Banarasi Das, Varanasi._

_Sushrut Samhita, Ayurvedava Sandipika Hindi Commentary by Ambikadutt Shastri, Chaukhambha Sanskrit Series, Varanasi._

_Vachaspatyam, Sri Taranath Tarka Vachaspati, Chaukhambha Sanskrit series, Varanasi._

_Vaidhya Sabda Sindhu, by Umesh Chandra Gupta, 1983 pub. Chaukhambha Orientalia, Varanasi._

_Yog Rattnakar, Vidhyotini Hindi Commentary by Laxmipati Shastri, 8th Edition 24, Chaukhambha Sanskrit Sansthan, Varanasi._
HOW WALKING IS SUPPORTIVE IN PREVENTION OF HYPERTENSION AS PER PRAKRTI

SUSHMA TIWARI*, SANGEETA GEHLOT** AND S.K. TIWARI***

Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, Sushma Tiwari, Sangeeta Gehlot and S.K. Tiwari the authors of the research paper entitled HOW WALKING IS SUPPORTIVE IN PREVENTION OF HYPERTENSION AS PER PRAKRITI declare that, We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal, This research paper is our original work and no part of it or its similar version is published or has been sent for publication anywhere else. We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Abstract

Ayurveda is a holistic approach of medicine man scripted and practiced in India since 1500 B.C. As per Ayurveda, an individual’s vital constitution decides tendency to diseases as well as therapy and life-style regimen to a great extent. In Ayurveda, seven broad constitutional types (Prakritis) have been described for each with a varying degree of physiological, anatomical and psychological variations and predisposition to different diseases. Blood pressure reducing effect of exercise possibly will result from reduced sympathetic discharge with exercise training. Regular aerobic exercise represents a prudent first line of defense in most therapeutic programmes to manage border line hypertension. Walking is one of the most simple and easy exercise without any previous practices. In this contemporary study VP (Vataj-Pittaj) individuals have shown significant decreased in blood pressure. Other parameters i.e. respiratory rate and pulse rate were also changed but these change stand under normal limits. The essence of study, walking is prophylactic non hazardous management for all hypertensive patients. Walking can control physiological variation in the body to maintain homeostasis of the body.

Key Words: Hypertension, Walking, Prakrti, Vyayama.

Introduction

Ayurveda is a primordial system of medicine renowned and practiced in India. Ayurveda has named a number of somatic diseases, where the psychic factors actively involved either at the level of causation or aggravation of diseases. In the psychosomatic mechanism both oörira dośa and manasa dośa involved.
Hypertension is the most common psychosomatic disorders in present era and up to great extent it can be controlled by regular physical activity. The grading of exercise can withstand variably from person to person.

Walking is a gentle, low-impact, isotonic exercise that provides no difficulty to individuals in higher level of fitness and health. Walking is a shape of exercise accessible to just about everybody. It is safe, simple and does not require any previous practice. And the health benefits are many. Long term walking can affect the many physiological variations in the body according to Prakṛti of individuals. So walking is an integral part of health to maintain homeostasis of the body. Waking is very important non drug therapy for hypertensive patient mainly for the pre hypertensive patients. Vyāyama produces lightness in the body, provides ability to bear troubles, reduces aggravated Doṣa, and improves the digestive power. ¹

Prakṛti
Qualitative and quantitative, unchangeable Dosika preponderance from birth to death is called as Prakṛti is a deciding factor during prognosis and treatment of diseases. Prakṛti is a state which is formed at the time of fertilization due to renown of doṣa.² Vātik individuals are very prone to all kinds of diseases on account of this it is the most awful among all. Prakṛti of human being is decided in intra uterine life according to predominance of Doṣa and never can be changed throughout life.³⁴ Prakṛti is one of the very important principles and plays a very important role in the designing of lifestyle of a person for maintenance of health. Its determination is also important in diseased condition as it is essential in the prognosis and planning of treatment. Prakṛti remains unchanged during the whole life and affects every aspect of life.⁵ Understanding the individuals temperament of one can know which food and drink and what type of job, exercise are appropriate for maintaining their health. If the daily activities, diet, occupation and behavior are not adjusted to balance this, then this constitutional humor will increase, thus may manifests in the form of unlike diseases. If the personality is known then herbs, diet and other course of therapies including yogic postures can be advised correctly both for disease treatment, maintenance of the health and to promote longevity and delayed aging process.

Importance of Prakṛti
Basic knowledge Prakṛti of is a vital tool in helping one to determine the most auspicious lifestyle factors.

1. To choose an appropriate profession Prakṛti / occupation
2. Observation of Health status as per Prakṛti- According to Ayurveda Prakṛti discloses everything about a particular individual. We can therefore assess individual’s status of health, such as strength (physical and mental), appetite, adaptability, compactness of body etc., and on the basis of these findings we can draw some specific conclusions about health status.
3. Disease susceptibility and Prakṛti- Each person in the universe has a unique combination of Doṣa in their body, known as Prakṛti. Due to faulty dietary habits or lifestyles or by not following a regimen according to his/her Prakṛti, a person can be more prone to diseases that are caused by the very same Doṣa of his Prakṛti. It is also described in Ayurveda that vāta Prakṛti individuals are more prone to diseases, so such individuals should adhere to the suggestions and verdict regarding food and lifestyle according to Prakṛti.
4. Preventive and promotive health care according to Prakṛti- A person is able to prevent various disorders from developing and is also able to promote his health by knowledge of individuals Prakṛti. It helps in
analyzing and observing dietary habits, lifestyles, daily and seasonal regimens etc. Different varieties of food and lifestyle according to one’s Prakṛti have been described, which suggests that one should follow these guidelines for prevention of diseases and promotion of health. Knowledge of personality of individuals helps in Adaptation of healthy dietary habits in the reference of Dīncharyā and Ritucharyā.

5. In diagnosis of the diseases – As per Āyurveda, analysis of Prakṛti is very important to diagnose the underlying disorders and to treat that patient. By observing the Prakṛti diagnosis of a particular disease becomes simpler, as it does not only provide an idea about the vitiated Doṣa but also provides the treatment principles for that person. Treatment is main foundation according to Prakṛti. Treatment is dependent on the acceptability of body to medications. Prakṛti illustrates us which types of herbs, diets, and lifestyles will help in the treatment of that person. With the help of Prakṛti we can assess the patient very well for his physical and mental strength, appetite, likings and disliking and his adaptability to food and medicines, etc. Thus, analysis or knowledge of Prakṛti is essential for all persons to remain healthy and to achieve the goals of a human life.

Hypertension: Blood pressure is a quantitative trait that is highly variable in population studies; Blood pressure has a normal distribution that is slightly skewed to the right. A daily walk lasting 20 minutes or more significantly reduces the risk of hypertension in men. For every 26 men who walk 20 minutes or more, one case of hypertension will be prevented. Alternatively, as little as 30 minutes vigorous exercise just once a week will also significantly reduce the risk.

Walking: Walking is a great exercise and very easy to perform because it is so simple to do. But using the accurate posture and movements is essential. Five minutes walking slowly to warm up muscles is necessary step of walking. In Āyurvedic literature word parikrma is used for walking during management of Prameha.

Enrollment Of Cases
Total 84 (55 male, 29 females) hypertensive cases were enrolled from Kayachikitsa O.P.D., IMS, BHU and some cases were obtained from Kashi Mumukshu Bhavan, Assi (Varanasi) for the period - Jan 2009 to Jan 2011. The selection of patients was random irrespective of sex, occupation, season and socioeconomic reflection. Prakṛti assessment was done also irrespective of sex, occupation and socioeconomic reflection. The entire patients belonged to age group of 35 to 65 years. Three follow ups have been done during the whole research work, initial, subsequent to one month and lastly after 3 months.

Line Of Action
In the current study, effect of exercise has been examined among hypertensive individuals. Isotonic aerobic exercise- walking was prescribed for Hypertensive patients for 3 months (three follow up) under physician guidance.

Duration of exercise: 30 minutes walking has been recommended, before those 5 minutes of warm up and after completion 5 minutes cool down performed. During entire period of study low caloric diet was prescribed. Breathing exercises kapal bhati, anuloma- viloma and deep breathing during expiratory and inspiratory phase have been advised initially 20 times a day in the morning empty stomach. These subjects were demonstrated about the scientifically designed exercise protocol. Our study group was divided as follows:
1. HTNC (Hypertensive control) - Exercise not performed
2. HTNE (Hypertensive exercise)- Exercise performed

**Inclusion Criteria:** Hypertensive patients aged 35-65 years were considered. The patients were of high normal, mild and moderate essential hypertension without any complication. Patients of Systolic blood pressure under high normal range above 129 mm Hg and diastolic BP above 84 mm Hg were included. Isolated systolic and diastolic hypertensive cases were also considered.

**Exclusion Criteria:** In both the groups patients aged below 35 years and above 65 years were excluded. Patients suffering from any secondary diseases like Mild/moderate hypertension cases with complications such as cerebro-vascular diseases, coronary artery diseases, renal diseases, cardiac heart failure, cardiomyopathy and any degree of heart blocks, pre-eclampsia/eclampsia and any psychosomatic disorder were excluded.

**Parameters:**

1. **Clinical parameter:** Pulse Rate, Blood Pressure, Respiratory Rate (These parameters have been recorded initially, 1 month and finally after 3 months).

**Evaluation Criteria**

1. **History And Clinical Examination:** A detailed history was taken and physical examination was performed as per proforma prepared by the department of Kriya Sharir.

**Prakṛti evaluation is necessary tool of our study**

Prakṛti evaluation is designed on the basis of the elucidation found in Caraka Samhita, which in turn, is based on the specific characteristics of a particular Doṣa (Ca.Vi.8/96-98). In this context, Caraka has explained the particular features of a particular Doṣa and the specific characteristics produced in an individual. Thus, Vāta has eight (8), Pitta has five (5) and Kapha has twelve (12) Guṇas in total. Further, each Guṇa is responsible for producing one or more traits/characters. Thus, three Doṣa possess neither equal number of Guṇas nor do they produce equal number of characters / traits in the individuals.

**Observations and Results**

<table>
<thead>
<tr>
<th>TABLE No.1</th>
<th>Incidence of Prakṛti as per group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prakṛti</td>
<td>GROUP</td>
</tr>
<tr>
<td></td>
<td>HTNC</td>
</tr>
<tr>
<td>VP</td>
<td>19</td>
</tr>
<tr>
<td>PK</td>
<td>8</td>
</tr>
<tr>
<td>VK</td>
<td>7</td>
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<tr>
<td>TOTAL</td>
<td>34</td>
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<table>
<thead>
<tr>
<th>TABLE No. 2</th>
<th>Effect of walking on Blood Pressure in hypertensive patients as per Prakṛti</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Prakṛti</td>
</tr>
<tr>
<td>Hypertensive control</td>
<td>VP (n=18)</td>
</tr>
<tr>
<td></td>
<td>VK (n=8)</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Group</td>
<td>Prakṛti</td>
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<td></td>
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<tr>
<td>Hypertensive control VP (n=18)</td>
<td>VP</td>
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<tr>
<td></td>
<td>VK</td>
</tr>
<tr>
<td></td>
<td>PK</td>
</tr>
<tr>
<td>Hypertensive exercise VP (n=29)</td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td>VK</td>
</tr>
<tr>
<td></td>
<td>PK</td>
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</table>

**TABLE No. 3 Effect of walking on pulse rate in hypertensive patients as per Prakṛti**

<table>
<thead>
<tr>
<th>Group</th>
<th>Prakṛti</th>
<th>Pulse (/ minute) Mean ± SD</th>
<th>Intragroup Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BT (Initial)</td>
<td>PAIRED t-Test</td>
</tr>
<tr>
<td>Hypertensive control VP (n=19)</td>
<td>VP</td>
<td>79.58 ± 4.93</td>
<td>t=2.167 p&lt;0.05 (S)</td>
</tr>
<tr>
<td></td>
<td>VK</td>
<td>81.14 ± 7.65</td>
<td>t=1.509 p&gt;0.05 (NS)</td>
</tr>
<tr>
<td></td>
<td>PK</td>
<td>81.25 ± 8.07</td>
<td>t=1.446 p&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Hypertensive exercise VP (n=28)</td>
<td>VP</td>
<td>78.71 ± 3.49</td>
<td>t=5.274 p&lt;0.001 (HS)</td>
</tr>
<tr>
<td></td>
<td>VK</td>
<td>80.27 ± 11.95</td>
<td>t=3.784 p&lt;0.001 (HS)</td>
</tr>
<tr>
<td></td>
<td>PK</td>
<td>78.67 ± 3.93</td>
<td>t=3.796 p&lt;0.002 (S)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Prakṛti</th>
<th>Respiratory Rate (/ minute) Mean ±SD</th>
<th>Intragroup Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BT (Initial)</td>
<td>PAIRED t-Test</td>
</tr>
<tr>
<td>Hypertensive control VP (n=18)</td>
<td>VP</td>
<td>23.72 ± 3.56</td>
<td>t=1.047 p&lt;0.05 (NS)</td>
</tr>
<tr>
<td></td>
<td>VK</td>
<td>22.86 ± 4.29</td>
<td>t=1.754 p&lt;0.05 (NS)</td>
</tr>
<tr>
<td></td>
<td>PK</td>
<td>26.28 ± 4.82</td>
<td>t=0.849 p&lt;0.05 (NS)</td>
</tr>
<tr>
<td>Hypertensive exercise VP (n=29)</td>
<td>VP</td>
<td>24.93 ± 3.82</td>
<td>t=5.506 p&lt;0.001 (HS)</td>
</tr>
</tbody>
</table>
**HOW WALKING IS SUPPORTIVE IN PREVENTION OF HYPERTENSION AS PER PRAKRĪTI**

<table>
<thead>
<tr>
<th></th>
<th>SBP (mm Hg)</th>
<th>DBP (mm Hg)</th>
<th>t-test Value</th>
<th>p-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>VK (n=15)</td>
<td>24.47±3.44</td>
<td>21.00±2.59</td>
<td>t=9.903</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>PK (n=6)</td>
<td>22.17±2.56</td>
<td>20.20±2.19</td>
<td>t=2.872</td>
<td>p&lt;0.05</td>
</tr>
</tbody>
</table>

**Discussion**

Walking is one of the safest and simplest exercises for hypertensive patients of all age groups. Combinations of walking, jogging and bicycling have been shown to be effective in managing hypertension, but there are inherent risks associated with strenuous exercises like jogging and bicycling. Furthermore, as most hypertensive patients tend to be overweight, jogging may not be an easy exercise for them. The positive effect of brisk walking on hypertension has been demonstrated in postmenopausal women. Hypertension is the common psychosomatic disorder. In present time due to stress, deskbound life style psychosomatic diseases are very common which affect mind follows the body. According to some previous studies hypertension was defined as an average systolic BP (SBP)≥140 mm Hg, an average diastolic BP (DBP)≥90 mm Hg, and/or self-reported current treatment for hypertension with antihypertensive medication.

Hypertension is a psychosomatic hemodynamic disease with a multifactorial pathology and etiology related to quite a lot of dietary, environmental and genetic factors. An observant exploration on Ayurvedic standpoint of hypertension is an ‘Avṛittavāta vyādhi’. The Duṣyās are rasa Dhātu with its mala Kapha, Sira, Mutra and Sweda. High normal blood pressure individuals were also considered in our study group suggests that a statistically highly significant (p<0.001) decrease in SBP was observed in VP Prakṛti of HTNE group and increase level was noted in non exercise invention group i.e. HTNC. It was similarly correct for VK individuals in HTNE group. PK Prakṛti individuals showed statistically significant (p<0.05) decrease in SBP. While in present study maximum numbers of essential hypertension cases were VP individual followed by VK Prakṛti individuals. This can be interpreted on the basis of fundamental principles, since Vāta and Pitta doṣa are mainly responsible for the essential hypertension and Vāta Prakṛti individuals are very reactive to any kind of stimuli. VK Prakṛti individuals have greater degree of raja Doṣa property than Kapha doṣa. So the individuals are more reactive to any kind of stimuli and prone to develop the chronic stress leading to different kind of psychosomatic disorders. On the basis of these findings we concluded that walking interventions are very useful in hypertension treatment in all. In this study maximum number of individuals belonged to VP Prakṛti. They were very responsive for any sort of diseases. The rationale for this could be that Pitta is responsible for intelligence and Vāta is responsible for initiation and enthusiasm. As suggested by the table no. 1 maximum number of individuals belonged to VP Prakṛti followed by PK and minimum number of VK individuals were present in our study. VP individuals showed the highly significant change in most of the groups. Whereas observed that instantly after isotonic test the diastolic blood pressure attained significantly higher values in VP and PK individuals in comparison to VK individuals. Furthermore, diastolic BP recorded after 7 minutes of completion of isotonic exercise remained significantly lower in VK individuals in comparison to VP and PK individuals. VP Prakṛti in HTNE, group VK Prakṛti in HTNE group, PK Prakṛti in HLE group showed statistically highly significant (p<0.001) decrease in mean Diastolic blood pressure after walking (isotonic exercise). The conclusion that can be presumed from these observations is that probably the vasodilatation is more significant in those individuals belonging to VP group. Accumulation of large amount of metabolites in Pitta Prakṛti individuals due to enzymatic reaction causes dilatation of blood vessel resulting decreased diastolic blood pressure. Another conclusion can be drawn from this result thatVyān Vāyu dilate the blood vessel more prominently due to this reason diastolic blood pressure reduced.
in case of VP individuals. Pulse is in fact heart rate, or the number of times ones heart beats in one minute. Pulse rates vary from person to person. Pulse is lower when individuals are at rest and increases when exercise (because more oxygen-rich blood is needed by the body when an individual exercise. The pulse rate used to check overall heart health and fitness level. Generally lower is better, but bradycardia can be dangerous. Symptoms of a dangerously slow heartbeat include weakness, loss of energy and fainting. On intra group comparison after first follow up, Table no. 3 suggested that the individuals with VP Prakṛiti in HTNE, VK Prakṛiti in HTNE group showed statistically highly significant (p<0.001) decrease in mean Pulse Rate after walking (isotonic exercise). Statistically significant (p<0.05) result was observed in VP Prakṛiti individuals in HTNC and PK in HTNE. This type of studies could not find till now.

As activity level decreases, vasopressin agents that increase heart rate are decreased in a reverse feedback loop of blood pressure homeostasis. Also, the heart rate partly depends on Starling’s law, which indicates that the more volume of blood enters the heart, the more will be pumped out. With a lower blood return after exercise, the heart will respond by beating both more slowly and also with less force per beat other study had shown the decrease sympathetic stress after exercise interventions causes decrease in pulse rate. Table no. 3 suggested that the individuals with VP Prakṛiti in HTNE, VK Prakṛiti in HTNE group showed statistically highly significant (p<0.001) decrease in mean Pulse Rate after walking (isotonic exercise). Statistically significant (p<0.05) result was observed in VP Prakṛiti individuals in HTNC, PK in HTNE group. This type of studies could not find till now.

Aerobic exercise increases oxygen consumption and improve functioning of the cardiovascular and respiratory systems. Maximum breathing capacity is about 50% greater than actual pulmonary ventilation during maximum exercise. 

As per Table no. 3, VP Prakṛiti in HTNE group, VK Prakṛiti in HTNE group showed statistically highly significant (p<0.001) decrease in mean respiratory rate after walking (isotonic exercise). From the above information we can wind up that VK Prakṛiti individuals show the significant changes in Respiratory rate in HTNE. Whereas significant increase was observed in control group but this increase was within normal limits therefore having no clinical significance. Tripathi Piyush et al (2009) also reported that respiratory rate was not significantly changed as per Prakṛiti.

Conclusion

The present work comprised a study of 84 cases. Out of these, 55 were male, 29 females patients were hypertensive. In this research work, maximum number of cases (57.14%) belonged to Vātaj –piitaj (VP) Prakṛiti and minimum number of cases (26.19%) belonged to Vātaj-Kaphaj Prakṛiti. Incidence of male patients was high in current study. Decreased in blood pressure, Respiratory Rate and Pulse Rate was observed in all three Prakṛiti in Hypertensive exercise groups after 3 months of walking but these changes were within normal limits.

REFERENCES

How Walking is Supportive in Prevention of Hypertension as per Prakṛti

CONCEPTUAL STUDY OF VATA-DOSHA- “THE CONTROLLER OF BODY”

NARENDRA SHANKER TRIPATHI*

Declaration

The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, Narendra Shanker Tripathi the author of the research paper entitled CONCEPTUAL STUDY OF VATA-DOSHA- “THE CONTROLLER OF BODY” declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal, This research paper is my original work and no part of it or it’s similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract

Vata itself is invisible only their functions are visible in the body. Vata act in all the directions. It controls on Pitta & Kapha also. The function of vata dosha are mainly qualitative and functional in nature. Sense of touch originates from vata. vata, very closely resembles with nerve impulse traveled through nerve fiber or entire nervous system. Nerve impulse is a self propagated disturbance in the nerve fiber. It is a electrical phenomenon which is fast travelling in nature in the neuron/nervous system. Neurons & nervous system act as the media for the conduction of impulse. They are Just like electrical wire which act as the media for the conduction of electricity.

Key words: Vata, Tridosha, Ayurveda

Ayurveda is science of life. It deals not only with body but also with Aatma(soul), manas (psyche) which are necessary for maintenance of physiological activity of the human body. Like any other substance in the universe, our body is also derived from five bhutas (Panch-Mahabhoot) along with Soul / Atma / Chetna.

Tridosha

The literal meaning of the word Tridosha is that which can cause abnormality /decay/ destruction, after their vitiation due to their unfavorable /abnormal condition. But doshas are not only responsible for abnormal condition but they maintain the normal functioning in our body Doshas can be defined as substances found in our body which are responsible for:

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1. Maintenance of physiological condition (health) in a healthy individual.

2. After their vitiation or in aggravated condition they can cause abnormality by polluting the tissue (Dhatu and Malas) of our body.

3. They are also responsible for the formation or determination of prakriti (personality) which remains unchanged through life.

Doshas are two type, sharirik (physical,- vata, pitta, and kapha) and mansik (mental,-sattva, raja, and tama). Pitta and Kapha are non movable itself they are mobilized and regulated by vata.

Physiological maintenance in the body is done by Tridosha (Trio) - Vata, Pitta & Kapha, also known as Tridosha. These are the 3 main entities on which whole foundation of Ayurveda stands. These are also known as doctrine of Tridosha. Without proper knowledge about this trio, neither maintenance of health in a healthy individual is possible nor is successful treatment/management of disease in a diseased person possible. Out of these trios vata has dominating / leading property.

Vata

The term Vata, is derived from the root “Va Gati Gandhanyo” i.e. to move, to enthuse, to make known and to become aware of; Induction, effort, and to enlighten. It is seen from Charaka-Samhita that the Sharira-Vata (biological Vata) is Asanghata (incorporeal) and Anavasthita (unstable).

Vata is that primal constituent of the living boy structure of which is Akash and Vayu, and function is Rajasic, it is concerned with the production of those somatic and psychic processes which are predominantly Rajasic or dynamic in nature, hence, the presence of Vata is to be inferred in such mental phenomenon as the exhibition of enthusiasm, concentration etc. It upholds all the supporting constituents and their due circulation throughout the body.

Vata is of five types

1. Pran Vayu : The type of vata which helps to take in the useful elements from nature (like air, food and water) is known as Prana. This is also energy on which the life is dependant. They are mainly located head, chest, mouth, tongue, nose, heart, mind, and brain. They are responsible for maintenance of physiological activity of respiratory system, deglutition, and spitting, sneezing, and belching process of the body. It is also responsible for buddhi (intelligence) he can correlate with nervous control (i.e. nerves, plexuses, tracts of these relevant organs specially lungs, heart, mouth, nose, esophagus and there controlling centers located in the brain.

2. Udan Vayu : Responsible for sound production the nervous control of the throat, larynx, neck, nose, pharynx, main function of udan vayu is speech production vak pravriti (speech) we are going to discuss speech activity in detail in another chapter, Prayatna (efforts) activity to achieve something, Urja (energy) and bala (strength) both these are required for activity, Varna (color of skin) normal color are fair, dusty, black, and in between fair and dusty, Smriti (memory) to reproduce stored knowledge, in the brain.

3. Vyana Vayu : The main site is heart but the hole body is its activity area. The main function of this vayu is control of heart and there activity maintenance of cardiac output, Sweating (sweda sravan) circulation of fluid in the body. The nervous, plexuses, along with their tract which controlled these function can be co related with vyana vayu.

4. Samana Vayu : Samana has been defined as “ samana nayanat samba”. Sama means balanced, there by keeping balanced state of body is a main function of saman vayu. The main site is Koshtha. According to charaka it is svedavaha, ambuvaha and doshavaha srotas. Sushruta has mentioned its site near agni, stomach and large intestine, while vagbhata has mentioned all above and near shukra and artava.
5. **Apana Vayu:** Apana vayu is located in the lower part of abdomen. The Vayu, which controls the activity (i.e. urination, defecation, ejaculation, ovulation etc.) in the apana region (mainly lower abdomen area) is called as Apana vayu. Apan vayu has the control on organs around umbilicus and in pelvic region, urinary bladder, genitals, colon, rectum and thigh. Controlled expulsion of semen, menstrual discharge, faeces, urine, flatus and fetus are the main function of apan vayu.

6. **Properties Of Normal Vata:** The Rukshata (roughness), Sheetata (coolness), Laghuta (lightness), Vishadata (non sliminess), Gati (movement), Amurtata (invisibility), unstability, these are the inherent qualities of Vata. 

**Function’s Of Normal Vata**

According to Charaka, Vata in its normal state is responsible for all activities of body. Vata in fact constitutes the life of living beings. When in morbid state it causes disease and death.

Charaka, further states that when Vata is in its normal state, it reflects itself in the form of Utsaha (enthusiasm), Uchchhawasa (inspiration), Niswasa (expiration), Cheshtha (all the activities or movements), normal metabolic transformation of Dhatus and proper elimination of Malas. According to Vagbhata, Vata in its normal state is said to govern Utsaha (enthusiasm), Uchchhawasa (expiration), Niswasa (inspiration), all Cheshthas (motor activities of the body-mental, vocal and physical), the regulation of natural Vegas (Urges-Vegas or spino-cerebral reflexes) which can be violently inhibited or provoked, the regulation of proper circulation and function of the seven fold Dhatus, or tissue elements, and also the function of the sensory organs.

Vata is also responsible for changes in motion and potential changes in SUKSHMA (microscopic), all the constituents of body. It stimulates the Agni and absorbs the Doshas. Vata exists in five forms viz. Prana, Udana Samana, Vyana and Apana. It is the user of all the senses and the carrier to the mind of all sense-impressions. It holds together the various elements of the body in their proper forms and maintains the cohesive unity of the body as a whole. It brings about speech, it is the basis of sound and touch, as well as the root matter of the organs of hearing and touch. It is the origin of joy and enthusiasm and the stimulator of Agni. It is the cause of the Doshas getting dried up and the Malas-waste products-being thrown out of the body, it is the cause of division in all vessels of the body-both Sukshma and Sthula. It is the cause which makes embryo in the womb to take particular forms, and it stands as an evidence of the existence of life.

The Vata, which is of five fold nature viz. Prana, Udana, Samana, Vyana and Apana, by the unimpeded movement of each of these, in their normal regions, regulates the functions of the entire body.

In spite of the above, Vata also performs all mental functions, sensory functions, lung functions, heart functions, circulation, swallowing, splitting, sneezing and eructation etc.

**Function Of Vitiated Vata**

The corporeal Vata when aggravated moves from one part of the body to the other parts. They are Sransa (looseness), Bhramsha (dislocation), Vyasa (expansion), Sang (obstruction-Mala Mutradi), Bheda (separation), Sada (depression), Harsha (excitation). Tarsha (thirst), Kampa (trembling), Varta (circular movement), Chala (motion), Toda (piercing pain), Vyatha (aching pain), Cheshtha and Khara (coarseness), Parusha (harshness), Vishada (sad), Sushira (porousness), Arunvarna (reddishness), Kashaya Ras (astringent taste), Virasa (tastelessness in mouth), Mukhashosha (dryness of mouth), Shoola (pain in body or parts of body), Supti (numbness), Sankocha (contraction), Stambha (stiffness), Khanjata (lameness), etc. are the actions of vitiated Vata. Any disease with these symptoms produced will be considered as a Vata-Vikara.

Charaka has described endogenous diseases of two types.
(1) Samanyaja (general type) : Disease caused by the combination of two or more Doshas.
(2) Nanatmaja (specific type) : Diseases caused by only one of the Dosha without being combined with any Dosha.

Charaka has mentioned that diseases caused by Vata are of eighty types, those of Pitta are forty types and those of Kapha are of twenty types.

We can say that nerve impulse is a nervous, metabolic living event or a chemical reactions-sequence propagated along a nerve fiber and nervous system. Vata is very closely resembles with nervous impulse travelled through nervous system.

Conclusion
Dosha are the substances responsible for Maintenance of health in healthy individual by maintaining physiological activities in healthy individuals. Due to their vitiation by their own factors, can cause abnormality in the functioning of different body organs by polluting tissue. They are also responsible for formation/determination personality of an individual. Vata is dominating dosha which is mainly responsible for movement all the functions i.e. that is movement (physical) or metabolic conversion are regulated vata i.e. approximately similar to neural nervous control.

REFERENCES
1. Susurut Samhita - 21/5 Introduction to Kaya Chikitsa C. Dwarkanath, p-111
2. Introduction to Kaya Chikitsa C. Dwarkanath, p-24
3. Charak Samhita Sutra - 20/12
4. Charak Samhita Sutra - 17/118
5. Charak Samhita Sutra – 18/49
6. Astang Hridaya Sutra - 11/1
8. Charak Samhita, Chikitsa - 28/5
9. Charak Samhita, Sutra – 20/12
11. MADHAV NIDAN, Aam-vata Nidan 25/1-5
12. Concept of formation of prakriti in Ayurveda by Dr. N.S. Tripathi, 4 july-Aug 2011, Anvikshiki Vol.5.
INFANT AND YOUNG CHILD FEEDING PRACTICES PREVALENT IN RURAL COMMUNITY OF VARANASI DISTRICT: A QUALITATIVE ASSESSMENT.

FAHMINA ANWAR*, Ratan.K.SRIVASTAVA**, Manushi SRIVASTAVA*** AND S.P.SINGH****

Abstract
Introduction: Infant and young child feeding is critical for child health and survival. WHO and UNICEF recommend that infants be exclusively breastfed and thereafter receive adequate complementary foods in addition to continued breastfeeding.

Objective: 1. to assess the Infant and young child feeding related knowledge and practices among child bearing women. 2. To identify existing socio-cultural factors influencing the infant and young child feeding practices.

Study Design: The study consisted of using qualitative methodology of Focused Group Discussion (FGD) to assess the Infant and young child feeding related knowledge and practices. The study was carried out in two villages i.e. Narayanpur and Baryasanpur of chairigaon block of Varanasi district. A total four FGDs with 38 respondents (mothers of 0-6months and 7-36 months children) were carried out at suitable public and private place. Study Instrument was facilitator’s check list and FGD was analysed by the method of manual thematic content analysis.

Results: There were gaps in knowledge about optimal infant and young child feeding practices and even where the knowledge existed; there was gap between the optimum practices with regards to infant feeding practices at community level. Few external and systematic challenges recorded in the study and the same can be used to improve behaviours of mothers.

Conclusion and recommendation: Most of the factors identified are modifiable. A comprehensive multipronged approach is required to reduce mortality in children.

Key words: Infant and young child feeding, Breastfeeding, Complementary feeding, Qualitative research methods, focus group discussion.

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Breast feeding improves infants and maternal health and cognitive development, and it is the single most important preventive approach for saving children’s lives. The Lancet series on child survival identified breastfeeding interventions to have the potential to prevent 13% of all under-5 deaths in developing areas of the world, ranking it as the most important preventive approach for saving children’s lives. Exclusive breastfeeding, that is, administering only breast milk and no other liquids or foods (WHO 2004) for the first 6 months of life confers important benefits to the infant and the mother, it protects infants against many common childhood diseases, including repeated gastrointestinal infections and pneumonia, and thereby against some of the major causes of childhood mortality.

WHO and UNICEF recommend that infants be exclusively breastfed for the first 6 months of life and thereafter receive adequate complementary foods in addition to continued breastfeeding until 2 years of age or beyond.

Results from 42 efficacy trials and effectiveness studies on complementary feeding interventions were recently compiled. They indicated that there is no single universal “best” package of interventions to improve complementary feeding because both the needs of and the options for accessing appropriate foods in the target population vary greatly.

Comparative international data shows that rates of breastfeeding are related to socio-cultural factors. With regard to complementary feeding, an additional 6% child death can be prevented with appropriate complementary feeding. A meta-analysis of complementary feeding strategies and linear growth showed that educational strategies alone are of most benefit in populations that have sufficient means to procure appropriate food, whereas in populations without this security, educational interventions are of benefit when combined with food supplements. It further concludes that improvement of complementary feeding through strategies such as counselling about nutrition for food secure populations and nutrition counselling, food supplements, conditional cash transfers, or a combination of these, in food-insecure populations could substantially reduce stunting and related burden of disease.

This study describes the results of a qualitative assessment conducted in rural communities in Charigaon block, Varanasi to understand the current practices and identify the gaps between the scientific evidences and prevailing practices of infant and young child feeding (IYCF).

Objectives
1. To assess the Infant and young child feeding related knowledge and practices among child bearing women.
2. To identify existing socio-cultural factors influencing the infant and young child feeding practices.

Methods
The present assessment and analysis was carried out in two villages of Charigaon block of Varanasi district in the state of Uttar Pradesh, India, over a period of 4 months i.e. from November 2010 to February 2011. The block has a total population of 2.5 lakh, of which vast majority lives in rural areas. With in the rural area of Charigaon block, Narayanpur and Baryasanpur villages (total population of 8,251) were purposively selected as these villages are under the auspices of department of community medicine, Institute of Medical Sciences, Banaras Hindu University for field training of undergraduate and postgraduate medical and paramedical students and have a good rapport to solicit cooperation from the community. Socio demographic characteristic of both villages are similar.
**Study design**

The study consisted of using qualitative methodology; Focused Group Discussion (FGD) to assess the Infant and young child feeding related knowledge and practices among primary care givers (mothers) of children aged 0-36 months of age. FGD was conducted at suitable public/private places. Health worker at village health facilities served as contact persons to identify and mobilize study subjects. To elicit information from across the community, every effort was made to include participants from all section of society. Two Focus group discussions were held amongst primary caregivers (mothers) of children under 6 months of age and other two FGDs for primary care givers (mothers) of children 7-36 months of age. From each age group one FGD was held in each village. A summary of participants and their educational status is shown in Table 1(a) and 1(b).

**1(a) Village wise distribution of number of study participant in each group**

<table>
<thead>
<tr>
<th>Participants</th>
<th>Narayanpur</th>
<th>Baryasanpur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother child pair 0-6 month</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Mother child pair 7-36 month</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

**1(b) Educational status of study subjects**

<table>
<thead>
<tr>
<th>Education</th>
<th>No. Of participants</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>2</td>
<td>5.2</td>
</tr>
<tr>
<td>&lt; 5 standard</td>
<td>16</td>
<td>42.2</td>
</tr>
<tr>
<td>5- 8 standard</td>
<td>18</td>
<td>47.4</td>
</tr>
<tr>
<td>High school</td>
<td>2</td>
<td>5.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>38</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The respondents were informed by the health worker and the researcher seven days in advance of the conduction of FGDs, and a repeat activity for mobilization of respondents was again carried out two days before the scheduled date of the FGD.

**Conduction of the FGDs**

The number of participant in each FGD ranged from 8 to 12 (table 1a). Two major themes were discussed 1. Breast feeding and 2. Complementary feeding. Issues related to the responsive feeding, food hygiene, and feeding of sick child were also covered with these two themes.

The FGDs were conducted with the help of two checklists. The check-list was separate for mothers of 0-6 months and 7-36 months children. It was conducted in local language and was assisted by two note takers. Each FDG session lasted from 45 minutes to one hour and was video and audio recorded. The moderator and the note taker transcribed their notes in local language separately. On the basis of these transcripts, final version was prepared and subsequently translated to English by the researcher with the support of audio and video recording for the purpose of manual thematic content analysis.

Data analysis was done of the two themes within the broad rubric of knowledge, perception and practices regarding Breast feeding and young child feeding.

**Results**

*Breastfeeding Practices (Mothers Of 0-6 Months)*

Almost all respondents reported that breast feeding was practiced in community; however there was deficit in mother’s knowledge about ideal breastfeeding practices, as well as gap between knowledge and Practice.
Breast feeding was initiated within half to one hour among 31.3% respondents, 25% started breastfeeding after one day as advised by their mother-in-laws and relatives. Some (12.5%) said after 5-6 hours as they were waiting for a relative to come and feed the baby first as per cultural belief prevalent in the community.

One mother of 0-6 month old infant stated “I started breastfeeding of the baby after 2 days as child was delivered via caesarean section, till then child was on cow’s milk and water”.

Belief regarding giving colostrums was fairly consistent among all respondent with 62.5% saying that they gave colostrums and knew that it is highly nutritious for children. Few (12.5%) of respondent said they gave Pre-lacteal feed because they were told to give it by their mother-in-law.

One mother of 0-6 month old infant stated “colostrum is dirty milk which should not be given to child, this was informed by her my Mother-in-law, but now we understand that it is like AMRIT.”

When probed about who assisted/trained/counselling them to breastfeed the child, 37.5% of respondents told that health worker (ANM, ASHA) taught them about the breast feeding of their child. One-third of them (37.5%) said their mother and mother-in-law informed about the same, 12.5% said they learned by themselves to feed the child. One respondent learned to breast feed from magazine, Television and radio.

Respondents gave varied response when asked about Exclusive Breastfeeding. A common practice reported across communities was giving herbal infusion in water; both to prevent and treat illness, since birth onward.

Statement of a mother of 0-6 months old infant “I give cow’s milk and water other than breast milk because my child cries, her stomach is not filled and mother’s milk is not sufficient.”

Only (6.2%) of respondent said they exclusively breastfeed the child. There was a consensus among respondents about giving water and cow’s milk to the baby as mother’s milk is not sufficient for the child. Another (12.5%) respondent said they give thin pulse or rice water also to baby after four months of age.

Half of the mothers used to feed the child at night also. Whereas 12.5% of respondents said they feed the child at night whenever child cries.

There was a consensus about breast milk not being enough for baby and mother cannot produces enough milk to fulfil the nutritional demand of growing baby, so supplementation in the form of other liquids like thin gruels, cow’s milk, cereal water in little quantities seemed necessary for mother to feed the child. Further, a crying infant or an infant who did not sleep at night were mentioned as strong reasons for introducing other milk (cow, goat & powder milk) as early as 1 month even.

When respondents were asked for intake of any special diet/nutrition during lactation, there was wide gap between knowledge and Practices as approximately one fourth, said they should eat more but due to work load they often forget or intake of food is skipped from their mind. Few respondents (18.7%) said that they preferred to take milk, curd, egg but not on regular basis. They took it only when it was available at home.

On mother of 0-6 month old infant stated: — “If we drink cows or buffaloes milk then our milk becomes thick.”

Cessation of the Breast feeding seemed to be at the discretion of mother and family members. Reasons for cessation included prolong separation between working mother (going outside from home) and child, the illness of mother, the mother willing to stop breastfeeding or child reaching at appropriate age. However 31.5% of respondents expressed that they should breastfeed the child till the child feeds willingly. Though other 37.5% said they should breastfeed the child till two years.

Babies were generally fed “Normally” during and after illness across communities, unless mothers are directed by health worker or influencers (Mother in law) in the household.

Discussion also centred on what should be done and what they do when their child suffers from diarrhoea. Less than half (43.7%) of the respondents said that first the child is treated at home by mother in-law and if child does not recovers then they go to nearby doctor. Whereas only one-fourth (25%) of respondent said they take their child to nearby health facility for treatment of diarrhoea. Only two (12.5%) mothers were aware
of ORS, and said it should be given during diarrhoea, though few were aware that it is available at the Public health center (PHC).

Statement of one mother of 0-6 months old infant: —— “when child is sick first we give home remedy advised by mother in-law, if child does not recover then we take her to the hospital.”

Complementary feeding (Mothers of 7-36 months old child)

There was in general a belief that breast milk neither has sufficient water nor sustenance for babies, especially after three months onward. There were variation among responses even within communities, several respondents reported that they started complementary food from 8 months onwards, though they start fluids or liquids from third or fourth month itself.

In responses to the timing to introduce other liquids and foods (complementary food) to babies, one-fourth of the respondents (25%) said after 9 months, another 25% of respondents said after 8 months. However 37.5% said that during first six months they gave breast milk and cow’s milk and then introduce semi-solid foods. Few (12.5%) said that one year child should have breast milk, cow’s milk and water mixed with sugar in it.

Statement of one mother of 7-36 months old child “I started feeding the baby with thin semi solid food along with breast milk and cow’s milk from 6 month.”

Mothers generally informed that they feed their child on demand, when further probed about how many times they feed the child, 31.2% of the respondents said whenever child cries then they feed the child. One fourth (25%) of the respondent said when whole family eats child eats along with them and have mother’s milk throughout the day. Two (12.5%) mothers said whenever and whatever they eat they give (little) to the child.

One mother of 7-36 months old child stated that “Whenever child does latrine, after that we surely feed the child. (Whole discussion group busted into laughter)”

When respondents were probed about diversity of food items in complementary food of their child, there was a mutual consensus among the respondents that whatever being cooked in house like pulses, rice, vegetables etc. was given to child, and sometimes banana was also given to child. Though Few (12.5%) of the respondents said they give pulses, rice, chapattis, egg, banana and other fruits to the child. One-fourth (25%) of the respondents said that for first year thin gruels like rice water and pulse water is given to child as child cannot digest other foods. After one year, whatever is cooked at home child eats or licks that food.

Respondents were further probed about consistency of food and whether they should add oil or sugar to it to make it energy dense, there was a consensus among the respondents about the food, that it should be thin as child cannot digest thick food. Half (50%) of respondents believed that oils are not digested by children, therefore it should not be added or included in their diets. While few (12.5%) of respondents were in assumption that oil can’t be digested by the child so is harmful for them.

Mother’s responses indicate that traditional belief and ability to reach women with effective messages are as significant as economic barrier to improving infant and young child feeding practices.

There was no agreement among respondents on whether child should eat with family or mother should feed the child. When asked about child feeding, 37.5% of the respondents reported that they (mother) feed the child whereas 12.5% said that their mother in-law should feed the child. Few (18.7%) of the respondents reported that their child eats by themselves with other children of the family. It was also obvious from the discussion that mother do not prepare any special food for the child and child is given family food in whatever amount he/she can eat or take.

Respondents indicated a general awareness about the importance of good hygiene in the preparation of food and before feeding children to prevent illness.
Statement of mother of 7-36 months old child: “I wash the bowl and my hands before feeding the baby.”

Though (12.5%) of the respondents said they often forget to wash hands before feeding the child due to work.

Babies were generally fed “normally” during and after illness across communities, unless caregivers (mothers) were otherwise directed by health worker or influencers in the house hold. When respondents were probed about feeding practices during illness of child, one fourth (25%) of them said that they give food in less quantity along with medicine and also thin food in consistency, whereas a small number (6.25%) said that they would stop giving food if the child vomits.

On mother of 7-36 months old child stated: “I give baby breast milk only, but if baby vomits I stop giving breast milk.”

Discussion

This study provides qualitative information of infant and young child feeding practices of child bearing women belonging to two villages of Chiraigaon block in Varanasi district.

Knowledge and reported practices on the issue of initiation of breastfeeding after delivery was different among respondents. Mothers reported delay of one to two-days in the initiation of breast feeding. Low rate of post-natal breastfeeding counselling regarding positioning and attachment of child to breast and also lack of baby friendly hospitals in the study area could have lead to persistence of such practices where appropriate intervention through education may improve the status. A report of South Asian countries reveal that in India only 24% of mothers initiate breastfeeding within one hour which is very low. Respondents stated that use of colostrums is increasing which could be due to the efforts of “Accredited Social Health Activist” (ASHA) as these worker focuses on essential newborn care promoting timely initiation and exclusive breastfeeding through home visits in the first month of life.

There was a significant difference between knowledge and reported practice of exclusive breastfeeding across the communities. Practices of exclusive breast feeding was uncommon as there was a general belief that breast milk has neither sufficient water nor sustenance for babies, especially for the babies of age three months and above. This is in line with the report of Breast feeding promotion network of India 2010 which reports the fall of exclusive breastfeeding from 69% at 2month to 27.6% at six months. Therefore efforts are required at least to maintain the exclusive breast feeding till 6 months of age. And slowly this may lead to the achievement of the goal of 100% exclusive breast feeding till the age of 6 months. Mothers in Chiraigaon villages reported that they often gave traditional herbs like asafoetida in water or milk of babies to drink from the first month onward while thin gruels were introduced from as early as third months to babies.

During FGD, it was observed that mothers did not interpret or considered Liquids and watery gruels given to their infants as “food” instead they regarded it into a different category. They explained that the “food” meant more solid foods that are harder to chew and swallow. This finding would be very important and must be utilised during the development of effective messages viz. when to introduce any liquid or food besides breast milk to babies?

There was also little consistency around how many times in a day children should be fed, whether they are fed the same food or different food from adults, whether they are fed with adults or separately. We felt the need for active and responsive feeding for children as there was no awareness about this. Though basic awareness of importance of hygiene and sanitation for good health of children was wide spread. However, without direct observation it is difficult to comment on their actual practices which are going on around hygiene, food safety, and sanitation.

Respondents’ personal tastes, liking and their economic ability were found to be important determinants of what children should eat, rather than choosing food to ensure a balanced diet.
The findings of this study have clearly shown that there is an important gap in knowledge about optimal infant and young child feeding practices. However, a large gap exists between the knowledge and ideal practice with regards to infant and child feeding. There are external and systematic challenges to improving behaviours, but with well trained and motivated health workers, as well as coordinated and targeted messaging in communities to caregivers especially mothers, a great deal of progress can be made towards optimal infant feeding practices for improved health of children under 3 years of age.

Interest of conflict: The authors declare that they have no competing interests.

Acknowledgement
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REFERENCES
BLOOD VISCOSITY IN DIABETIC RETINOPATHY: PHYSIOCHEMICAL CHARACTERISTICS

AJAY KUMAR MISHRA*

Declaration
The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, Ajay Kumar Mishra the author of the research paper entitled BLOOD VISCOSITY IN DIABETIC RETINOPATHY: PHYSIOCHEMICAL CHARACTERISTICS declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal. This research paper is my original work and no part of it or its similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract
The viscosity of blood is considered an important factor in genesis of diabetic retinopathy since it determines the peripheral resistance to blood flow through the micro circulation. A rise of blood viscosity is considered to increase the resistance to blood flow in the capillaries contributing to fluid transfer and could explain onset of exudates and haemorrhages in the retina in diabetics.

Introduction
Blood is a wonderful and complex substance containing many functions. It constantly changes and adopts to meet the body requirements. Viscosity is described as fluid’s internal resistance to flow and may be thought of as a fluid friction in flow of fluid. Healthy blood varies in viscosity as it flows normally and become much “thinner” by the time it reaches the capillaries. It can even change viscosity locally at a given point in order to pass through a constriction. Early investigators conceptualized blood as a viscous fluid, assuming that the viscosity controls its flow properties 1. Major shift in the viscosity has been found to be associated with many pathologies such as myocardial infarction, peripheral vascular disease cancer and diabetes mellitus with or without its complications 2.

Diabetes mellitus still remains one of the most perplexing problems of clinical medicine. It is a complex syndrome characterized by a lack of insulin secretion and/or increased cellular resistance to insulin resulting in

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persistent hyperglycemia with or without glucosuria, which result from a derangement in the mechanism blood sugar homeostasis. The prevalence of diabetic retinopathy is strongly related to the duration of diabetes, nearly in all patients with type-1 (IDDM) and more than 60% of the patient with type-2 (NIDDM) diabetes have some degree of retinopathy. As the prevalence of diabetes and life expectancy are increasing, incidence of blindness due to diabetes has increased from 4.3% in 1940 to 18.4% in 1962.

Retinopathy accounts for at least 80% of blindness in diabetics. In United States, diabetes is one of the three leading cause of blindness and is the second leading cause of new adult blindness. In our country diabetes mellitus is as common as in other part of world. Pilot survey carried out by the Diabetic association of India showed prevalence rate varying from 1% in general populations to 7% in office going adults. In its pathogenesis duration of diabetes, uncontrolled diabetic state, aberration of plasma lipid levels, adrenocortical hyperfunction, increase in serum concentration of protein bound carbohydrates etc. have been implicated. Recently “blood viscosity” has been implicated in the association of many diseases. There are few reviews on the role of blood viscosity in the aetiology of diabetic retinopathy.

Objectives of the study

This study was designed to observe:
⇒ Whether blood viscosity in the cases of diabetes is different from that of normal healthy controls.
⇒ If viscosity is found to be increased in diabetes as recently reported, whether the increase in viscosity can be attributed to the increase in specific gravity.
⇒ To find out whether any specific cause of increase in viscosity can be concluded from the observations.

Material and Methods

In present study, estimation of blood viscosity has been done on 50 patients of diabetes and 25 controls. Among the 50 diabetic patients, 25 had no evidence of retinopathy while the remaining 25 had features of diabetic retinopathy. These cases were selected from outdoor and indoor of IMS hospital, BHU, Varanasi. These patients were randomly selected among diabetics referred to the eye clinic for fundus examination and were under treatment with insulin and/or oral hypoglycaemic agents. The metabolic control was adequate for all patients (postprandial blood glucose level below 199 mg/dl)

Exclusion criteria

(a) Patients affected by systemic hypertension or thromboembolic disease.
(b) Patients under treatment with anticoagulant drug or other therapy.
(c) Patients who had recent surgical operation.
(d) Patients during menstrual cycle.

These Patients were grouped under:
⇒ Group A- Controls
⇒ Group B- Diabetic without retinopathy
⇒ Group C- Diabetic with retinopathy

Group A (Controls): Selected from the patients visiting to ophthalmology department OPD with other ocular complaints e.g. Refractive disorders, Cataract, Squint or Ptosis. Their fasting blood sugar was below 125mg%. These patients did not have any symptoms of weight loss or weakness.

Group B (Diabetic without retinopathy): Only those cases were taken who had diabetes but no diabetic retinal changes. Patients on antidiasabetic therapy having fasting blood sugar below 125 mg% and postprandial below 199 mg%, this means this group includes only controlled cases of Diabetes mellitus.
**Group C (Diabetic with retinopathy):** This group also comprised of patients having Diabetes mellitus but these patients showed a variety of diabetic retinal changes. Criteria for this group also remained the same as for group B. Fundus examination under full mydriasis revealed varying degree of diabetic changes in retina. All the patients under this group were under adequate treatment.

**Investigations**

(A) Biochemical Studies:
⇒ Fasting and postprandial blood sugar was estimated in Centre for Clinical Investigations, University Hospital, BHU

(B) Biophysical studies:
⇒ Blood viscosity by Brookfield LV-II Viscometer.
⇒ Specific gravity.
⇒ Blood osmolality with the help of Fisk 1-10 Osmometer.

**Observations**

<table>
<thead>
<tr>
<th>Duration of Diabetes (years)</th>
<th>(Group B) Diabetic without retinopathy</th>
<th>(Group C) Diabetic with retinopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>&lt;5</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>5-10</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>&gt;10</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

*Comments:* The retinopathy cases has diabetes for significantly longer duration than their counterparts of non-retinopathy cases.

<table>
<thead>
<tr>
<th>Shear rates(sec⁻¹)</th>
<th>Whole Blood Viscosity (cp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.5</td>
<td>6.51±1.23</td>
</tr>
<tr>
<td>45</td>
<td>5.22±1.00</td>
</tr>
<tr>
<td>90</td>
<td>4.07±0.64</td>
</tr>
</tbody>
</table>

**Table 3: Specific gravity, Osmolality and whole blood viscosity at shear rate 22.5 sec⁻¹**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity</td>
<td>1.0713±0.0175</td>
<td>1.1858±0.1238</td>
<td>1.1948±0.1747</td>
</tr>
<tr>
<td>Blood Osmolality (mOsmol)</td>
<td>290.84±3.63</td>
<td>291.96±3.48</td>
<td>289.96±4.31</td>
</tr>
<tr>
<td>Whole Blood viscosity (cP)</td>
<td>6.51±1.23</td>
<td>8.39±1.25</td>
<td>8.53±1.58</td>
</tr>
</tbody>
</table>

**Discussion**
⇒ The present study was done with a total of 50 cases of diabetes, majority of cases were males (66%) with the age varying from 40-70 years.
⇒ Female predominance of incidence of diabetes is well reported but in India data is reversed because women seek medical attention less frequently than male.
⇒ Study shows that with the increase in shear rate blood viscosity decreases.
⇒ Blood viscosity of group B is significantly higher than the group A.
⇒ The rise in blood viscosity in group B cases may be either due to increase in blood hematocrit or blood fibrinogen level.
⇒ Specific gravity of Group B is significantly higher than Group A, this high specific gravity of Group B may be due to increase in either blood hematocrit or blood fibrinogen level.
⇒ Blood osmolality of Group B is not significantly different from Group A suggest group B patients are not under osmotic stress, which also points out that none of the patients have acute conditions because of adequate treatment with antidiabetic drugs.
⇒ Blood viscosity of Group C is significantly higher than Group A and similar to Group B. It has been reported that increase in blood hematocrit is not significant in diabetic retinopathy but rise in blood fibrinogen is significant.
⇒ Specific gravity of Group C is significantly higher than Group A, this high specific gravity may be due to increase in either blood hematocrit or blood fibrinogen level. High hematocrit is not significant in diabetic retinopathy cases therefore in present study high specific gravity may be due to increased fibrinogen level.
⇒ There are few drugs available which decreases blood viscosity and their use in diabetes can be studied in relation to prevention of diabetic retinopathy.

Conclusion
⇒ Diabetes mellitus (DM) is a major medical problem throughout the world. Diabetes causes an array of long-term systemic complications that have considerable impact on the patient as well as society, as the disease typically affects individuals in their most productive years.
⇒ Patients with diabetes often develop ophthalmic complications, such as corneal abnormalities, glaucoma, iris neovascularization, cataracts, and neuropathies. The most common and potentially most blinding of these complications, however, is diabetic retinopathy.
⇒ One of the most important aspects in the management of diabetic retinopathy is patient education.

Acknowledgement
I am grateful to Department of Biophysics, Institute of Medical Sciences, Banaras Hindu University for providing me the facilities to carry out this work for the compilation of my thesis submitted to Banaras Hindu University for award of M.D (Biophysics).

REFERENCES
MANAGEMENT OF DIABETES-A HOLISTIC APPROACH

Shruti Khanna*

Declaration
The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, Shruti Khanna the author of the research paper entitled MANAGEMENT OF DIABETES-A HOLISTIC APPROACH declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal. This research paper is my original work and no part of it or its similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Diabetes mellitus (DM) is a major medical problem throughout the world. Diabetes causes an array of long-term systemic complications that have considerable impact on the patient as well as society, as the disease typically affects individuals in their most productive years. One of the most important aspects in the management of diabetic is patient education. Diabetes is principally a metabolic disorder in which the body is unable to handle its main fuel - glucose. The causative factors of this disease include sedentary habits, physical and mental stress. This disease finds a reference in times even before the birth of Christ, and in the medical treatise Sushruta. Charaka, the great master of Indian Medicine, in his treatise (Circa, 400 BC) observed that Mudhumeha (diabetes mellitus) is produced by alterations in the metabolism of carbohydrates and fats: the statement still holds good. Diabetes can be controlled by a change in diet and lifestyle, and by taking medication and exercising regularly.

Signs of diabetes

- Excessive hunger and thirst
- Frequent urination
- Weight Loss
- Feeling tired and weak
- Itchy skin
- Numbness/tingling in feet
- Delayed wound healing
- Skin infections

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Causes

- Heredity
- Obesity
- Incorrect dietary habits
- Inadequate physical work
- Viral infections
- Effects of hormones
- Side effects of certain drugs
- Psychological factors
- Other Illnesses

Target organs of Diabetes

- Arteries
- Eyes
- Kidney
- Liver
- Pancreas

Guidelines For The Prevention And Management Of Diabetes

Diet Control:

Low glycemic index foods (i.e. foods that are transformed slowly into sugar by digestion) include:

- Green vegetables, rajma (kidney beans), chana (Bengal gram), mung, whole grains, fish, sweet potatoes, yams, corn, low-fat yoghurt and karela (bitter gourd).
- Low glycemic index snacks include: Bajra and jowar khakhras, upma, oats, whole grain bread and bran cereals.
- Low glycemic index fruits include: Apples, papayas, oranges, lemons, pappanus (pomello), grapefruits, guavas, and black jamuns.

Absolutely avoid: Mixing fruits with meals, fruit juices, excessive consumption of proteins and fats (this breaks into sugar if taken in excess and in turn results in diabetes).

Excercise

Light exercise like walking, cycling, jogging, swimming, and tending to the garden/backyard are necessary for a diabetic person. Contraction and expansion of muscles use up a good deal of sugar. This relieves the load on the pancreas. Additionally, accumulated fat is also used in such activities. Consequently, as the body weight decreases, this may itself ameliorate the symptoms of diabetes. Regularity in exercise, however, is of paramount importance. Irregular exercises may harm the body.

Benefits of exercise:

1. Decreased blood sugar during and after exercise
2. Improves insulin sensitivity
3. Improves lipid profile (reduces triglycerides and increases HDL)
4. Improvement in mild to moderate hypertension.
5. Increased energy expenditure leads to increased fat loss, and is an adjunct to a diet for weight loss.
6. Improved sense of well being.
Heal with Yoga and Meditation

The therapeutic aspects of yoga include asanas, meditation, relaxation and breathing techniques and lifestyle changes. Yoga can help prevent and even rehabilitate people suffering from diabetes. Yoga includes muscular stretching (yogasanas), breathing exercises (pranayama), dietary and behavioural restrictions (yama, niyama, pratyahara), mind control (analysis) and relaxation (dharma, dhyana and samadhi). These bring harmony between the body and the mind leading to better physical and mental health. The integrated approach of yoga operates at the physical, mental, emotional, intellectual and spiritual levels, using varied yogic postures, and key principles like rest, forbearance and internal awareness. Yoga has proved to be useful in bringing down the blood glucose level, and in turn, controlling diabetes.

Different asanas are designed to stimulate specific parts/organs of the body. Stress causes an imbalance in the secretion of several hormones, which disturb the body’s metabolism, increasing the complications. The beta cells of the pancreas do not secrete the necessary insulin into the system. In such a situation, yogic relaxation techniques help release the stress on the immune system level and normalize its functioning. Certain yogasanas can also stimulate the pancreas and improve its functions.

Meditation provides deep relaxation, during which fatigue and deep-rooted tensions are released. Meditation is one to the best stress management systems. It works by normalizing stress-induced hormones and the body’s metabolism. Chants combined with sectional breathing techniques (pranayama) such as bhastrika, Kapalabhati and ujjayi help bring emotional stability and control the irritability and negativity that affects the mind.

A yoga programme revitalizes the body’s cells, improves circulation, digestion and respiratory function. It also manages stress, lowers body weight changes lipid levels and brings about a qualitative stable heart rate with reduced blood pressure. A yogic programme involves the practices of shankaprakshalana (complete washing out of the gastrointestinal tract by drinking lukewarm saline water followed with yogic postural exercises), Vamadhouti kriya (stomach wash) asanas like bhujangasana, naukasana, dhanurasana, ardha-matsyendrasana, halasana, paschimottansa (which affects the viscera), vajrasana with sakshibhavana (which disciplines the mind), yogmudra, uddiyana bandha, naulichalana (stimulates the pancreas), sarvangasana, viparitakarni mudra (revitalises the system), matsyasana, ushtrasana, supavajrasana, chakrasana, (reversing the imbalances), anulom – viloma, ujjayi and bhramari pranayama (prana distribution and stabilization), trataka and Aum mediation (mental and emotional balances), makrasana and shavasana (total relaxation) are essential to control diabetes.
STUDY OF LATTICE DYNAMICS OF GRAY TIN

S.R.B. Thapa*

Declaration
The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, S.R.B. Thapa the author of the research paper entitled STUDY OF LATTICE DYNAMICS OF GRAY TIN declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal, This research paper is my original work and no part of it or its similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract
A phenomenological model is used to study the lattice dynamics of gray tin. In this model ion-ion interaction are taken into account. Phonon frequencies, Debye Characteristic temperature and microspic elastic constants of gray tin are studied using Urey Bradley Valence Force Field (UVVF) approximations. The potential energy of the crystal involves (i) the central force due to bond-stretching (ii) the angular force due to bond bending (iii) central force between non-bonded atoms (iv) the force due to interaction of one internal co-ordinate to adjacent internal co-ordinate. Calculated results of phonon dispersion curves, Debye Characteristic temperatures and microspic elastic constants are compared with experimental results giving fairly good agreement.

Key Words: Phenomenological model, Phonon frequencies, Debye Characteristic temperature, microspic elastic constants, Urey Bradley Valence Force Field (UVVF) approximations.

Introduction
Gray tin has diamond structure. Experimental and theoretical studies of lattice dynamics of gray tin have been made by several workers in the past.

Various attempts have been made to study the dynamical behavior of solids with the application of valence force fields. The theoretical study of lattice dynamics of diamond has been made by Tubino et al. (1972) using a six parameters valence force field. Lattice dynamics of diamond type crystals have been studied by using

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Keating’s valence force field by Bashenov et al. (1978). Kulda et al. (1997) explained coupling between acoustic and optic branches in longitudinal mode along [111] direction. In this present paper four parameter valence force field model developed for the study of lattice dynamics of diamond by Thapa (2011) is extended for same type of crystal gray tin.

In this model Urey-Bradley Valence Force Field (UVVF) is assumed to describe the forces operating inside the solids which crystallize in diamond structure. Urey-Bradley Valence Force Field is the combination of the simple valence force field and the central interaction between the non-bonded atoms. Thus forces considered are those which resist the extension or compression of valence bonds together with those which oppose the bending or torsion of bonds and central interaction between the non-bonded atoms. Contribution to potential energy from other neighbours except first and second neighbours has been neglected because of the short range character of the force field. The Coulomb electrostatic interactions are not considered since atomic charges are either zero or very small.

**Theoretical Model**

The theoretical model which is used here is already reported by Thapa (2011). The secular determinant for the normal modes of vibration of the atoms in the crystal is given by

\[
\left| D_{ab}(q,k,k') - \omega^2 \delta_{ab} \delta_{k,k'} \right| = 0
\]

\[
D_{ab}(q,k,k') \text{ represents the elements of the dynamical matrix } D(q) \text{ and } \omega \text{ is the angular frequency of the normal modes of vibration of the crystal. } \delta_{ab} \text{ and } \delta_{k,k'} \text{ are the usual kronecker delta functions. Solving the secular determinant (2) for long wave length limit, following expressions for the three elastic constants for the diamond structure crystal gray tin are obtained in terms of model parameters } k_r, k_{r1}, k_{rr} \text{ and } \Upsilon/r_0^2.
\]

\[
C_{11} = \frac{1}{a} \left[ (1/3) k_r - (1/6) k_{rr} + 4 k_{r1} + 4 (\Upsilon/r_0^2) \right]
\]

\[
C_{12} = \frac{1}{a} \left[ (1/3) k_r - (1/6) k_{rr} + 2 k_{r1} - 2 (\Upsilon/r_0^2) \right]
\]

\[
C_{44} = \frac{1}{a} \left[ (1/3) k_r - (1/6) k_{rr} + 2 k_{r1} + (2/3)(\Upsilon/r_0^2) - A^2/B \right]
\]

Where \( A = - \left[ (2/3) k_r - (1/3) k_{rr} - (8/3)(\Upsilon/r_0^2) \right] \)

\( B = \left[ (4/3) k_r - (2/3) k_{rr} + (32/3)(\Upsilon/r_0^2) \right] \)

Solving the secular determinant along [100] direction one gets

(i) at zone centre (Γ)

\[
(\omega_{LO}^2)(\Gamma) = 2/m \left[ (4/3) k_r - (2/3) k_{rr} + (32/3)(\Upsilon/r_0^2) \right]
\]

(ii) at zone boundary (X)

\[
(\omega_{LO}^2)(X) = 1/m \left[ (4/3) k_r - (2/3) k_{rr} + 8 k_{r1} + (40/3)(\Upsilon/r_0^2) \right]
\]

\[
(\omega_{TO}^2)(X) = 1/m \left[ (4/3) k_r - (2/3) k_{rr} + 4 k_{r1} + (20/3)(\Upsilon/r_0^2) + (4/3)(\Upsilon/r_0^2) + (16/3)(\Upsilon/r_0^2) \right]
\]

With the help of equations (5), (6) and (7) along with equilibrium condition of the lattice model parameters are evaluated.

Input data for evaluating model parameters \( k_r, k_{r1}, k_{rr} \) and \( (\Upsilon/r_0^2) \) are given in table 1 & 2 while evaluated values of model parameters are given in table 3.

**TABLE 1 (Zone boundary phonon frequencies of gray tin)**

<table>
<thead>
<tr>
<th>Crystal</th>
<th>Zone boundary and zone centre phonon frequencies(1012Hz)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray tin</td>
<td>( v_{LO}(X) )</td>
<td>( v_{TO}(X) )</td>
</tr>
<tr>
<td></td>
<td>4.67</td>
<td>5.51</td>
</tr>
</tbody>
</table>
TABLE 2 (Lattice constant and mass)

<table>
<thead>
<tr>
<th>Crystal</th>
<th>Lattice constant (2a)</th>
<th>Mass (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey tin</td>
<td>6.4912 \times 10^{-8} cm</td>
<td>197.0586 \times 10^{-24} gm</td>
</tr>
</tbody>
</table>

TABLE 3 (Evaluated values of Model parameters of grey tin)

<table>
<thead>
<tr>
<th>Crystal</th>
<th>Force Constants (10^4 dyne cm^-1)</th>
<th>(\frac{(\Upsilon/r_0)^2}{\nu})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey tin</td>
<td>-1.115652 0.278913 -18.847608 0.275339</td>
<td></td>
</tr>
</tbody>
</table>

Using the evaluated values of model parameters elastic constants \(C_{11}, C_{12}, C_{44}\) are evaluated.

TABLE 4 (Elastic constants of gray tin)

<table>
<thead>
<tr>
<th>Elastic Constants</th>
<th>Experimental Values Kushwaha (1980)</th>
<th>Present Calculated values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C_{11})</td>
<td>0.69</td>
<td>0.768</td>
</tr>
<tr>
<td>(C_{12})</td>
<td>0.293</td>
<td>0.427</td>
</tr>
<tr>
<td>(C_{44})</td>
<td>0.362</td>
<td>0.287</td>
</tr>
</tbody>
</table>

The calculated values of model parameters are used to obtain phonon dispersion curves of diamond along [100],[110] and [111] directions.

Lattice specific heats at different temperatures from Thapa (2011) is

\[
C_v = \frac{3R}{6000} \sum \nu g(\nu)E_i \left( \frac{h\nu}{k_BT} \right) \tag{8}
\]

\[
E_x = \frac{x^2 e^x}{(e^x - 1)^2} \text{ where } x = h\nu/k_BT. \ h = \text{Plank’s constant, } \nu = \text{frequency,}
\]

\(k_B\) is Botzmann constant, \(T = \text{temperature of crystal, } R = \text{Molar gas constant.}\)

The computed values of \(C_v\) are used to find Debye characteristic temperatures form standard table of \((C_v - \theta_D/T)\) from Saha and Srivastava (1965).

**Results and Discussion**

**Elastic Constants**

Observation of the table 4 shows that calculated values of elastic constants \(C_{11}\) and \(C_{44}\) in the present work is comparable with their experimental values whereas the value of \(C_{12}\) has comparatively greater divergence from the experimental value.

**Phonon frequencies**

The theoretical study of lattice dynamics of gray tin has been made by Tubino et al. (1972) using a six parameter valence force field. Price and Rowe (1971) measured phonon dispersion relations of gray tin in symmetry directions.

Calculated phonon frequencies, plotted for gray tin along three principal symmetry directions [100],[110] and [111] are presented in Fig.1 along with experimental points of Price and Rowe (1971). The computed results are in satisfactory agreement with the experimental values having greater divergence for the transverse acoustic mode along [100] and for acoustic mode along [111]. It is significant to note that present work
explains the splitting of transverse optic mode along [110] direction whereas no splitting is observed in Kushwaha’s (1980) work in this direction. Transverse acoustic mode frequency is higher than the experimental value in the present work. The results obtained are quite satisfactory on the whole. However, no comparison of calculated phonon dispersion curve with experimental dispersion curve is possible along [110] due to unavailability of experimental results.

**Fig.1.** Phonon dispersion curves of gray tin along symmetry directions. Solid circles (·) represent the experimental results due to Price and Rowe (1971).

**Specific heat and Debye Temperature**

The Debye characteristic temperatures ($\theta_D$) of gray tin obtained from computed values of specific heat are plotted in Fig.3 against temperature ($T$) with experimental points of Hill and Parkinson (1952). There is good agreement between theoretical and experimental Debye temperature at low temperatures but comparison at higher temperatures is not possible since experimental Debye temperatures at high temperature are not available. However, our results of Debye temperature agree well with those of Kushwaha (1980).

**Fig.3.** ($\theta_D$ – $T$) curve for gray tin along with experimental points (0) due to Hill and Parkinson (1952).
Conclusion

The present lattice dynamical model having only four disposable parameters which successfully explains the values of elastic constants, phonon dispersion curves and Debye temperature of diamond is also capable to explain the same properties of gray tin. This gives an emphasis on the suitability of the application of valence force fields to the covalent crystals which gave highly directional bonds resulting from the well defined orbital hybridization. Introduction of interaction terms for changes in bond length and bond angles in the present formulation may improve the features of the present results.

Reference

STUDY OF SIMPLE AND MIXED LIGAND COMPLEXES OF GLYCYL LEUCINE WITH Cu (II), Ni (II), Co (II) AND Zn (II)

KHAGESH KUMAR SINGH*

Declaration
The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, Khagesh Kumar Singh the author of the research paper entitled STUDY OF SIMPLE AND MIXED LIGAND COMPLEXES OF GLYCYL LEUCINE WITH Cu (II), Ni (II), Co (II) AND Zn (II) declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal, This research paper is my original work and no part of it or it’s similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract
An innovative solution electrophoresis technique has been used for study of mixed complexes of some divalent metal ions viz, Cu(II), Ni(II), Co(II) and Zn(II) with glycyl leucine as primary legend and NTA as a secondary legend. The stability constants of mixed complexes formed were found to be: 5.75, 4.26, 3.25, 3.15 (log k values) for Cu(II), Ni(II), Co(II) and Zn(II) respectively at 30°C and ionic strength 0.1 M

Key Words: Solution Electrophoresis, Stability constants, Glycyl leucine mixed complexes.

Introduction
For the study of Metal-Legend equilibria partition technique, solvent extraction, and paper electrophoresis have been ion exchange method mainly employed by a number of workers. Jok has done a significant work for the determination of stability constants for metal complexes adopting the electro migration studies. From the migration mobility curve, he succeeded in determining the stability constants of amino acid complex of some bivalent metal ions. A theoretical treatment was given by Biernet for the study of step wise complex formation. The technique subsequently attracted the attention of few workers who applied it to examine various complexing system in an aqueous medium. In recent years, Singh et al. have published a number of paper in which a new approach have been made for the study of complexation reaction in solution with the help of paper electrophoresis.

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The gel or paper electrophoresis has the striking drawback in the sense that the path of migrating ion is not uniform. The surface of paper or gel medium, on which the charged species moves, depends on the mode of manufacturer of paper or gel. Keeping the discrepancies in mind, a venture to work in pure solution in this paper has been undertaken. According to Glasstone13 relatively a little work has been done on the transference number of ions in mixtures, although Hittorf and Moving boundary methods have employed. It is possible, to derive the required transference numbers by the analysis of the anodic and cathodic compartments before and after electrophoresis.

In the present work glycyl glycine as a primary legend and NTA as a secondary legand has been studied from the point of the view of the complexation with four metal ions viz Cu(II), Ni(II), Co(II) and Zn(II).

**Experimental Instruments**

**Electrophoretic tube:** A simple electrophoretic tube, 18 cm long and of 5 mm bore with a stopper in middle and is fused perpendicularly at the ends with short wider tubes of 1.2 cm bore, arms have been utilized to insert the platinum electrodes. These electrodes are connected with an electrophoresis voltage supply. The voltage can be varied through three different ranges viz. 0-100, 100-200, and 200-300 volts.

**pH-indicator and Accessories:** CP 901 century digital pH-meter having glass electrodes assembly and working on 220 volts/50 cycles stabilized A.C. main was used.

**Colorimeter:** A colorimeter of visible range 400-750 nm of carlzeiss (jena specol) was employed.

**Chemicals:** Cu(II), Ni(II), Co(II), Zn(II) perchlorate solutions were prepared by precipitating the corresponding carbonates from 0.1 M solution of sulphates of metal with solution of sodium carbonate, washing the precipitates with water and treated with AR grade 1% perchloric acid. These were boiled on a water bath and filtered to get stock solution of the metal perchlorate $5.0 \times 10^{-3}$ M (approx). Stock solution of the complexing reagents glycyl leucine were prepared by dissolving accurately weighted amounts in water. Solutions of required strengths were then prepared by suitable dilutions.

**Perchloric acids as background electrolyte:** A stock solution (1.0M) was prepared by suitable dilution of 70% perchloric acid. The solution was standarised by titrating a suitable volume of its dilute solution against a standard NaOH solution.

**Detecting reagent for Cu(II), Ni(II), Co(II) and Zn(II):** Ammonium thiocynate solution for Cu(II), dimethyl glyoxime for Ni (II) k, stannous chloride solution , ammonium thiocynate and acetone for Co(II) ,Zncon\{5-(2-Corboxy-phenyl)-1-(2-Hydroxy5-sulpho phenylformazon} for Zn(II)14

**Procedure:** At the outmost a solution containing $1\times10^{-2}$ M and glycyl leucine,0.1 m perchloric solution and respective amount of metal ion solution, [2x10^{-3} Cu (II), 2x10^{-3}Ni(II) or 1x10^{-4}, Co (II) and Zn(ii) were prepared. respectively. The pH of the solution was adjusted by adding sodium hydroxide solution .An aliquot of 10 ml ion is taken in the electrophoretic tube and then thermo stated at 30°C. after allowing electrolysis30 minutes, the middle stopper was closed and developing the solution of anodic compartment by adding developer. The absorbance of the solution was taken at $\lambda_{max}625$ nm respectively.

The observed mobility of migrating cation was calculated by measuring the change in the absorbance of the solution contained in the anodic compartment.

Firstly the absorbance taken before electrolysis ($A_0$) and after passing electricity for 30 minutes at potential difference 50 volts , the stopper was closed. This was $A_1$. The differences between these two give the mobility of respective ion. Under a potential gradient, a metal ion will more in the field, the speed and its direction depending upon the charges and size of the ion.
Results And Discussion

M(II)- Glycyl leucine binary system

The plot of the overall mobility of a metal spot against pH gives a curve with a number of plateaus. The first, at the beginning, corresponds to a region in which metal ions are uncomplexed. A second plateau in each instance with positive mobility indicates the formation of a 1:1 complex of a cationic nature. A further increase of pH results in a third plateau with zero mobility, which indicates the formation of an electrically neutral metal complex. The literature also assigns prominent liganding properties to unprotonated anionic species of leucine ruling out any such property to the Zwitterion. In view of the above observation, the complexation of metal ion with the glycyl leucine anion $L^-$ may be represented by:

$$
M^{2+} + L^- \rightarrow ML \\
ML^+ + L^- \rightarrow ML_2
$$

The metal spot on the paper is thus a conglomeration of uncomplexed metal ion and 1:1 and 1:2 complexes. The overall mobility $U$ is given by:

$$
U = \frac{u_0 + u_1 K_1 [L^-] + u_2 K_1 K_2 [L^-]^2}{1 + K_1 [L^-] + K_1 K_2 [L^-]^2}
$$

where $u_0$, $u_1$, and $u_2$ are the mobilities of the uncomplexed metal ion, 1:1 complex and 1:2 complex respectively. For calculating the first stability constant $K_1$, the region between the first and second plateau is pertinent. The overall mobility $U$ will be equal to the arithmetic mean of the mobility of the uncomplexed metal ion, $u_0$, and that of first complex $u_1$, at a pH where $K_1 = 1/[L]$ with the help of dissociation constants of Glycyl glycine ($K_1 = 10^{334}$, $K_1 = 10^{1036}$).

The concentration of the liganding Glycyl leucine, $L^-$, is calculated with the equation:

$$
[L^-] = \frac{[LT]}{1 + [H]/K_2 + \{H\}^2/k_2}
$$

Where $[LT] = $ total concentration

The stability constant $K_2$ of the second complex can be calculated by taking into consideration the region between the second and third plateaus of the mobility curve. These calculated values are given in Table -1.

Metal –NTA System

The absorbance difference of metal ion solution in presence of NTA at different pH are plotted. The absorbance difference of last plateau in case of Cu(II), Ni(II), Co(II) and Zn(II) is negative. Hence this indicates the anionic nature of metal NTA complex. Hence only one NTA anion to combine with metal ion to give 1:1 complexes. The stability constant of complexes with NTA were calculated as mentioned in metal penicillamine complexes and is given in Table -1.

$M -$Glycyl Glycine –NTA –Mixed Complexes

The study of this system was made at pH 8.5. From the absorbance difference VspH curves for metal -glycyl leucine and metal- NTA binary complex system that binary complexes are formed at pH 8.5. Hence it was considered appropriate to study the transformation of $ML_2$ to $ML$ –NTA at pH 8.5 in order to avoid any side interaction. The study of these mixed complexes have been carried out in presence of Glycyl leucine with progressive addition of secondary ligand NTA from 1x10^{-7}M to 5x10^{-3}M at a fixed pH 8.5. The observations are plotted. These figures elucidates the transformation, of $ML_2$ to $M$ –$L^-$ NTA complexes on progressive
addition of NTA. The figure shows two plateaus. The first plateau correspond to M-(glycyl leucine)₂ whereas the second plateau correspond to a new complex. This new complex may be a binary complex M–NTA produced in accordance with the interaction, where the ligand L is completely replaced by the NTA.

The complex may also be a mixed complex of M–L–NTA as M-L₂++NTA M-L-NTA+L in which the NTA adds on to ML giving an anionic species.

Obviously the final plateau corresponds to the absorbance difference of M-NTA or M-L-NTA, whichever is formed is not identical to the absorbance difference of M-NTA (binary complex) as observed in pure metal ion and NTA interaction. The new absorbance is greater in magnitude than that of M-NTA. This confirms the formation of M–L–NTA complex. The between the two plateaus represent the progressive transformation of binary complex ML₂ into ML-NTA mixed complex as:

\[ ML_2 + L^- \rightarrow ML + NTA + L \]

The K’ can be calculated with the help of the method of mean mobility obviously K’ will be given by the reciprocal of the tri negative anion concentration of NTA at the mid point of two plateaus. The calculated value of stability constant are given in table -1

<table>
<thead>
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<th>Metal Ion</th>
<th>Log K₁, ML</th>
<th>Log log ML₂</th>
<th>Log KM-NTA</th>
<th>K-M-NTA-L</th>
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<td>8.15</td>
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<tr>
<td>Zn(II)</td>
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<td>10.09</td>
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</table>

Acknowledgements
The author feels pride and is grateful to Shri Dev Murti, Chairman Shri Ram Murti Groups Of Institutions, Ram Murti Puram Bareilly (UP) for encouragement and providing research facilities. I shall be failing in my duties if I don’t thank Mr Aditya Murti Secretary SRMS- IMS Bareilly for co-operation and motivation.

References
1. V. JOKL, J. Chromatography 14, p.71, (1964)
2. J. BIERNET, Rocz. Chem. 38, p.343, (1964)
OXIDATIVE STRESS: ASSESSMENT OF RESPONSE BY BIOMARKERS

RANJANA S KHANNA*, H D KHANNA**, KANCHAN KARKI***, REENA NEGI**** AND DEEPTI PANDE*****

Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, Ranjana S Khanna, Kanchan Karki, Reena Negi, Deepa Pande and H D Khanna the authors of the research paper entitled OXIDATIVE STRESS: ASSESSMENT OF RESPONSE BY BIOMARKERS declare that, We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal, This research paper is our original work and no part of it or it’s similar version is published or has been sent for publication anywhere else. We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Introduction

Increased oxidative stress leads to reactive oxygen species (ROS) / free radical attack on physiologically important molecules, such as lipids, proteins, various enzymes and DNA. Oxidative stress presents numerous opportunities for tissue injury through formation of reactive oxygen/nitrogen species. Free radical i.e. any atom or molecule that has a single unpaired electron in an outer shell and other reactive species are constantly generated in vivo and cause oxidative damage to DNA and lipid. Evidence for oxidative injury comes from measurements of biochemical markers of lipid peroxidation and protein oxidation. Malondialdehyde and protein carbonyls are byproducts of oxidation of lipids and protein respectively.

Malondialdehyde (MDA) is the byproduct of oxidation of lipid and can be assessed biologically as a measure of lipid peroxidation. DNA is probably the most significant biological target of oxidative attack and it is widely thought that continuous oxidative damage is a significant contributor to many neonatal diseases. Oxidative DNA modification occurs as a consequence of damage to purines and pyrimidines bases. Among the oxidative bases, 8-OHdG is the most abundant and accepted as a sensitive marker for oxidative DNA damage. DNA damage is assessed by measuring the steady state level of 8-OHdG in DNA in various tissues.

8-OHdG is secreted in blood stream and also into urine providing an estimate of damaged DNA. The study of oxidative DNA damage is recognized as a useful marker for the estimation of DNA damage produced

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by oxygen radicals generated endogenously or exogenously. DNA oxidative damage from reactive oxygen species (ROS) is a common type of damage faced by cells in various diseases and it may also lead to many different mutations in DNA.

**Free Radicals**

A free radical is a very reactive molecule capable of independent existence for only a short time. Free radicals have one or more unpaired electrons (an electron alone in its orbit). Molecules with all of their electrons paired are more stable. A molecule with an unpaired electron is prone to take one from another molecule. When it reacts with molecules making up biologic structures (such as cell membranes), it can damage those structures. Free radicals often contain oxygen atoms. In addition to oxygen radicals there are some non-radical oxygen-containing molecules such as hydrogen peroxide that also cause damage to biologic structures; together these are all called “reactive oxygen species”.

Reactions involving ROS proceed in a chain reaction. If the original radical takes an electron from a stable non-radical molecule, that molecule becomes a radical and will react with another stable molecule, causing damage all along the way. Lipid peroxidation is a chain reaction in which cell membranes are damaged, causing the cells to function poorly or to collapse.

Some ROS are generated by the human body for a purpose. Phagocytes produce superoxide and use it to kill bacteria they engulf. Others are produced as normal metabolites of many biochemical processes, such as aerobic respiration. They also are formed when there is tissue injury or ischemia followed by reperfusion. They can be acquired (toxins or pollutants such as ozone) or generated in response to something occurring in the environment (such as ionizing radiation, including sunlight). There are many different sources of free radicals within cells and the environment. In aerobic organisms, free radicals are produced during and through normal metabolic processes. Key sources include electron transfer in the plasma membrane and cell respiration in the mitochondrial membrane. Their production can proceed enzymatically (with catalysts) or non-enzymatically. Cells make antioxidants to protect themselves from oxidative damage by ROS. Uric acid, superoxide dismutase and bilirubin are examples of antioxidants the body makes for itself. Cell membranes incorporate vitamin E and beta-carotene, antioxidants acquired nutritionally. Vitamin E interrupts lipid peroxidation by giving a radical one of its electrons. It then becomes a tocopherol radical, which is much less reactive and therefore safer, effectively putting an end to the chain reaction. It migrates to the membrane surface where vitamin C recycles the tocopherol radical back into vitamin E, and it goes to work again protecting the cell membrane. Different antioxidants work in different places and in different ways to protect against oxidative stress.

**Antioxidants- Oxidative Stress**

In order to counteract intracellular damage by free radicals, cells have developed a so called *intracellular antioxidant system*. This process transforms free electrons into a nonreactive form by proteins (enzymes). Antioxidants regulate oxidative reactions by inhibiting, delaying or hampering the oxidation of the substances. The intracellular enzymes function as antioxidants are the backbone of this cellular defense system. The key antioxidant enzymes possess certain elements that shield and protect proteins. Non-enzymatic antioxidants can also neutralize radicals (e.g. water-soluble substances such as vitamin C, glutathione or fat-soluble substances such as vitamin E or vitamin A/â-carotene). For example, the enzyme SOD transforms superoxide radicals into hydrogen peroxide, which is then broken down by catalysis into water and oxygen. Free radicals are not exclusively damaging metabolic products, but also have a series of important functions. For example they serve in immune defense because leucocytes and macrophages utilize their bactericidal effects: they produce free radicals and thus destroy bacteria and other foreign substances. Moreover, free radicals probably play a role in the body’s tumor suppression by mediating programmed cell death (apoptosis).
Immune-relevant cells also use the reactive potential of ROS as a cellular defense mechanism against entering pathogens to kill bacteria, viruses and degenerated cells. Radicals also fulfill important physiological function such as regulating the vascular tone and those cell functions controlled by oxygen concentration. They also influence signal transmission mechanisms and trigger oxidative stress responses as well as apoptosis. 

Oxidative stress is the result of an imbalance between the intracellular production of free radicals and the cellular defense mechanisms. The balance between oxidants and antioxidants can be disrupted by an increase in free radicals or a reduction of anti-oxidative substances. Oxidative stress can trigger a number of potentially damaging biochemical reactions. Production of radicals is directly involved in the oxidative destruction of macromolecules such as lipids, proteins and nucleic acids.

**DNA damage**

DNA is the chemical that carries the instructions for nearly everything our cells do. Some genes (parts of our DNA) contain instructions for controlling when our cells grow and divide. Certain genes that promote cell division are called Oncogenes. Others that slow down cell division or cause cells to die at the appropriate time are called tumor suppressor genes. Cancers can be caused by mistakes, or defects, in the DNA called mutations that turn on oncogenes or turn off tumor suppressor genes.

The fundamental cause of cancer is damaged or faulty genes. The life-sustaining chemical reactions that occur naturally in our cells generate harmful by-products, and these can cause DNA damage. Most cancers are caused by DNA damage that accumulates over a person’s lifetime.

DNA damage is very frequent and appears to be a fundamental problem for life. DNA damage is also the underlying cause of mutations leading to cancer. In human cells, the estimated average number of DNA damages occurring per hour is about 800, and the number per day is about 19,200. The incidence of DNA damage is likely higher than this in cells subject to unfavorable conditions such as inflammation or tobacco smoke exposure. Most DNA damages are removed by DNA repair enzymes, but these repair processes are not 100% efficient.

In dividing cells, DNA damages, if not repaired, cause errors during DNA synthesis leading to mutations that can give rise to cancer. Thus individuals with an inherited impairment in DNA repair capability are often at increased risk of cancer.

Although most mutations, upon expression, are likely to have a deleterious or neutral effect on the cells that harbor them, some will provide a growth advantage. The growth advantage may arise from an increased rate of cell division or a decreased rate of cell death. Such cells will tend to proliferate at the expense of neighboring cells to give rise to a field of mutant cells. Within such a field, further DNA damage may give rise to a cell with a second expressing mutation that provides a further proliferative advantage relative to surrounding cells. This new double mutant will expand, forming a secondary field within the first field. Repetition of this process, often over decades, may give rise to a pre-malignant field and ultimately to cancer.

In general, the two chief sources of DNA damage contributing to progression to cancer appear to be DNA-adduct-forming molecules and reactive oxygen and nitrogen species (ROS and RNS). Major source of DNA damages leading to mutation and cancer are the reactions of DNA with ROS and RNS. Another major source of ROS and RNS leading to cancer is inflammation stemming from chronic infection. Neutrophils and macrophages/monocytes produce bursts of ROS in order to destroy invading pathogens. These ROS can damage the DNA of the infecting pathogen, the DNA of invaded cells, and also nearby host cells that were not invaded (“innocent-bystander injury”). Such chronic damage can contribute to tumor development. Chronic inflammation is an important risk factor for prostate cancer, and this may also be due in part to infecting viruses or bacteria.
Programmed cell death, or apoptosis, is a natural mechanism used to remove damaged cells from the body before they can become cancerous. This process of detection and repair of DNA damage carried out by our bodies is intimately connected with the cellular controls that trigger apoptosis. If cells that sustain DNA damage fail to undergo apoptosis, they may incur additional mutations that take them along the road to becoming cancerous.

**Oxidative stress and DNA damage response**

Oxidative stress is produced in cells by oxygen-derived species resulting from cellular metabolism and interaction with cells of exogeneous sources such as carcinogenic compounds, redox-cycling drugs and ionizing radiations. DNA damage caused by oxygen-derived species including free radicals is the most frequent type encountered by aerobic cells. When this type of damage occurs to DNA, it is called oxidative DNA damage and it can produce a multiplicity of modifications in DNA including base and sugar lesions, strand breaks, DNA-protein cross links and base free sites.

**Lipid Peroxidation**

Free radicals trigger lipid peroxidation chain reactions by abstracting a hydrogen atom from a side-chain methylene carbon. The resulting carbon-centered lipid radical then reacts with \( \text{O}_2 \) in aerobic cells to give a peroxy radical that subsequently propagates a chain reaction which transforms polyunsaturated fatty acids (either as free acids or as part of lipids) into lipid hydroperoxides. Lipid peroxidation (LPO) can impair membrane function, inactivate membrane-bound receptors and enzymes, disturb membrane fluidity, and increase permeability. Lipid hydroperoxides can also interact with antioxidants (such as \( \alpha \)-tocopherol) or decompose after reacting with metal ions (such as iron or copper) or iron proteins (such as hemoglobin), leaving hydrocarbon gases (ethane, pentane) and unsaturated aldehydes (malondialdehyde) as by-products. Methods for detecting
and quantifying LPO in vitro and in vivo usually examine lipid peroxides or derived radicals directly or else detect lipid peroxide conjugates or decomposition products indirectly. Malondialdehyde levels are assayed by thiobarbituric acid reactive substances (TBARS). MDA, which is a stable end product of fatty acid peroxidation, reacts with TBA at acidic conditions to form a complex that has maximum absorbance at 532 nm.

**Carbonyl Proteins**
Oxygen radicals can modify amino acid side chains, form protein aggregates, cleave peptide bonds, and make proteins more susceptible to proteolytic degradation. In the process, some amino acid residues are converted to carbonyl derivatives. Exposure to gas-phase cigarette smoke also modified human plasma proteins, producing carbonyl proteins with lost sulphydryl groups. The assay is based on the spectrophotometric detection of the reaction between 2, 4-dinitrophenyl hydrazine (DNPH) with protein carbonyl to form protein hydrazone.

**Antioxidants**
Living organisms have developed complex antioxidant systems to counteract reactive oxygen species and to reduce their damage. These antioxidant systems include enzyme such as superoxide dismutase, catalase and glutathione peroxidise; macromolecules such as albumin, ceruloplasmin, and ferritin; and an array of small molecules including ascorbic acid, \( \alpha \)-tocopherol, \( \beta \)-carotene, reduced glutathione, uric acid and bilirubin. The sum of endogenous and food derived antioxidants represent the total antioxidant activity of the system. The assay of overall antioxidant capacity provide relevant biological information of the system.

The assay relies on the ability of antioxidant to inhibit the oxidation of ABTS (2,2’-Azino-di-[3-ethylebenzthiazoline sulphonate]) to produce the radical cation ABTS by metmyoglobin. The amount ABTS’ produced will be monitored by reading the absorbance at 750 nm. The antioxidants in the sample cause suppression of the absorbance to a degree proportional to their concentration.

**Conclusion**
Oxidative stress results from diminished antioxidant protection as well as increased free radical production. Therefore, investigating antioxidant depletion as a biomarker of oxidative stress may involve assessment of decreases in antioxidant concentrations or increases in their metabolites. DNA, lipid, and protein oxidation products provide an extensive and growing array of potential biomarkers. Development of a broader panel of biomarkers to examine both pro- and antioxidant reactions needs to be pursued. This might include the capacity of a biological sample to resist oxidation in vitro or ex vivo and modulation of redox-sensitive transcription factors or related alterations in signal transduction pathways. The capability to adequately assess genomic factors relevant to antioxidant defenses and oxidative stress is limited, this facet of new research approaches will become increasingly important in determining which individuals are most likely to respond to antioxidant interventions.

**Acknowledgement**
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**References**


15. Harris, E. D., 1992, Copper as a cofactor and regulator of copper, zinc superoxide dismutase, J Nutr, 122 (3 Suppl), 636-640.


ANTIMICROBIAL ACTIVITY OF SOLANUM ESCULENTUM

KHAGESH KUMAR SINGH*

Declaration
The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, Khagesh Kumar Singh the author of the research paper entitled ANTIMICROBIAL ACTIVITY OF SOLANUM ESCULENTUM declare that , I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal. This research paper is my original work and no part of it or it’s similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Acetone methanol and water extracts from the leaves of solanum esculentum were investigated for their antimicrobial activities. Growth inhibition was determined using agar dilution assays against ten selected bacterial and three fungal species. Acetone and methanol extracts were active against the Gram positive and Gram negative bacteria at a concentration of 5 mg/ml. None of the extracts inhibited the growth of staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae and Penicillium notatum. The activities of the extracts on the test fungi were generally low. Methanol extracts was particularly suppressive to the growth of fungi with inhibitory percentage ranging from 47.22 to 50.56 % on Aspergillus nigar and Fusarium oxysporum.

Key word: solanum esculentum, solanaceae, antimicrobial, antibacterial, antifungal.

Introduction
There has been an increasing incidence of multiple resistances in human pathogenic microorganisms in recent year, largely due to the indiscriminate use of commercial antimicrobial drugs commonly employed in the treatment of infectious diseases. The number of resistant strains of microbial pathogens is growing since penicillin resistance and multi resistance pneumococci caused a major problem in south Africa in 1977 (Maurer-Grimes et al . 1996; Elloff, 1998). This situation, coupled with the undesirable side effects of certain antibiotics and the emergence of previously uncommon infections are a serious medical problem(Marchese and Shito, 2001; Poole, 2001). This has forced scientists to search for new antimicrobial substances from various sources like the medicinal plants. The screening of plant extracts and plant products for antimicrobial activity has show that higher plants represent a potential source of novel antibiotics prototypes (Maurer- Grimes et al, 1996; Rabe and van staden,1997; Afolayan, 2003).

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solanum esculentum L. (solanaceae). The stems are densely covered with shiny reddish–brown prickles and bears clusters of brightly orange berries on the stems. Ethnomedical information from the indigenous people of the Eastern UP revealed that extract from the plant I used by the Bantu tribe as a reedy for syphilis, sore throat, toothache and for the treatment of boils (Batten and Bokelmann, 1966). There is however, no report on the antimicrobial property of s. esculentum in the literature. Yet, species of the solanum subgenus leptostemonum are known for their possession of medicinal flavonoids (silva et al., 2002, 2004). According to mathekga and mayer (1998), in vitro antimicrobial screening methods could provide the needed preliminary observations necessary to select among crude extracts, those with potentially useful properties for further chemical and pharmacological investigations. This study was aimed at investigating the antimicrobial property of s. esculentum by preliminary bioassay screening.

**Material and Methods**

*Plant material:* the plant material was collected from a natural population and a voucher specimen was prepared and deposited in the National Botanical Research Institute Lucknow (SP.NBG.022/II)

*Extract preparation:* portions of the air-dried leaves were extracted separately in acetone, methanol and water for 24h. the extracts were filtered

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Gram +/-</th>
<th>MIC (mg/ml) acetone</th>
<th>MIC (mg/ml) MeOH</th>
<th>MIC (mg/ml) Water</th>
<th>Antibiotics (µg/ml) Str</th>
<th>Antibiotics (µg/ml) Chl</th>
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<tr>
<td>Bacillus cereus</td>
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<tr>
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<tr>
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<td>na</td>
<td>na</td>
<td>&lt;2</td>
<td>&lt;2</td>
</tr>
</tbody>
</table>

^minimum inhibitory concentration
^not active at concentration d 5 mg/ml
Str: Streptomycin; Chl: Chloramphenicol

Using a Buchner funnel and Whatman No.1 filter paper concentrated to dryness under reduced pressure with a vacuum evaporator at 4°C until further use. Before use each extract was re- suspended in their respective extractant to yield 50 mg extract residue per ml solvent.

**Anti Bacterial Testing**

Ten bacterial species used in this study were obtained from the department of microbiology, Rhodes University. Bacterial species were maintained on nutrient agar plates and recovered for testing by sub- culturing in nutrient broth (Bio lab No. 2) for 24 h. Before use each bacterial culture was diluted 1:100 with fresh sterile nutrient broth (Afolayan and Meyer, 1997; Grierson and Afolayan, 1999).

The bacteria were streaked in radial pattern on the agar plates (Afolayan, 1995). Plates were incubated at 37 °C and examined after 24 and 48 h. complete suppression of growth by specific concentration of an extract was required to be declared active (Sindambiwe et al., 1999; Mathekga et al., 2000). Each extract was tested at 5.0, 1.0, 0.5, and 0.1 mg/ml. blank plates containing only nutrient agar and another set containing nutrient
and 2% acetone or methanol served ads controls. Acetone and methanol have been reported to be non–toxic to the organisms at 2% (Meyer and Afolayan, 1995; Mathekga and Meyer, 1998).

**Anti fungal testing**

Potato dextrose agar (PDA) was prepared and autoclaved before the addition of the extracts. Extracts were filtered through 0.22 μm syringe–felted filters, to remove possible contaminants, before mixing with the molten agar (at 45°C) to final concentrations of 5.0, 1.0, 0.5, and 0.1 mg extract residue per ml and poured into petridishes. Each plate was swirled carefully until the agar began to set and left overnight for the solvent to evaporate. Blank plates containing PDA or 2% extractant served as controls.

Three fungal species were obtained from the department of microbiology, Rhodes University. Each culture was maintained on PDA and was recovered for testing by sub–culturing on fresh PDA for 3 days at 25°C. The prepared plates were inoculated with plugs obtained from the activity growing margin of the fungi plates and incubated at 25°C for 5 days (Afolayan and Meyer, 1997). The diameter of the fungal growth was measured and expressed as percentage growth inhibition of three replicates. Significant different within the means of the treatments and the controls were calculated using the LSD statistical test at 5 % probability (Steel and Torrie, 1996).

**Result and Discussion**

Acetone, methanol and water extract from the leaves of S. tomentosum showed anti bacterial activities (table 1) however, little or no activity against the tested organism. The spectra of activity against the tested organisms. The activities of acetone extract was found to be higher on gram negative than gram positive bacteria, while methanol extract displayed mire activity on gram positive bacteria . The action of s. tomentosum on bacillus cereus and staphylococcus aureus is note worthy. Bacillus cereus is a human pathogen whose infection ate amongst the most difficult treat with conventional antibiotic (Mathekga et al., 2000). The susceptibility of pseudomonas aeruginosa to the extract of this plant may be a pointer to its potential as a drug that can be used against this organism. Infections caused by pseudomonas species such as mastitis are often difficult to combat (Salie et al., 1996). It is of interest to note that the growth of staphylococcus aureus. Escheria coli and Klebsiela pneumoniae were not inhibited by the extracts at the tested concentration. In this study the acetone and methanol extracts were more active than the water extracts Traditionally, However, Plant extracts are prepared with water as infusions, decoction and poultices; therefore or would seem un likely that the traditional healer is able to extract those compounds which are responsible for activity in the acetone and methanol extracts.

**Table 2** *Anti fungal activity of S. tomentosum*

<table>
<thead>
<tr>
<th>Extract</th>
<th>Conc.(mg/ml)</th>
<th>F. oxysporum</th>
<th>Percentage inhibition</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F. oxysporum</td>
<td>A. niger</td>
</tr>
<tr>
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<td>41.67c</td>
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<td>34.44b</td>
<td>36.11c</td>
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<tr>
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<td>0.00a</td>
</tr>
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<td>0.00a</td>
<td>0.00a</td>
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<tr>
<td></td>
<td>0.5</td>
<td>32.22b</td>
<td>5.55c</td>
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</table>

**Table 2** *Anti fungal activity of S. tomentosum*
The results of antifungal assays of S. tomentosum are presented in table 2. The extracts showed the least activity on the growth of these organisms at 5 mg/ml. however, methanol extracts suppressed the growth of Fusarium oxysporium and Aspergillus niger with inhibition percentages ranging from 47.22 to 50.56%. F. oxysporium is a phytopathogen that causes vascular wilt and damping off in plants which could result in substantial stand reduction and yield loss (Gerlach, 1954; Kishi, 1974). A. niger was reported to be resistance to dichloromethane, aqueous and methanolic extracts of 14 plants used for traditional medicine in Paraguay (Portillo et al., 2001). In this investigation, however, methanol extracts suppressed the growth of A. niger significantly. Water extract did not show any appreciable activity on the growth of the fungi at 5 mg/ml or lower, except on F. oxysporium which was weakly (36.56%) suppressed by the extract, Pencillum notatum showed no growth inhibitions even at 5 mg/ml which was the highest concentration of extract used in this investigation. These results signify the potential of S. tomentosum as a source of therapeutic agents which may provide leads in the ongoing search for anti microbial botanicals. The findings also validate the claims for the use of this plant in traditional medicine by the Xhosas of the Eastern Cape.

Acknowledgements

This research was supported by the National Research Foundation of South Africa.

References


Elloff J N (1998) which extract should be used for the screening and isolation of antimicrobial components from plants Ethnopharmacology 60; 1-8.


E-GOVERNANCE IN RURAL AREA: ACCEPTANCE AND CHALLENGES IN DEVELOPING COUNTRIES

SAMAN MUITAVA* AND DR. PRASHANT KUMAR PANDEY**

Declaration
The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, Saman Mujtava and Prashant Kumar Pandey the authors of the research paper entitled E-GOVERNANCE IN RURAL AREA: ACCEPTANCE AND CHALLENGES IN DEVELOPING COUNTRIES declare that, We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal, This research paper is our original work and no part of it or it’s similar version is published or has been sent for publication anywhere else. We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Abstract
Good governance is one of the key requirements of development of any nation. Where E-governance has been perceived as a key of better government which is implemented through National e-Governance Plan, to bring efficiency and effectiveness in citizen-centric services, socio-economic transformation, especially in the fields of education, health, skill-building, entrepreneurship and in creating employment opportunities but this cannot be achieved by developing countries because of “unavailability of required infrastructure”. In this context, this paper is emphasizes on the reason why E-governance is not fully accepted by developing countries. The reason is the rural area and the lighting point of this paper is how to reach the section of the society which has remained tangential to the government sphere due to cost and accessibility reasons it seeks to formulate a roadmap for delivering value proposition to the rural populace and equipping them for the better use of E-governance.

Keywords: Good governance, E-governance, citizen centric services, entrepreneurship, infrastructure, value proposition, developing countries.

1. Introduction
E-governance, which has now become the most talked word around the world. It is a government website on the internet not only the website but it is more than that. But what is it exactly?

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E-GOVERNANCE IN RURAL AREA: ACCEPTANCE AND CHALLENGES IN DEVELOPING COUNTRIES

It’s a process to reform the Governments work that can share information and deliver services to external and internal clients for the benefit of government, citizens, companies, customers, and public intuitions through the application of modern information and communication technologies.

E-government is the use of information and communications technologies (ICT) to transform government by making it more accessible, effective and accountable. The main aim of E-governance is to provide support to all government, citizens and businesses.

The extent to which E-governance develops in a country is a function of the collective national and local capital supplying IT services and of informal social and human capital creating a demand for E-governance but there is a certain differences in terms of leading and lagging countries. Differences in the capacity of countries to supply standard E-government services, poor human, organizational and technological infrastructure.

This paper deals with problems and solutions why Rural areas and Developing countries can’t accept the E-governance.

It focuses on the problems of last miles collection in Developing countries i.e. “unavailability of required infrastructure”. To provide E-governance required depth it has been witnessed that developing countries have deeper telephonic/mobile penetration than the internet penetration that causes an information gap between Western and Developing countries.

This paper tries to reach to the section of the society which has remained tangential to the government sphere due to cost and accessibility reasons. Diffusion of E-governance is much needed to reach out to these peripheral sections in the developing countries. The model proposed in this article improves upon the “time-to-public” and “time-in-public” of E-governance services. The article provides a roadmap to bridge the rural-urban digital divide based on an analysis of successful e-governance projects. It seeks to formulate a framework for delivering value-proposition to rural populace and equipping them for the better use of E-governance that can results in more transparency, greater convenience, less corruption, revenue growth, and cost reduction and help the people to interact with government and each other.

This paper will serve as a literature review that provides an outline of the reasons why E-government often fails in Developing countries. Given the focus of the article, is how to improve the condition of people in developing countries by improving access to information that will become useful to their daily lives, providing government services, and offering new opportunities so that they can participate in the political process starting from the rural farmlands of Gyandoot in India to small villages in Africa.

What challenges does developing nation have while accepting e-governance?

Government is a machinery or institutional arrangement for exercising the sovereign power, while governance is the process as well as the result of taking authoritative decisions for the benefit of society, managing a country’s social and economic resources. If the governance does not bring maximum benefits for maximum number of people, it results into mal-governance. In a welfare state, the aim is to be Good Governance, and “Good” Governance can be achieved only when it have the honesty,equitability,transparency&accountability. Imagine a situation in which all interaction with the Government can be done through one counter 24 hours a day, 7 days a week, without waiting in lines at government offices.

E-governance is the most suitable one, which can bring a paradigm change in the face of governance. E-governance is the deployment of Information and Communication Technology (ICT) in the delivery of public services that increases the efficiency and effectiveness of organizations and help in aligning the processes with best practices from the developed world. ICT is often welcomed as an important instrument for accelerated change, along with it in this competitive economy, E-Governance is ubiquitous. But in terms of success of E-Governance projects, developed nations are far ahead of developing nations, resulting in a digital divide. Developing nations have failed to exploit the full benefits of ICT. A plethora of causes are responsible for this, like, lack of proper technology, poor funding facility, lack of political commitment etc. This paper is an attempt
to illustrate such issues, by taking the experiences from some developing countries around the world, such as “The Internet”, that lets each citizen to make contact with the government through a website where all forms, legislation, news and other information will be available 24/7.

The paper said about the reason why E-governance is not accepted by the rural area and about the developing nation that are struggling to get a foothold in the ICT revolution? The one of the reason behind this can be the government are focusing more on internal efficiency rather than service delivery, and the projects that focus on service delivery are confined to licenses and taxes, and are mostly urban focused. Needs of poor have not been specifically targeted? Countries like India where some states have made considerable progress in electronic delivery of services to urban populations face the following challenges in implementing pro-poor E-Governance:

- To bring clarity to the objectives of pro-poor targeting.
- To ensure delivery of public services in rural areas.
- To balance standardization and localization.
- To leverage private sector and build Private Public Partnerships (PPPs) to serve rural areas.
- To make independent impact assessment of what has worked.

Moreover there is a lack internal capacity in e-Governance project conceptualization and implementation.

Citizens, Business, Public servant, NGO’s, etc

Data Communication devices

Mobile digital cell kiosk pc telephones center conferenceing

Internet Extranet

Web Emails

Management support system

Office automation

Basic support System

Government Data

Architecture of E-Governance

The extent to which E-Governance develops in a country and the lower rate why it is not accepted in developing countries is the low penetration of Internet that shows the difference in between the leading and lagging countries. Differences in the capacity of countries that supply standard e-government services reflecting the degree of modern resources and E-participation facilities which shows the political openness and extent of corruption. In countries with a high degree of modern resources and a majority of adults on line, digital choice creates limits as well as opportunities for e-governance. But in developing countries due to the lack of infrastructure there is less use of internet like the rural one do not even know what the internet is? And the area where this facility is available they do not fully utilize it. Generally we have two different types of users like the online one and the non-users. The non-users of the Internet are older people who see no need for going on line. Among those
who are on line, a majority prefer to contact local and central government by traditional means, such as
telephone or writing a letter. In the most modern and open societies the diffusion of the Internet is most likely to
promote government efficiency and the virtual linkage of disparate public agencies serving the same client that
are not achieved by it even it may be possible because of lack of knowledge. And if some wants to spread
knowledge like, in many countries some have experimented with Telecenters as a delivery mechanism in rural
areas. But these all are failed because these Telecenters are not piping in Government services. This may be
due to a lack of computerization in Government agencies or a lack of coordination between Government
agencies and the private owners of Telecenters. Most Telecenters projects are in a pilot stage. Furthermore
there has been limited scaling up of Telecenters and therefore only a minuscule of the Rural population has been
covered by such centralization.

Some data based on the Internet Penetration

<table>
<thead>
<tr>
<th>Countries</th>
<th>Population (million)</th>
<th>per capita income in US$</th>
<th>Population Density/km²</th>
<th>% Population Below Poverty</th>
<th>% Literacy level</th>
<th>Telecom Penetration %</th>
<th>Internet Penetration %</th>
<th>E-readiness core</th>
</tr>
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<tr>
<td>Cambodia</td>
<td>15.0</td>
<td>2000</td>
<td>70.0</td>
<td>40</td>
<td>73.6</td>
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<td>5600</td>
<td>636</td>
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<td>90.9</td>
<td>20.92</td>
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<td>92</td>
<td>12.35</td>
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<td>69.2</td>
<td>8.32</td>
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<td>328</td>
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<td>99.9</td>
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<td>202</td>
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<td>40</td>
<td>92.6</td>
<td>4.00</td>
<td>9.1</td>
<td>2.93</td>
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<td>Sri Lanka</td>
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<td>90.4</td>
<td>4.42</td>
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<td>4</td>
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<td>47.24</td>
<td>67</td>
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</tr>
<tr>
<td>Thailand</td>
<td>66.52</td>
<td>8,100</td>
<td>127</td>
<td>10</td>
<td>92.6</td>
<td>10.55</td>
<td>12.7</td>
<td>4.69</td>
</tr>
</tbody>
</table>

The Problems that are generally faced by the Rural Areas and Developing Countries are:

Infrastructure and Connectivity: Most developing countries lack the necessary infrastructure to build computerized
system and provide access to such systems via the Internet in rural and remote areas. Even the basic infrastructure of
a stable electricity supply does not exist in rural/remote areas of most countries. Basic communication infrastructure
such as access to telephony is also poor. In the absence of telecommunication infrastructure, providing Internet access
in rural areas becomes expensive.

By some estimates the cost of an Internet kiosk in a rural area is nearly twice the cost in urban areas because a rural kiosk
needs a power back up as well as a satellite connection for communication besides the computing equipment10. Some
of the countries are experimenting with new technologies which can lower the costs of providing access in rural areas.
Even if Internet access is provided, it is unlikely to be broadband, limiting the kind of applications that can be supported.
The experience of some countries suggests that the problem is one of the last mile. Many countries like India have
invested in large networks using optical fiber which connect the semi urban towns but do not reach the villages.

Language and illiteracy: In addition to the problems of infrastructure, there are problems of illiteracy that need to be
overcome. Applications have to be designed for use by illiterate people or even if people are literate (as in Sri Lanka) to
provide a local language interface. Use of devices such as touch screens can further multiply the costs. Building
content in local languages can also be an expensive proposition. In general there is a lack of IT literacy. This requires
that most on line services need to be offered through an intermediary (operator) who can understand the need of the
illiterate client operate the computer to service the need and often interpret the output if the need is informational.

Human Capacity: Another big challenge is the human capacity within Governments to perform some of the critical tasks
that are essential for building successful e-Government applications. For example, the key challenges identified in the
adaptation of the e-government initiatives in Mongolia, especially for poor and vulnerable groups, are citizen participation,
human development and security issues, and the digital divide. Citizen participation is still low, due to a lack of initiative,
and due to the inertia left behind by a command-administrative system. The low population density, financial constraints
and underdeveloped communication networks has added barriers to participation, while there exists a poor understanding
of democracy and human rights.

Stimulating Weak Demand: The challenges that are recognized can in some measure be overcome with additional resources.
However, there are many challenges that are not recognized. There are other forms of divide, such as gender, age,
economic, regional which also need to be overcome. Providing services at the door step of populations with greater heterogeneity and geographically dispersed demand escalates costs.

In most Rural/Inaccessible areas, there are large pockets of semi-literate populations who have not yet had any experience of benefiting from access to knowledge and information. Nor can they conceptualize the benefits of electronic delivery of Government services. The demand for services therefore needs to be catalyzed as it is weak. An effort needs to be made to understand the latent needs. Apart from all these this paper shows about various countries like India, Sri Lanka, Mongolia and Fiji discuss various plans for setting up telecenters in rural areas. Government of India has announced a new policy for creating 100,000 Rural Computerized Service Centers (available on Ministry of IT website). Sri Lanka has used a least cost subsidy approach to identify partners from NGOs to set up telecenters. Not all telecenter projects have been successful in the past. The Reasons cited for failure in Mongolia include capacity, management, and budgets. The paper from Fiji identifies the high costs that need to be incurred for opening telecenters in remote islands.

A large number of pilots have built Telecenters to provide access to information and services in Rural areas. Some of them have been successful in catalyzing and servicing the demand. However, few of these pilots have been scaled up. Finally it is the scale that can create an impact on the poor. The efforts needed to reform processes, manage change and scale up have been under estimated by e-Government planners.

Apart from all these the Another Researcher made by Heeks(2003) who told that, most implementation in Developing countries fails, with 35% being classified as total failure(e-government was not implemented or was implemented but immediately abandoned) and 50% as partial failure(major goals was not attained and/or there were undesirable outcomes) this is just the disturbing facts especially in developing countries that lead because of limited number of resources at their disposal and cannot afford to wastefully spend large amount of money typically of such projects.

The problems that often arises with Developing countries is that there is frequently a mismatch between the current and future system, due to the large gap in the physical, cultural, economic and various other contexts between the software designer and the place in which the system is being implemented (Heeks 2002). The model has lead Heeks(2003) to identify archetypes of situation where design-reality gaps are common. These are:

**Hard-soft gap:** The difference between the actual technology(hard) and reality of the social context/people, culture, etc.) in which the system operates(soft).

**Private-public gap:** The difference between the private and public sectors means that a system that work in one sector often does not work in the other, due to gaps between the system designed for the private sector and the reality of the public sector into which the system is transferred.

**Country context gap:** The gap exist when trying to use the e-government system for both developed and developing countries, which arises from the gap between the system designed for one country and the reality of developing country into which the system is transferred.

It is this idea of gaps as conceptualized by Heeks(2002) that can be seen as a framework upon which almost all available literature on the failure of the e-government in developing countries is based. So these are the challenges that raise the need for formulating the national policies and strategies. These are:

**Issues in National Policy /Strategy**

**Lack of Pro-poor e-Government strategy formulation:** The primary concern is one of lack of focus of national e-Government strategies on policies on vulnerable groups—whether these are poor who can not afford to access services or those groups which are denied an opportunity to access because of some other barrier. As the Chinese paper indicated, the political profile of these groups will need to be raised for them to receive consideration from the policy makers political level to dialog with the NGOs.

**Top-down versus Bottom-up:** Perhaps it will be easier to target the poor and the vulnerable if the applications are developed at the local levels of Government. However, in many countries the development of e-Government strategy is top down from the national Government.

For example, the Philippines paper discusses the strategy of development of ICT applications for local Government in the Philippines and debates the choice between a totally centralized specification, design, and implementation versus a completely decentralized process of development. It recommends a middle path of centrally defined standards and local development. A variety of middle paths have been explored by other countries. Therefore, keeping the balance between central coordination and agency ownership is an important issue when the programs are driven by central Governments as was also pointed out in the Thailand paper.

**Appropriate Mix of Technologies:** As the experience from Philippines and Mie Prefecture suggests, there are many different technologies that can be used to promote participation by the common citizens in the affairs of the Government.

*Poor Implementation and lack of Public-Private-Civil Society Partnerships*
A partnership between Government, civil society and private sector going is the best way to promote digital inclusion and pro-poor Government programs. Private sector can bring in the investments and operational management expertise; Government can provide the enabling policies and bridging subsidies and the civil society can intermediate between the technology and illiterate populations by interpreting the needs and scouting for solutions. Governments need to develop pragmatic policies on providing subsidies to compensate for higher costs of taking ICTs to rural areas or vulnerable groups. However, subsidies are not required in all cases and private sector may well be able to provide access in those areas which have a strong rural economy. Examples of Public-Private-Partnerships (PPPs) were cited from many countries such as India and Korea. For instance, the Korean government expanded e-literacy in rural areas by the means of PPP.

**Lack of Proper Assessments**

One aspect that gets ignored in most national plans is the need to assess impact of projects in a systematic way. Several e-Government projects were described in different papers including some that were designed to help the vulnerable groups. However, very few of the papers could shed any light on the usage of these applications and the impact on citizens. There is therefore no way for the policy makers to understand as to what works and what does not and to get any guidance on the nature of projects that should be taken up.

India is addressing some of the above issues through its National e-Governance Plan which aims to:

- Implement mission mode projects in key departments (that focus on development or serve rural populations) with large public interface.
- To ensure that even the remote areas can benefit from ICT.
- To provide generic program components including capacity building and ,
- Build a component on impact assessment.

Apart from all these issues we must also have Training and Funding Assistance that can promote the E-governance in developing countries

- Training programs for Project leaders who can Define project deliverables, deal (negotiate) with Consultants and vendors and manage an Outsourced development process.
- Funding to build internet infrastructure, procure E-Government solutions, get customized software developed to implement applications.
- Programmatic loans for implementing an E-Government strategy.
- Loans for building networking and communications infrastructure.
- Seed loans/grants to SMEs, NGO to build kiosks in rural and urban areas.

*These all helps in Achieving the Target like*

**24/7 Service Model :** Systems and processes have to be adapted to a completely new service model. Intake processes are made self-service and even in the middle of the night a citizen should get an immediate (automated) response about the status of the application. Citizen’s expectations towards government’s response times will change because of the new communication medium. E-mail should be seen a new but serious channel besides the traditional channels such as telephone, physical counter, post and fax.

**Need for Content :** Websites consist of content (information). Governments will have to collect (buy), produce and update content daily. In phase 1 content will be static, but in phase 2 content will be changing every day. Content managers in each (large) department are responsible for the information on the website.

**Human Resources :** Maintaining technological infrastructure requires IT skilled resources. Governments will have to compete with the private (commercial) sector to recruit the necessary IT skilled people.increase in employment.
IT Department: With the implementation of e-governance IT is becoming more and more important in government operations. The need for a professional IT department will inevitably increase, not only during implementation, but also for maintenance of software, hardware and infrastructure.

To IMPLEMENT the E-governance we should have,

The first steps towards e-governance solutions and the delivery of services as mentioned in the E-Governance model combine short-term results and long-term goals. This chapter investigates how a long-term e-policy, or vision, can be formulated and what short-term steps, or projects, have to be taken. The relation between long-term and short-term is crucial. Only if projects are in alignment with a long-term vision success will be secured.

The E-governance model presented can serve as a reference for governments to position where a project fits in the overall evolution of an e-governance strategy. An e-governance strategy is necessary to achieve the desired goal. In other words, the goal is the ambition level of the government regarding democracy, government and business aspects of e-governance.

The model assumes that governments have defined an ICT and e-governance vision (policy), which describes the ambition level for each aspect. Only some Western countries have a clear vision of e-governance. In most developing countries the first step will be to investigate what the ambition level is. The model also assumes that all necessary infrastructures, telecommunications and Internet access is available. In most Western countries this is the case; in developing countries this will be quite different. The strategy should also deal with these boundary conditions and constraints. Going from global objectives to concrete targets is a complex process that can be taken with all stakeholders in IICD’s Roundtable Workshops.

Projects will only have a structural value for development when embedded in a vision and supported by a strategy. Andersen consulting has defined an approach to implement E-governance projects:

- **Trial is important**
  - Think BIG, start SMALL and scale up

- **Justification for projects**
  - Clarity about benefits. Many projects still see IT as an end.

- **Raising resources (Bankable Projects)**
  - Poor are willing to pay: should deliver value
  - Private sector involvement - BOOT, BOLT

- **Organization to design, develop and implement**
  - Strong Internal Leadership
  - Insource Analysis; Outsource Design, Development

- **Project management**
  - Rolling out to large number of sites

So to have E-governance in the rural and developing countries is must and it should Satisfy the following Criteria these are:

**Success Factors**: In developing countries a lot of inhibitors exist. It is difficult to tell what the main bottleneck is because a lot of basic aspects of Good Governance are not in place yet.

When successful, E-Government initiatives optimize government operations and service delivery. If not successful, these initiatives can cost governments millions of dollars and enormous amounts of wasted time. Solutions can be in a certain phase and in the context of possible success (and fail) factors that are mentioned below.

The following aspects have to be taken into account when examining the risk of implementing E-governance solutions.

- Political stability (elections, democracy or dictatorial Regime)
- Level of trust in Government (perception of service levels)
- The importance of Government identity (Fragmentation or integration)
- Economic structure (education, agriculture, industry or service)
Government structure (centralized or decentralized)

Different levels of maturity (weakest part of the chain determines speed)

Constituent demand (pushes or pulls).

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Government structure (centralized or decentralized)

Different levels of maturity (weakest part of the chain determines speed)

Constituent demand (pushes or pulls).

Awareness is much important for the promotion that can be possible through:

A National E-Governance Summit: A Summit to create a document laying out process and structure, programmed and project priorities for the National E-Governance Initiative, including any targets should be organized. It should ensure anticipation from all stakeholders, concerned political parties, bureaucrats, academia, private sector, NGO and the citizens.

Raising Awareness Among Leaders: In addition to the Summit, other mechanisms would need to be used to raise awareness and commitment among senior officials. These would include the President, Prime Minister, Ministers, Chief Ministers, Secretaries and leaders of other institutions of civil society who largely determine whether and how change takes place. By addressing both government and civil society leaders, drivers to E-governance are created both inside and outside government.

For senior officials, private and personalized training will be required. In order to sustain skills and confidence, direct and continuing use of ICTs will be beneficial.

Political Acceptability: Despite the importance of technological and skill infrastructures, it is the politics of E-governance initiatives that probably hold the key. E-Governance projects have made slow progress in many countries because they do not serve the political self-interests of the major stakeholders, particular senior public officials. The views of senior public officials are therefore absolutely critical; hence the emphasis laid on the issues of leadership and commitment, the emphasis on building awareness and confidence, and the emphasis on ‘winning hearts and minds’. Public Officials must be convinced that e-governance is in their self-interest:

- in order to gain election victory,
- in order to respond to threats,
- in order to gain control, credibility, kudos, and other intangible resources

Other civil society stakeholders – managers, users, citizens in some cases – have less power but can still delay, skew or block e-governance initiatives. Building capacities, listening, addressing self-interest and motivation, and devising adequate incentives will all have a role to play here.

National Association for SMART State Governments: NASSgov

A tripartite body having participation from the private, Government and NGO sector should be formed to act as the watchdog of various E-Governance initiatives in the State. Author suggests formation of National Association of SMART State Governments or NASSgov for achieving the goal. NASSgov will be a national level body like NASSCom having representatives from Politics, Bureaucracy, IT industry, Academia and Citizens.

The major activities of NASSgov will include:

- A bimonthly newsletter on E-Governance
- Provide consultancy on E-Governance
- Bring out an annual status report on E-Initiatives in India
Launch www.nassgov.org as a window of Indian E-Governance Initiatives.
> Showcase world’s Best Practices on E-Governance Organize seminars, summits and information exchange programs
> Establishment of a School of E-Governance

**Advertisement**
Providing the certain slogan or message to customers through advertisement that help them in identifying the e-government activities.

Another important strategy is for agencies across the enterprise to present a unified front. All collateral materials sent to “traditional” customers should stipulate the source and location of the alternative electronic way of doing business.

For example, on a tax form there should be the location of its source like a website address.

Agencies should encourage front-line employees to promote to customers going online next time they wish to transact business.

**Conclusion**
Thus from above discussions we conclude that E-Governance implementation is the need of the hour. For successful implementation Standards, Infrastructure, Legislations, Strategy all needs to be in place. It also requires establishment of various institutions under the Ministry of Information Technology. It requires a Global Vision and local implementation. And above all it requires E-readiness in the minds of citizens and the Government employees.

The papers try to present many different perspectives on pro-poor E-Governance. The conclusions as have been reported in this paper point to an overall lack of serious concern for the poor and vulnerable in the design and implementation of e-Governance programs.

In the concluding sessions of the paper it is suggested that,

- Each country should define as to which sections of the population constitute the vulnerable group that needs to be targeted. Their geographical spread needs to be mapped. Participatory approaches need to be used in developing e-Government programs and plans, so that the needs of the poor are well articulated and can be reflected in the choice of applications and their design.
- Existing national e-Government programs and e-Government projects should be audited in a systematic way to determine the potential and actual impact on poor and the vulnerable. A Tool Kit can be designed for the purpose of carrying out such an audit.
- Policy makers need to be sensitized to the fact that the digital divide will be further exacerbated unless e-Government specifically focuses on the poor and the vulnerable and that e-Government has the potential to deliver significant benefits to the vulnerable/poor.
- Capacity needs to be built for e-Government program designers to:
  - To promote participation by relevant stakeholder groups from civil society in formulating e-Government plans and strategies.
  - Define policy frameworks that promote the use of different technologies that are relevant for the poor; provide incentive for creation of appropriate content, and create affordable and convenient access points
  - Make application choices that can potentially impact the poor/vulnerable
  - Create partnership with NGOs, media, and Private Sector in implementing pro-poor e-Governance
  - Capacity needs to be built for project implementers to use participative methods in design and implementation of projects/applications focused on the poor/vulnerable.
  - A large amount of training material (case studies, tool kits) needs to be created to support capacity building.
  - There is considerable scope for regional cooperation in sharing telecommunication infrastructure for creating access points, build content and exchange best practices. Moreover regional and cross-border development issues such as HIV/AIDS, natural resources and disaster management, trade and transport, tourism etc are areas where regional e-government cooperation could be of significant mutual benefit. Mechanisms need to be evolved for developing such cooperation.
REFERENCES

E-government handbook for developing nation. A project from info dev.
M.C. Okoronkwo: a model for E-governance system implementation for developing countries.
Michael Backus(2001): E-governance in developing countries.
Subhash Bhatnagar enabling e-government in developing nation.
Subhash Bhtnagar –paving the road towards pro-poor e-governance finding and observation from Asia-Pacific case studies.
Sameer Sachdeva (2002) white paper on e-governance strategy in India.
STUDY OF AGROTIS IPSILON - A SERIOUS PEST OF POTATO IN NORTH BIHAR

ARCHANA RANI*

Declaration
The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, Archana Rani the author of the research paper entitled STUDY OF AGROTIS IPSILON - A SERIOUS PEST OF POTATO IN NORTH BIHAR declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal, This research paper is my original work and no part of it or it’s similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract
Potato is a very important vegetable crop in Bihar. It is attacked by more than 100 arthropod pests, of these about 80 have been reported in India. In Bihar the incidence of cutworm Agrotis ipsilon Hufn, occurs in all potato growing areas. The Life cycle and Biology of cutworm Agrotis ipsilon was studied in the laboratory on potato. The life cycle duration varied between 38 to 57 days. The longevity of male & female was observed 2 to 4 and 5 to 8 days respectively.

Keywords: Potato, Pest, Fecundity, Longevity, Ecology.

Introduction
Potato (Solanum tuberosum) is an ideal food crop because of its virtue like wide adaptability, flexibility of production and diverse range of human taste and preference. The changing life style, urbanization and increasing demand for fast food have given a big boost to potato processing both in the developing and developed countries. In India, the major production area of potato i.e. about 74 percent is located in three states namely Bihar, U.P. and west Bengal. Potato is attacked by more than 100 arthropod pests, of these about 80 have been reported in India. Out of various insect pests, cutworm (Agrotis) is very serious in Bihar. Agrotis ipsilon is major insect pest of potato in the plains. The larvae of this insect pest damage the crop in initial stage by cutting the young plants and their bases near the ground level and later on by feeding on the shoots resulting to retarding the plant growth and crop yield. After tuberization, they feed by boring and nibbling into tubers.

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view of the seriousness of the problem, present investigations were carried out to study the Life history and Biology of Agrotis Epsilon (Hufn).

Materials and Methods

The Life cycle and Biology of cutworm, Agrotis ipsilon was studied in the laboratory during 1999 - 2000 at Muzaffarpur at room temperature 25° - 30°C. The rearing was started with a pair of adult moths in the coupling jar. The mouth of coupling jar was covered with fine cloth. The life history was studied on the host plant Potato (Solanum tuberosum). In the coupling jar, Glucose was used for survival of adult moth. The fecundity & longevity were noted for each pair of adult moth. Just after the hatching the eggs, tender leaves of host plant were kept in plastic jar and transferred the newly hatched larvae with fine channel brush to the host plant. Different plastic jars were used for larval feeding, jars partly filled with soil were used for pupation. The incubation, larval and pupal period were noted. The sex ratio and cannabolism were also noted accordingly.

Results

Result obtained on the average duration of life cycle, longevity, fecundity, sex ratio and cannabolism are summarised in table-1. From the data of the table, it is evident that the duration of incubation period, larval period and pupal period ranged between 4 to 7 days, 22 to 30 days and 12 to 20 days respectively. The total life cycle duration varied between 38 to 57 days. Larvae moulted five times thus, there were six instars of larvae of Agrotis ipsilon. The longevity of cutworm was recorded 2 to 4 days in males and 5 to 8 days in females. The sex ratio of males and females was recorded to 1.5: 1.00. The fecundity rate of cutworm was recorded 57 to 270 eggs / female. The cannabolism rate was recorded 20%.

Discussion

Simpson (1977) has reported more than 100 arthropod pests on potato crop from various regions of the world. Mishra and Agrawal (1989) have given a comprehensive list of insect and non insect pests damaging potato in different parts of India. Rivnay (1964) has reported that the incubation period of Agrotis ipsilon was 3 days in summer while about 7 days in spring & Autumn at 18° to 22°C. He also observed that high or low relative humidity during development reduced fecundity. Naser et al (1965) studied that the pupal period ranged between 15 to 20 days and sex ratio was 1:1. According to the result of present investigation, the duration of life cycle of Agrotis ipsilon ranged between 38 to 57 days. The longevity of male and female ranged between 2 to 4 and 5 to 8 days respectively. The fecundity was observed 57 to 270 eggs / female and the sex ratio (male: female) was observed 1.5 : 1.00.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Duration (Days)</th>
<th>Number/Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation period</td>
<td>4 – 7</td>
<td></td>
</tr>
<tr>
<td>Larval period</td>
<td>22 – 30</td>
<td></td>
</tr>
<tr>
<td>Pupal period</td>
<td>12 – 20</td>
<td></td>
</tr>
<tr>
<td>Total life cycle</td>
<td>38 – 57</td>
<td></td>
</tr>
<tr>
<td>Longevity male</td>
<td>2 – 4</td>
<td></td>
</tr>
<tr>
<td>Longevity female</td>
<td>5 – 8</td>
<td></td>
</tr>
<tr>
<td>Sex ratio (male : female)</td>
<td>1.5 : 1.00</td>
<td></td>
</tr>
<tr>
<td>Fecundity (eggs/female)</td>
<td>57 – 270</td>
<td></td>
</tr>
<tr>
<td>Cannabolism</td>
<td>20%</td>
<td></td>
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</tbody>
</table>
REFERENCES
CHANGING DYNAMICS OF HOSPITAL MARKETING IN THE GLOBAL ERA: STRATEGIC ISSUES AND CHALLENGES

RAJ KUMAR SINGH*

Abstract
Healthcare is an essential requirement in anybody life. The Institutional Healthcare Service Providers are Hospitals. With the increase in the population, increasing per capita income and awareness towards the Healthcare there is a boom in the Healthcare Sector in India through an exponential growth of Hospitals all around the country specially in the cities irrespective of its sizes. In this scenario of mushrooming of the Hospitals it become a difficult task to differentiate a good hospital and a bad hospitals in terms of quality of Healthcare Services delivered by them. In such situation, the Marketing of Hospital is continuously changing its dynamics with lot of issues and challenges. This study is meant for the exploration of the Strategic Issues and Challenges of Hospital Marketing in the context of current Global Era.

Introduction
If we go through any newspaper, health magazine, tune a radio, see a TV Advertisement or take note of huge hoardings lined up on city junctions; we are sure to run into tons of Hospital Advertisement that speak of the best of care provided at their hospital. Moreover these days we see many Hospitals updating logos, altering the visual look of their communications, changing positioning lines and giving facelifts to their facilities. Hospitals in India have now come to believe that marketing their services is crucial to the success of their hospital

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© The Author 2012, Published by Mpasvo Press (MPASVO). All rights reserved. For permissions e-Mail: maneeshashukla76@rediffmail.com. Read this paper on www.onlineijra.com.
business. Their Marketing efforts are maturing to the point that even patients today have fairly come to the point that even patients today have fairly come to terms with excepting the concept of Hospital Marketing.

**Objective of Study**

Objective of the present study is to know how the Marketing Dynamics of Hospitals are changing and its subsequent Strategic Issues and Challenges in the current Global Era.

**Hospital Marketing Concept**

Hospital being skeptical about marketing their services was a common phenomenon earlier. Given the fact that Indians did not like Hospitals to Hard-sell themselves, hospital promoters, CEOs and their Management were bound to experience this hit or miss situation before promoting their hospitals. Marketing has been a bad word in Healthcare and also very misunderstood concept. Although it has been subtly practiced over the years. The demand and supply situation was so poor that efforts to get patients were really not required. Over the year the idea of Healthcare Service as Social Service was so perceived by the Indian Service Users that commercial Marketing, Promotion and Profitable Pricing were looked upon as almost criminal acts.

Regardless of all the factors that influenced the traditional Marketing approach, Hospital Marketing as a concept for growth evolved in the recent past. The increasing corporatisation of Hospital Groups, Medical Tourism and increasing tourism and increasing consumerism within the industry that has proved to be a blessing in disguise for Healthcare Organisations. Increase in the number of private players has led to healthy competition within the industry. This in turn has propelled hospitals to market their services aggressively. On the other hand, consumerism has given hospitals a fair shake to promote what best facilities they have to offer to their customers. The most positive aspects of this momentum is that hospital marketers and senior managements are turning their attention towards their brand. Traditional method of marketing commonly known as the ‘word-of-mouth’ technique is now succeeded by more strategic and tangible techniques. Additionally, various marketing strategies have been developed in order to ethically market their hospitals without misleading their patients.

The emphasis is now shifted from an aggressive marketing approach to a well thought-out brand building activity. After starting almost apologetically decade back, it has come a long way taking near centre stage in most regions. The evolution is not yet complete and institutions are experimenting with various structures using different nomenclatures for similar roles. The role of a sales person and public relation (PR) is well established. The need for digital marketing and branding are also registered, particularly after the Medical Tourism hype and increased corporatisation. The latter two and sometimes even PR are outsourced by hospitals these days.

**Marketing for Sales or for Brand Building**

There is always a debate about whether or not Marketing of Hospital is associated with Brand Building activity. Definition of Marketing remains unchanged, it’s execution may differ by market and industry. Hospital Marketing encompasses all aspects including Brand Building. It depends on the market context for individual healthcare organisations, but from a long term perspective Branding takes precedence over sales approach of marketing for majority of healthcare organisation. Within a hospital too there are certain departments like in patient care, emergency services, critical care services etc., where Brand Perception (hospital or doctor) precedes sales approach of marketing where as reverse is true for departments like OPD, health check ups, day care, home care etc. Hospitals must market mostly on technology or a particular department. For example if any new equipment is acquired and installed, the hospital must communicate about the same either through...
print or electronic media. Similarly, if any landmark achievement in the field of medicine or research work or any unique surgery has been done it must be highlighted. This enhances the image of the hospital in the long run.

**Effective Marketing**

Reforms in Marketing Strategies and increased competition within the industry has brought opportunities as well as challenges. Hospitals mostly interpret their marketing success in the common mantra of the ‘hospitality lingo’. It is a common belief among hospital promoters and management staff that their patient is the best medium to promote their hospital. This may be true to a certain extent, but it is not the only way to draw potential customers. Success demands more than just increased foot falls. It requires a hospital to be on the top along with maintaining healthy, rapid and sustainable development momentum. Experts have time and again highlighted that as hospital administrators and marketing managers it is a must to examine and reflect on the core issue, review the market as well as economic conditions and study the strengths and weaknesses of their competitors. This activity in return ensures that the hospital has enough information to strategise an effective marketing plan.

Organisational vision, mission and values are the starting point for a good marketing plan. These then have to be broken into short and long term goals. Goals are like milestones to reach the destination. But organisations do not operate in isolation. They are part of a larger market with several players, influencers and stakeholders. The organisation itself has its strengths and weaknesses. Before initiating an action plan a marketer needs to study the environment and the capability of the organisation itself. Understanding the market is the tricky part which requires lot of data and information.”

**Sensible Marketing**

The industry experts advocate soft marketing rather than being aggressive. They believe that the nature of the industry does not support on-the-face advertising. Keeping in mind the Indian consumer it a must to conduct sensitive and sensible marketing. Though some experts believe that a little aggressive nature is effective.

**Internal Marketing is Vital**

In pursuance to make a hospital worthy of external marketing it is imperative for every hospital to practice internal marketing. This inspires the hospital staff and makes external marketing simple. The impact of effective marketing should be felt across the organisation. If one area needs to be identified it would be the customer interphase departments. Marketing efforts are geared to re orient the organisation around the customer/patient. Marketing experience measured through his/her feedback form the measure of marketing impact.

**USP**

Experts opine that hospital marketing is a complex equation because most often the producer himself is the marketer. Since the production and consumption takes place simultaneously, there is no physical or time gap between the production and consumption. For this reason hospital marketers are forever challenged by the need to differentiate their product/service on the basis of their USP from the rest of their competitors. The stronger the basis of this differentiation, the longer it takes for competition to ‘catch up’. “Hospitals should consistently communicate what they have to offer to their customers. This is also necessary for Brand Building. Figure out the relevant uniqueness of your hospital, as this will help you to differentiate themselves from the
rest. Market the same idea within your internal staff and create an operating process for the same. Then, communicate the same thought to your target audience. Effective communication within the hospital and to the target audience will create a successful brand. Besides this, every hospital intending to market themselves must advertise its core beliefs through a well thought of brand campaign. It is imperative for customers to know what their hospital stands for, what are its core values are and how does it strive to stay true to those beliefs. Interestingly these days, integrated health record is one aspect that hospitals use to differentiate themselves from their competitors. The number of hospitals providing these services are relatively less in number, yet this technology oriented system has gained enough recognition within the industry. Hospital providing these services have attracted a lot of patients.

**Tools and Techniques**

Using the correct medium to market hospital services is a must. Tools come in handy for strategising the marketing plan, market analysis and measuring outcomes. A whole lot of statistical tools are available to analyse market research data. Marketers are always looking for consumer insights, their perceptions about the services, the brand, competition and needs. Capturing these insights is a tricky process. One has to rely on statistical tools and technological resources to draw meaningful insights.

*Mass Communication:* advertising in newspapers, brochures, inserts, multi media etc.

*Personalised Communication:* Bulk SMS, emails, loyalty programme etc.

*Public Relation Activities:* Community development initiatives, accolades, achievement etc.

*Brand Building Activities:* Brand recall activities, brand perception improvement activities

*Incentive based Sales:* Direct to consumer approach, special packaging / rates etc.

**Social network or digital media**

*Insurance:* A large number of people in the country pay for their medical bills but a significant number may have insurance or maybe supported by their organisation for medical expenses. He further believes that it is essential that the hospital is empanelled with insurance companies (and Third Party Administrators, TPAs) and corporate. Similarly, foreign patient facilitators and insurers need to be locked in.

*General Practitioners(GP):* Physicians are important business partners of the hospitals they are attached to. Mostly patients do not walk into a hospital on their own, they are referred by local physicians. It is important that these general physicians are convinced of a hospital’s capability in handling complex cases for them to refer patients. Building a good relation with GPs is important to increase your business.

*CRM a New Way:* CRM is a new concept that stems from a rich range of marketing as well as social activities. Although this concept has its roots in the West, it has gained rapid acceptance in India in the recent times. The concept is based on strategic positioning and marketing tools that involve the cooperative efforts of a “for profit” business and a non-profit organisation for mutual benefit. Marketing professionals are of the opinion that the CRM concept is beneficial to both parties as the campaign gives the corporate hospital the opportunity to improve brand image, build customer loyalty and increase sales whereas on the other hand, it provides funds to the charity institute which is working to support a special cause.

*A Marketing Team:* All of the above mentioned techniques to effective marketing will be successful if the hospital is backed by a spirited marketing team. An effective marketing plan can be achieve if the hospital has a proactive marketing department within the hospital who can facilitate the hospital to plan and execute the entire marketing campaign effectively.
Conclusion
To study the Strategic Issues and Challenges in the Changing Dynamics of Hospital Marketing in the Global Era, the Hospital should have proper concentration on defining its Marketing Objective, have an effective Marketing Team, Impressive communication and promotional plan. CRM play an important role in the Marketing of Hospitals. Providing Insurance Facility to its Patients are an important Brand developing strategy. The whole Marketing strategy should be a sensible one with Internet Marketing as a Tool and reference from General Practitioner as a guiding factor.

REFERENCES
KAMBLI RAELENE, (July’ 2011)-, Doing It The Marketing Way, Express Healthcare Management, pp 13-17
MOORTHI, YLR, (2000), Brand Management-The Indian Context, Vikas Publishing House (P) Ltd
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