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### **Editorial:**

**1]**

**Yoga and Medical science**

**Editorial**

**Dr Janardan V Bhatt**

If one is searching articles in PUB MED and looking for articles or papers related to Yoga, one will find more than thousand titles on yoga. But how many of medical people working in yoga get education and training in Yoga in medical institute. In March 2005 in India a national workshop on stress and its management by yoga was organized by the Department of Physiology, Jawaharlal Nehru Institute of Post graduate Medical Education and Research Pondichery. Inspired by the lucid and insightful exposition of the potential of yoga for mankind in the course of a highly successful workshop, it was decided that a declaration should be made on the occasion. With suggestions from the invited faculty and delegates, organizing secretary made a declaration on yoga titled "JIPMER declaration on yoga, March 2005" during the valedictory function.

The key issues that were highlighted and consensus achieved include the following:

1. The human mind is invariably affected in most disease conditions and addressing this is central to the treatment of any condition.
2. Faith constitutes a substantial component of the healing process.
3. Yoga in its broadest sense has the potential to improve the quality of life of healthy individuals, as well as patients with very common conditions such as high blood pressure, mental health problems like depression and anxiety.
4. Treatment of disease based on scientific evidence should be generously complemented by treatment based on faith and patients must be encouraged to harness their own powers for healing.
5. Science is inadequate to examine the complexity of yoga and it would be incorrect to examine the effects of yoga under the framework of contemporary medicine.
6. The issue that yoga, a valuable ancient tool with origins in India, was misrepresented and misunderstood, was also brought out.

Experts struck a consensus about the need for changes in health and education policy, which include:

1. Greater collaboration between allopathic practitioners and yoga practitioners in planning and evaluation of patient care.
2. Creating as soon as possible, departments of yoga education, research and therapy at least in tertiary care centres, with adequate numbers of trained personnel to provide yoga therapy to patients who are likely to benefit from the effects of yoga therapy.
3. Increased funding to provide integrated and holistic health care.

4. Greater funding for validating the scientific basis of yoga.
5. Establishing a task force to formally prepare a report based on available evidence as to what types of yoga techniques may be appropriate for which conditions.
6. Formal training in yoga and accreditation of yoga institutes.
7. Inclusion of yoga as part of undergraduate and postgraduate medical education so that doctors are aware of the potential of yoga  
16th and 18th March, 2005.

As per literature Yoga emphasizes treatment of the root cause and not the symptoms. It works in a slow, subtle and miraculous manner. Modern medicine can claim to save a life at a critical stage, but, for complete recovery and regaining of normal health, one must believe in the efficiency of Yoga therapy. The Yogic way of life includes a code of ethics, regulations, discipline etc, coupled with prayers and meditation. Even discussion of these subjects helps one relieve mental tensions and change attitudes. Simple asanas like the pavanmuktasana and the shavasana help to stretch and relax the whole body and neutralize tensions. The limbs of locomotion as well as all the vital organs relax and therefore function normally. A simple pranayama technique ensures better utilization of oxygen from the air that we breathe, better utilization of lung surface and the better circulation of oxygenated blood. This is accompanied by reduced rate of respiration, which in turn helps to reduce the heart rate and blood pressure. The most profound effect is achieved by meditation. Latest medical research proves that there is a marked reduction in cell activity or metabolic activity and the body sustains it self on less food and less oxygen as well as less sleep and rest; as a result, the heart, lungs and other vital organs get the kind of rest they need to recover from stress. During meditation the pattern of alpha and beta waves recording the brain activity indicate a deep state of relaxation, deeper than the state of deep sleep.

Potential health benefits of yoga are numerous and may include:

- Stress reduction. With its quiet, precise movements, yoga draws mental focus away from busy, chaotic day and toward calm as one move the body through poses that require balance and concentration.
- Increased fitness. As one learn and refine new poses, one may enjoy improved balance, flexibility, range of motion and strength. And this means that there is less likely to injury during daily activities.
- Management of chronic health conditions. Yoga might help with a variety of health conditions, such as cancer, depression, pain, anxiety and insomnia, by

helping with sleep problems, fatigue and mood. Yoga also can help reduce heart rate and blood pressure.

While one should not expect yoga to cure or offer 100 percent relief, it can help some health conditions when combined with standard treatment. And if one already enjoy good health, yoga can be an enjoyable supplement to your routine life by changing the whole physiology.

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Health benefits of yoga - MayoClinic\_com

All India Council of Technical Education (AICTE) UGC AICTE mulls introducing yoga in curriculum'

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2]

**BREATHING TESTS: A MEASURE OF THE  
REGULATION OF THE MATERNAL  
CARDIOVASCULAR ACTIVITY DURING  
PREGNANCY**

**Dr Neeta Bachlaus, Associate Professor, Deptt of Physiology,  
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Abstract:

The study was the response to breathing test in 30 healthy pregnant volunteers in 20<sup>th</sup> to 29<sup>th</sup> weeks of singleton pregnancy with a mean of 25.2 gestational weeks. Deep breathing difference (DBD) was similar in both the groups. The heart rate variability was significantly lower in the second trimester of pregnancy reflected by the smaller standard deviation of R-R interval ( $SD_{R-R}$ ) during the quiet breathing test.

Key words: pregnancy, heart rate, deep breathing, quiet breathing.

## Introduction

Pregnancy divests all bodily functions otherwise devoted to the preservation of milieu interior for the favorable growth and development of the fetus (Hyttén & Leitch; 1971).

The reigns of body control functions are held conjointly by the autonomic nervous system and the endocrinal system. Autonomic nervous system preponders over the endocrinal system in the control of haemodynamic changes associated with pregnancy. Inadequate or lack of prenatal care as observed more in developing countries is responsible for spontaneous abortions, low birth weight infants, and still birth. This carnage can be attributable to deficiency of autonomic nervous control mechanism in pregnancy.

Breathing test is a non-invasive tool to measure the cyclical variations in the heart rate due to sympathetic and vagal impulses on the sino-atrial node.

#### Materials and Methods

The fact that the maximum haemodynamic alterations occur at mid term, I perform the test by randomized selection of 30 women with singleton pregnancy attending the antenatal clinic of new civil hospital Surat in their 20<sup>th</sup> to 29<sup>th</sup> gestational weeks with a mean of 25.2 weeks. The control group comprised of equal number of samples in reference to comparable age and accessibility. The mean ages in the control and cases were 26.8 years (range 19 – 38) and 25.2 years (range 20 – 35) respectively. The studies being quantitative in nature 30 cases in each group were considered to be adequate for statistical inference. The variations regarding physical fitness, body weight for height, haematocrit & hemoglobin level (within limits) were allowed in both groups.

The subjects were familiarized with the laboratory surroundings, equipments and examination procedures to minimize the fluctuations in values caused by anxiety. The recordings were taken between 10A.M. – 12 Noon. There was a minimum gap of two hours between the breakfast and the recording of observations

The blood pressure was measured by the pneumatically inflated micro computerized Vital max 800 non – invasive pulse blood pressure monitor. The observations were corroborated by the standard auscultatory Riva-Rocci method with the help of pneumatically operated mercurial type sphygmomanometer. The appearance (phase I) and the apparent disappearance (phase V) of the Korotkoff's sound marked the systolic and diastolic pressure respectively.

#### **Deep Breathing Test**

This test was performed with subject breathing at the rate of 6 breaths/min with an equal duration of inspiratory and expiratory cycles beginning at the end of one minute of supine rest. Simultaneously electrocardiogram was recorded in Lead II for the entire duration. The mean of the differences between the maximum and minimum instantaneous heart rates in all the successive respiratory cycles were expressed Deep breathing difference (Wheeler & Watkins; 1973)

#### Quiet Breathing Test

The standard deviation of the length of R-R interval in the Quiet Breathing Test was calculated during a 2-minute period starting 1 minute after initiation of supine rest. The time domain index was calculated by converting inter beat graduations of the ECG roll into milli-seconds by multiplying with the speed at which the roll moved.

Statistical method: the unpaired 't' test was applied to the data of independent observations made on individuals of the mid term pregnant and non- pregnant groups. As

per null hypothesis ( $H_0$ ) it was assumed that there is no real difference between the means of the two samples. The level of significance was set at 5 % ( $P > 0.05$ ).

Observations and result:

Table 1: General parameters in pregnant & non-pregnant groups:

VARIABLES	PREGNANT		NON-PREGNANT		P>0.05 SIGNIFICANT(*)
	Mean	± S.D.	Mean	± S.D.	
Age (yrs)	25.23	3.41	26.77	5.6	0.2
Height(cms)	151.67	5.74	152.07	4.44	0.77
Weight(Kg)	48.43	8.15	50.27	7.86	0.383
Gestational Weeks	25.23	2.11	-	-	-
Hemoglobin (gm %)	9.88	1.05	10.57	1.21	0.1

Table 2: The resting heart rate & blood pressure in pregnant and non-pregnant groups

VARIABLES	PREGNANT		NON-PREGNANT		P<0.05 SIGNIFICANT(*)
	Mean	± S.D.	Mean	± S.D.	
RESTING VALUES					
Heart rate(beats/min)	88.77	14.13	77.87	9.43	< 0.001*
Systolic B.P.(mm of Hg)	104.27	10.45	111.17	9.46	< 0.01*
Diastolic B.P. (mm of Hg)	68.57	7.16	74.33	7.2	< 0.0008*

Table 3: The heart rate responses to breathing tests in pregnant and non-pregnant groups:

VARIABLES	PREGNANT		NON-PREGNANT		P>0.05 SIGNIFICANT(*)
	Mean	± S.D.	Mean	± S.D.	
Breathing tests					
DBD	35.04	10.88	36.32	8.64	0.647
$SD_{R-R}$	29.22	14.85	47.02	20.3	0.0002*

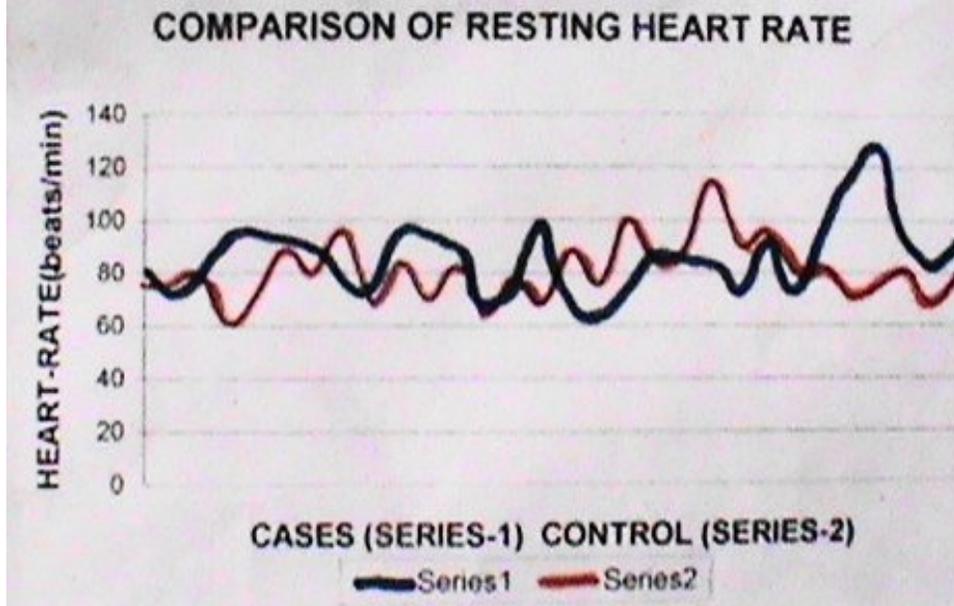
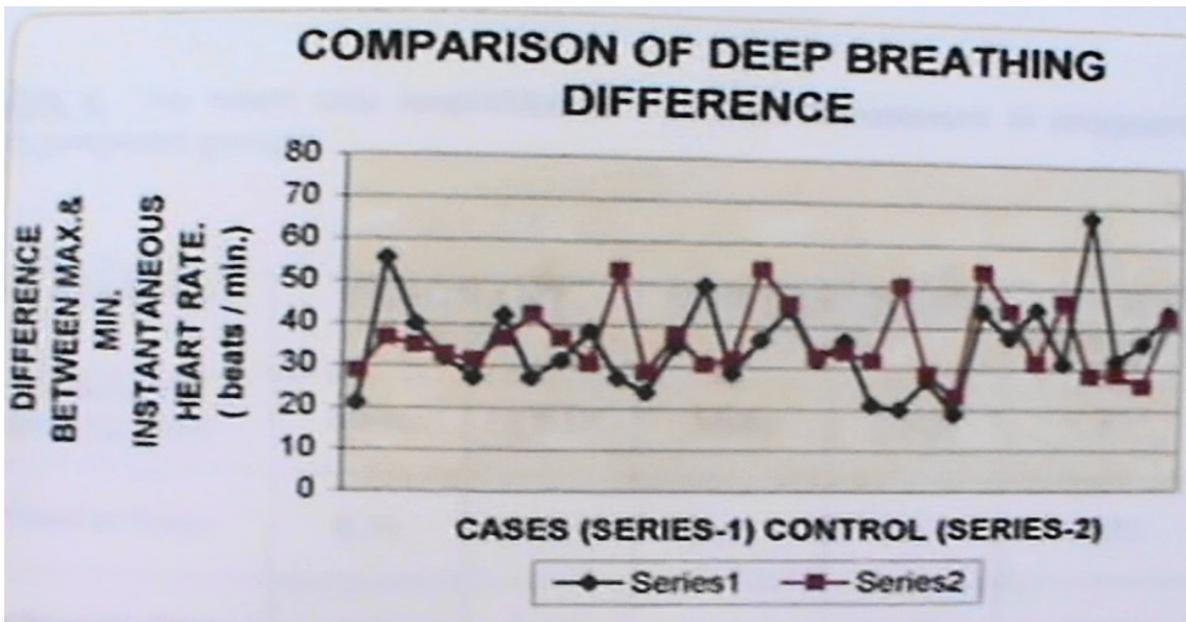


Fig 1





arrhythmia is considered to be the net effect of the central integration of this afferent inflow (Melcher 1976).

Augmentation of respiratory sinus arrhythmia is found to occur due to increase in tidal volume (Hirsch & Bishop 1981) thereby leading to an increased heart rate response to controlled breathing (Freyschuss & Melcher 1976). Although vital capacity and respiratory rate remain unchanged during pregnancy, there is notable increase in tidal volume and minute ventilation at rest (Yeast 1990). It may be summarized that change in respiration doesn't explain the lower  $SD_{R-R}$  values of mid pregnancy. Nonetheless the influence of blood pressure levels brought about by the increased blood volume and decreased peripheral resistance could explain the variation in the vagal discharge (Kunze 1972).

Deep breathing difference was similar in both pregnant and non-pregnant groups. This response is under parasympathetic control and mediated by the vagus nerve. (Baldwa & Ewing 1977).

The heart rate responses to deep breathing and heart rate variability demonstrated by the  $SD_{R-R}$  have the same efferent limb in vagus. This suggests that the difference in  $SD_{R-R}$  values in the two groups originates either from the afferent inputs or the central integration of the stimulus but not from the reduced efferent capacity of the autonomic control of the heart

The growing uterus exerts increasing pressure on the large veins impeding venous return to the thoracic cavity; this reduces the fluctuations in the right atrial distension and contributes to the decreased heart rate variability during quiet breathing.

#### Conclusion:

A rearrangement of the autonomic tone takes place in normal pregnancy, which could be interpreted either as a shift of autonomic balance towards a relative vagal predominance or as the consequence of attenuation of baro reflexes. Breathing tests can be recommended for studying the regulation of the maternal cardiovascular system.

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3]

### **ANALYSIS OF LUNG FUNCTIONS IN FLOUR MILLS AND RICEMILLS WORKERS.**

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#### **ABSTRACT**

##### **Aims:**

To study of the lung function tests in asymptomatic flour and rice mill workers and this study would be helpful in preventing longstanding harmful effects of such exposures and it is also useful for preventing environmental risks.

**Study Design:** Cross – sectional study

##### **Material and Methods:**

The subject 207 asymptomatic healthy male is instructed to take maximal inspiration (to TLC) and he was connected to medspiror through the mouthpiece, after that nose clip is applied and the subject was asked to exhale forcefully into the medspiror as fast as possible.

##### **Statistical analysis:**

Statistical tests used like Student's 't' test for two groups and ANOVA for multiple group comparisons.

##### **Results:**

Majority of lung function test parameters showed reduced levels in flour mill workers when compared to rice mill workers. However the difference was not statistically significant .

##### **Conclusion:**

It is concluded that flour dust and rice husk dust causes deterioration of pulmonary functions in subjects working at mills (flour and rice). The findings of this study recognized the role of grain dust (flour and rice) for a longer duration in decline of pulmonary function test among flour mills and rice mills workers.

**Key-words:** Lung function, flour mill worker, rice mill worker

##### **Introduction:**

Each day, our lungs are directly exposed to more than 7000 liters of air, which contain varying amount of inorganic & organic particles, as well as potentially lethal bacteria & viruses. In general, lot of uncertainty exists about the role of environmental pollutants in production & progression of airway abnormalities. Airway pathology changes have been recorded with industrial & fumes. Dust, the tiny particles dispersed in air due to mechanical disintegration of rocks, minerals, & other materials by impulsive forces such as drilling, blasting, crushing, grinding, milling, sawing and polishing or to the agitation or breaking down of organic materials such as cotton fibers, pollens & fungal pores. Fumes consists of metal oxides formed by heating metals to their melting point.<sup>1,2</sup> With the formidable upsurge in pulmonary physiologic research over the past four decades, has seen a marked increase in our understanding of the functional disturbances & pathophysiology of lung diseases<sup>3</sup>. Since the middle of 20<sup>th</sup> century medical departments of a large number of factories became concerned, as number of pulmonary impairment cases with workplace-relationship had developed. Significance of pulmonary functions in assessing respiratory responses to various air borne pollutants has been known and large number of studies have been undertaken to see the effect of dust in various occupations.<sup>4,5,6</sup> Spirometric measurements FVC & FEV1 are considered as an integral part of epidemiological respiratory health studies.<sup>2,7,8</sup> Effects of dust are well documented in coal mine, cotton, talc, asbestosis, wooden dust, iron foundry & jute mill.<sup>9,10,11</sup> Reduction in ventilatory function were observed in cotton workers, coal miners, asbestosis, wooddust & in grain elevators.<sup>12,13,14,15,16</sup> Effect of rice and flour dust on pulmonary function parameters are not reported in literature and only few studies have been conducted in all over India. Only some cases of asthma & rhinitis were noticed in flourmill workers<sup>17</sup>. few have mentioned the decrease in FEV1 value, grain weevil protein was found to be the reason of allergic asthma in these subjects & rice husk also decreases the pulmonary functions<sup>18,19</sup>. It is also observed that diffusion & FEV1 % were decreased in bakers who were having allergy to flour but they were not able to find any immunoglobulin in un concentrated serum in these subjects. Davis et al.1976 found out that grain might be an important cause of asthma after exposure to grain dust. They observed that there was involvement of small & large airways rather than lung parenchyma<sup>20</sup> However, the results of previous studies are inconsistent particularly in relation to lung function impairment in flour mill & rice mill workers. This study was undertaken to evaluate the pulmonary functions of workers exposed to dust in flour mills and rice mills.

### **Subjects and Methods:**

207 asymptomatic healthy male subjects employed in flour mills and rice mills in and around Davangere between age group 20 to 50 years.

After recording all data, subject was asked to sit on the stool comfortably. The subject is instructed to take maximal inspiration (to TLC) and he was connected to medspiror through the mouthpiece, after that nose clip is applied and the subject was asked to exhale forcefully into the medspiror as fast as possible. Each test was repeated three times and with interval of 5 minutes between each test and the best of three readings was taken.

### **Results:**

FVC-Forced vital capacity, FEV1-forced expiratory volume in 1 sec, PEFr-Peak expiratory flow ration

FEF25-75-Mean forced expiratory flow during the middle held of the FVC

FEF200-1200-mean forced expiratory flow ratio between 0.2 to 1.2 liters of volume change.

FEF25%-forced expiratory flow after 25% of the FVC has been expired

FEF50%-forced expiratory flow after 50% of the FVC has been expired

FEF75%-forced expiratory flow after 75% of the FVC has been expired

FEV1/FVC-capacity ratio expressed as percentage.

**Tabl-1: Physical characteristics of non-smokers and smokers of Mill workers**

Parameters	Smokers (n=118)		Non-Smokers (n=89)		Total (n = 207)	
	Range	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range	Mean $\pm$ SD
Age (yrs)	21-50	35.5 $\pm$ 7.9	20-50	33.2 $\pm$ 8.0	20-50	34.1 $\pm$ 8.0
Height (cm)	150-188	166.7 $\pm$ 7.5	140-188	166.5 $\pm$ 9.5	140-188	166.5 $\pm$ 8.9
Weight (Kg)	38-80	59.1 $\pm$ 10.0	38-90	63.6 $\pm$ 11.4	30-90	61.7 $\pm$ 11.0

**Table-2 : Duration of exposure to dust and pulmonary functions in two groups**

Duration of exposure	Non Smokers ( n=118)				Smokers ( n=89)			
	< 5yrs (n=30)	5-10 yrs (n=63)	> 10 yrs (n=25)	F –value significance	< 5yrs (n=14)	5-10 yrs (n=49)	> 10 yrs (n=26)	F –value significance
FVC <sub>(L)</sub>	2.73 $\pm$ 0.67	2.51 $\pm$ 0.66	2.23 $\pm$ 0.44	4.41 P<0.05	2.05 $\pm$ 0.39	2.12 $\pm$ 0.52	1.86 $\pm$ 0.56	3.10 P<0.05
FEV <sub>1(L)</sub>	2.21 $\pm$ 0.55	1.97 $\pm$ 0.53	1.90 $\pm$ 0.29	3.25 P<0.05	1.46 $\pm$ 0.40	1.45 $\pm$ 0.33	1.36 $\pm$ 0.38	0.51 NS
PFE <sub>R(L/Sec)</sub>	7.48 $\pm$ 1.95	7.06 $\pm$ 1.77	6.38 $\pm$ 1.57	2.64 NS	5.47 $\pm$ 0.94	5.98 $\pm$ 1.55	5.43 $\pm$ 1.69	1.90 NS
FEF <sub>25-75%</sub> (L/Sec)	4.17 $\pm$ 1.04	4.13 $\pm$ 1.22	3.83 $\pm$ 1.09	0.77 NS	3.34 $\pm$ 0.81	3.81 $\pm$ 1.00	3.21 $\pm$ 1.54	3.41 P<0.05
FEF <sub>200-1200</sub> (L/Sec)	6.11 $\pm$ 1.86	5.76 $\pm$ 1.59	5.31 $\pm$ 1.86	1.47 NS	4.18 $\pm$ 1.02	4.58 $\pm$ 1.40	4.47 $\pm$ 1.47	0.70 NS
FEF <sub>25%</sub>	2.60 $\pm$ 0.73	2.63 $\pm$ 0.88	2.47 $\pm$ 0.97	0.29 NS	2.21 $\pm$ 0.70	2.64 $\pm$ 0.84	2.30 $\pm$ 1.21	2.24 NS
FEF <sub>50%</sub>	4.59 $\pm$ 1.16	4.52 $\pm$ 1.34	4.26 $\pm$ 1.08	0.55 NS	3.63 $\pm$ 0.81	5.10 $\pm$ 1.00	3.46 $\pm$ 1.60	3.45 P<0.05
FEF <sub>75%</sub>	6.57 $\pm$ 1.69	6.52 $\pm$ 1.47	6.00 $\pm$ 1.65	1.19 NS	5.03 $\pm$ 1.10	5.51 $\pm$ 1.49	4.93 $\pm$ 1.82	1.83 NS
FEV <sub>1</sub> / FVC (%)	83.64 $\pm$ 19.48	81.57 $\pm$ 20.93	87.42 $\pm$ 15.5	0.81 NS	72.9 $\pm$ 22.3	72.6 $\pm$ 23.0	78.8 $\pm$ 25.8	1.08 NS

**Table – 3 : Comparison of Lung Functions between Flour and Rice mill workers**

Groups	Flour Mill workers (n=112)	Rice Mill workers (n=95)	t-value significance
FVC <sub>(L)</sub>	2.22 $\pm$ 0.86	2.35 $\pm$ 0.77	1.13 N.S.
FEV <sub>1(L)</sub>	1.69 $\pm$ 0.56	1.85 $\pm$ 0.69	1.84 N.S.
PFE <sub>R(L/Sec)</sub>	6.39 $\pm$ 1.86	6.51 $\pm$ 1.86	0.47 N.S.
FEF <sub>25-75%</sub> (L/Sec)	3.82 $\pm$ 1.33	3.86 $\pm$ 1.18	0.25 N.S.
FEF <sub>200-1200</sub> (L/Sec)	5.19 $\pm$ 1.71	5.21 $\pm$ 1.78	0.07 N.S.
FEF <sub>25%</sub>	5.88 $\pm$ 1.70	5.92 $\pm$ 1.73	0.16 N.S.
FEF <sub>50%</sub>	4.19 $\pm$ 1.42	4.18 $\pm$ 1.27	0.01 N.S.
FEF <sub>75%</sub>	2.52 $\pm$ 1.02	2.54 $\pm$ 0.86	0.06 N.S.
FEV <sub>1</sub> / FVC (%)	76.13 $\pm$ 21.32	80.72 $\pm$ 32.35	1.22 N.S.

The mean height and weight of subject in group I (smoker) was 166.7 cm and 59.1 kg respectively. Similarly mean height and weight of group II (non-smokers) was 166.5 cm and 63.6kgs respectively.

Table-2: shows that forced vital capacity(FVC) value of non-smokers exposed for less than 5 years shows the mean value of  $2.73 \pm 0.67$  & that exposed more than 5 years. But less than 10 years shows the mean value of  $2.51 \pm 0.66$  & those exposed more than 10 years shows the mean value of  $2.23 \pm 0.44$ . Analysis showed that as duration of exposure increased FVC showed reduction of mean level ( $P < 0.05$ ). The FEV1 value of non smokers exposed for  $< 5$  years shows the mean value of  $2.21 \pm 0.55$  & that expose  $> 5$  years &  $< 10$  years shows mean value of  $1.97 \pm 0.53$  & those exposed more than 10 years gives mean value of  $1.90 \pm 0.29$ . Analysis showed that as duration of exposure increased FEV1 is reduced significantly ( $P < 0.05$ ).

Even in smoker group also showed similar correlation between exposure and FEV1 valve level, as the exposure duration is increased there is a reduction in FEV1 level showing inverse relationship between variables.

PEFR value of non-smokers exposed for  $< 5$  years shows a mean value of  $7.48 \pm 1.95$  and that exposed  $> 5$  years &  $< 10$  years gives the mean value of  $7.06 \pm 1.77$  and those exposed  $> 10$  years shows the mean value of  $6.38 \pm 1.57$

Even in smoker, groups also showed similar relation between exposure & PEFR values. It is observed that PEFR is seen to be reduced in both groups (smokers & non-smokers) with increased duration of exposure. But however it is not statistically significant.

FEF25-75 value of non-smokers exposed for less than 5 years shows a mean value of  $4.17 \pm 1.04$  & that exposed more than 5 years and less than 10 years shows mean value of  $4.13 \pm 1.22$  and those exposed more than 10 years, mean value shows  $3.38 \pm 1.03$ .

The FEF200-1200 value of non smoker exposed for less than 5 years shows the mean value of  $6.11 \pm 1.86$  and that of exposed more than 5 years and less than 10 years shows the mean value  $5.76 \pm 1.59$ , and those who exposed more than 10 years shows the mean value of  $5.31 \pm 1.86$ .

In the other group (smokers) exposed to dust for the same duration as above shows clear reduction in values as follows,  $4.78 \pm 1.02$ ;  $4.58 \pm 1.40$ ;  $4.47 \pm 1.47$ . we observed decreased values in smokers.

FEF25% value of non-smoker exposed for less than 5 years, shows a mean value  $2.60 \pm 0.73$  & that exposed more than 5 years but less than 10 years shows the mean value of  $1.63 \pm 0.88$  & those who exposed more than 10 years shows the mean value  $2.47 \pm 0.97$ .

In an least smoker exposed less than 5 years shows the mean value of  $2.21 \pm 0.70$  and that of more than 5 years and less than 10 years shows mean value of  $2.64 \pm 0.84$  and more than 10 years  $2.30 \pm 1.21$ .

There is clear reduction in smokers exposed, but not statistically significant. FEF50 value of non-smoker exposed for less than 5 years showed the mean value of  $4.59 \pm 1.16$  & that of exposed more than 5 years and less than 10 years shows the mean value of  $4.56 \pm 1.08$ .

In case of smokers who exposed less than 5 years showed the mean value of  $3.63 \pm 0.81$  & that of who exposed more than 5 years and less than 10 years shows the mean value of  $3.63 \pm 0.81$  & those who exposed more than 10 years shows  $3.46 \pm 1.60$ .

There is a clear reduction in smokers exposed to dust it is statistically significant.

FEV1/FVC ratio in non-smokers exposed to dust shows the mean value of  $83.64 \pm 19.48$  in workers exposed less than 5 years and in that those who exposed more than 5 years and less than 10 years shows the mean value of  $81.57 \pm 20.75$  and those who exposed more than 10 years it is  $87.42 \pm 15.5$ .

In relation to this smoker group shows the mean value of  $72.9 \pm 22.3$ ,  $72.6 \pm 23.0$ ,  $78.8 \pm 25.8$  exposed to dust to same duration as mentioned above there is clear reduction in smokers compared to non-smokers but not statistically significant.

TABLE-3: the levels of lung function tests among the flourmill & rice mill workers were also assessed separately. In order to know the effect of exposure for flour & rice dust. Majority of lung function test parameters showed reduced levels in flour mill workers when compared to rice mill workers. However the difference was not statistically significant.

**Discussion:**

We observed a lower FVC, FEV1, PEF, FEF25-75%, FEF200-1200, FEF50%, FEF75%, FEV/FVC were significantly reduced ( $P < 0.001$ ) in smokers.

The acute exposure to cigarette smoke is associated in most studies with decreased mucocilliary transport, which reduces or shows delay in alveolar clearance.

**Effect of flour dust and rice dust on pulmonary functions in mill workers**

It may be grain weevil protein or grain mite be responsible for asthma after exposure to grain dust causing small or large airways obstruction. Hendrick et al (1986) noted a decrease in diffusion and FEV1% in bakers again in a provocative test but did not find any immunoglobulin in their unconcentrated serum<sup>15</sup>

So, after assessing the effect of smoking we analyzed the effect of flour dust and rice dust on pulmonary function test, and correlating the same regarding duration of exposure.

**Effect of duration of working at mills:**

Effect of duration of working at flour mill and rice mills is an important factor to determine the effect of flour and rice dust on pulmonary functions. It ranged from 1-18 years. When 30 mill workers with less than 5 years working duration shows the mean values FVC-2.73, FEV1-2.21, PEF-7.48, FEF<sub>25-75%</sub>-4.12, FEF<sub>200-1200</sub>-6.14 and the workers exposed more than 10 years showed further reduction in pulmonary function test, FVC, FEV1 is significantly reduced and rest of the parameters are not statistically significant. This showed that their duration of working in flour mill & rice mill workers does effect the pulmonary function test, But the damage caused is not highly significant. The pulmonary functions of 25 mill workers with more than 10 years working duration showed significant reduction of FEV1, FVC ( $P < 0.05$ ).

It shows that increased duration of working at flour mill & rice mill increases the lung damage causing both airway obstruction and interstitial involvement. The lower values of lung function test among flour mill and rice mill workers exposed to grain dust for longer duration where in smokers in both groups suggest that dust exposure and smoking has effect on pulmonary function test.

A decrease in FVC, FEV1, PEF, FEF25-75%, FEF200-1200, FEF25%, FEF50%, FEF75%, suggests that these parameters are very sensitive in detecting changes in pulmonary functions at an early stages.

**Conclusion :** The duration of working in flour mill & rice mill workers does effect the pulmonary function test, But the damage caused is not highly significant. Increase in duration of working at flour mill & rice mill, increases the lung damage causing both airway obstruction and interstitial involvement. The lower values of lung function test among flour mill and rice mill workers exposed to grain dust for longer duration. The lower values of pulmonary function test in mill workers exposed to grain dust for longer duration, suggest that dust exposure have effect on pulmonary function test. This is probably due to hypertrophy of mucosal cells due to irritation by grain dust, which causes obstruction for the exhaled air. Effect is very much dependent upon the extent of exposure, both in the form of duration of daily working hours and number of years they have worked in the mill. It is suggested that all the mill workers must be provided with better facilities and proper engineering measures (ventilation) so that employees are exposed to less dust.

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## **A RETROSPECTIVE STUDY OF 5 YEARS: ORGAN PHOSPHOROUS POISONING IN AHMEDABAD.**

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### ***Abstract:***

Poisons are known to mankind since time immemorial. Of the various substances used for suicide in India, Organ phosphorous compounds form a significant group as observed by much workers. The study was aimed to generate a baseline data on the epidemiological factors contributing to the incidence and mortality due to O.P. Poisoning. So as to highlight the problem this requires planned and concentrated effort in dealing with it on a broader horizon. Since prevention is the only logical approach there is an urgent need to take appropriate steps to prevent loss of lives. The analysis of the data revealed that 65 cases of O.P. poisoning brought to the mortuary of Smt. NHL MMC, Ahmedabad for medico-legal autopsy, during 5 years period i.e. 1995 to 1999. The age group ranged between 10 years to 40 years and above, with maximum incidence between 21-30 years and males outnumbering females. The main mode of poisoning was suicidal by ingestion.

### ***Key words:***

Organ phosphorous, Poisoning and Insecticides.

### ***Introduction:***

Toxicology is a basic science of poisons. PARACELTUS over 400 years ago pointed out that poison is an agent that is capable of producing injury or death when ingested or absorbed. The EBERS PAPYRUS perhaps earliest medical record (1500), record 800 recipes and many contain recognized poisons, e.g. hemlock, aconite, opium, metal such as Cu, Pb etc. HIPPOCRATES while introducing rational medicine, about 400 BC, added number of poisons. THEOPHRASTUS (370-286 BC) recorded numerous poisonous plants in DE HISTORIA PLANTARUM. Romans too made considerable use of poisons. A competent and well respected physician MAIMONIDES (AD 1135-1204) was a profile writer who wrote Poisons and their antidotes. Death due to poisoning has been known since time immemorial and poisoning contributes to be a major problem all over the world although its type and associated morbidity and mortality vary from country to country or even place to place in the same country. Organ phosphorous compounds are extremely used as pesticides for soft bodied insects in agriculture. Commercially available common household insecticides are

Trade name	Chemical contents (%)	LD50(mg/Kg)	Fatal dose in 50 kg man
<b>ORGANOPHOSPHATES:</b>			
Tik-20(New)	Fenitrothion(2)	500	1200 c c
Dalf	Fenithion(2)	15	50 c c
Finit	Malatheon(1)	1375	7000 c c
<b>CARBAMATES</b>			
Baygon, Hit	Propoxure(1)	95	4750 c c

**Material and Method:**

The material for the present study were collected from all the cases showing confirmed O.P. Poisoning on chemical analysis of viscera in the forensic science laboratory which brought for medico-legal autopsy to the mortuary of Forensic Medicine Department, Smt.NHLMC, Ahmedabad for 5 years.i.e.1995 to 1999. Individual victim's data was entered as P.M. No., deceased name, age, sex, address, marital status, occupation, type of poison consumed, mode of poisoning and time of consumption. All data has been taken in a prepared proforma and analysis made from the data analyzed in various tables.

**Result:**

**Table-1 Annual O.P. deaths in comparison to total unnatural deaths-**

Year	Total Medico-legal autopsies	O.P. Poisoning cases(Percentage)
1995	759	06 (0.8%)
1996	900	16 (1.8%)
1997	904	15 (1.7%)
1998	894	15 (1.7%)
1999	935	13 (1.4%)
<b>Total</b>	<b>4392</b>	<b>65 (1.5%)</b>

--The present study reveals that out of a total 4392 medico-legal autopsies conducted during years 1995 to 1999.O.P. Poisoning was responsible for 65 (1.5%) of the unnatural deaths in Ahmedabad with highest incidence in year-1996.

**Table-2 Socio-demographic Profile-**

Age	Frequency n=65	Percentage %
Below 10 years	3	4.6
11 - 20 years	18	27.7
21 - 30 years	29	44.6
31 - 40 years & above	15	23.1
<b>Sex</b>		
Male	34	52.3
Female	31	47.7
<b>Marital status</b>		
Unmarried	37	56.9

Married	28	43.1
<b>Residential Area</b>		
Rural	34	52.3
Urban	31	47.7

--The poisoning was common in the age group of 21-30 years. Male outnumbered the female, the male: female ratio being approximately. Among the deceased 56.9% were married. The number of victims from the rural population was more than urban.

***Time & Place of suicide-***

Place of suicide was home for 87.7% of victims with preferable time in between 12.01 to 18.00 hrs & in September month (18.5%).

***Table-4 Mode of exposure & Route of exposure-***

Mode of exposure	Ingestion	Inhalation
Suicide	60	0
Homicide	3	0
Accidental	0	2
<b>Total</b>	<b>63</b>	<b>2</b>

--All who choose suicide they prefer ingestion but accidental prey were by inhalation

***Table-6 Subgroup of all OP poisoning-***

Sub group	Male	Female	Total (%)
Dimethoate	3	6	9 (13.8)
Methyl Parathion	5	1	6 (9.2)
Pharate	0	3	3 (4.6)
Pyrethide	0	1	1 (1.5)
Monthio-monocrotopho	1	0	1 (1.5)
Malathione	8	9	17 (26.2)
Phosalone	1	1	2 (3.1)
Dichlorvas	2	3	5(7.7)
Fint malthion	2	0	2 (3.1)
Non Monthio-monocrotophos	10	6	16 (24.6)
Oxydimiton	0	1	1 91.5)
Quinalphos	2	0	2 (3.1)
<b>Total</b>	<b>34</b>	<b>31</b>	<b>65 (100)</b>

\*All homicidal deaths were due to Malthione compound of O.P. poisoning.

Two commonest subgroup used in suicide were Malathione (26.2%) & Non Monthio-monocrotophos (24.6%).

***Table-7 Sex wise distribution of time of O.P. Poisoning-***

Time	Male	Female	Total
Day	20 (58.8%)	23 (74.2%)	43 (66.2%)
Night	14 (41.2%)	8 (25.8%)	22 (33.8%)
<b>Total</b>	<b>34</b>	<b>31</b>	<b>65</b>

\*Chi square =1.7, which insignificant at  $p > 0.5$

--It has been observed that day time was preferred by deceased but female (74.2%) prefer day compare to male (58.8%).

**Table -8 Sex wise distribution of time lag in bringing patient to hospital**

Time Lag	Male	Female	Total
0.00 to 4.00 hrs	30	24	54 (83.1%)
5.00 to 9.00 hrs	3	3	6 (9.2%)
10.00 to 14.00 hrs	1	4	5 (7.7%)

\*Chi square= 0.0137, which insignificant at  $p>0.5$

--Majority of poisoning cases were hospitalized before deaths. It has been observed that 30 males and 24 females' cases hospitalized within 0.00 to 4.00 hours of intake of poisons. The poisoning deaths could be related to the dose ingested as well as the time elapsed between ingestion and arrival at the hospital. (Table-8)

### **Discussion:**

The retrospective 5 years study showed 65 cases of O.P. Poisoning brought to the mortuary of F.M. dep't., Smt.NHLMMC,Ahmedabad. O.P. poisons is now rapidly becoming a very commonly used agent for self poisoning as revealed by the present study. The maximum incidences in the age group of 21-30 years noticed in our study are conformity with the result of Mehta et al <sup>(1)</sup>. The reasons for this trend may be that this age group is most susceptible associated with frustration, failure at school, unsuccessful in love affairs, conflicts with parents etc.It was observed inn the present study that 52.3 % victims from rural background and 47.7% victims from urban background. It is interesting to note that out of 31females, 58.1% were married and 41.9% were unmarried. Married females outnumbered unmarried female, may be due to social and financial stresses and devil of dowry causes the loss of patience. Married males (55.9 %) are more prone to suicide than unmarried males (44.1%). The factor responsible for the trend observed in our study may be due to early marriage in rural community along with its added familial responsibility social customs and limited resources. Suicide was the common mode of poisoning (93.3%). This endorses our views that the inability to cope up with the demand put forth by standard set by the materialistic modern society is the main factor responsible for fatal poisoning in this region. Different worker in this field have also found similar result in their studies <sup>(2, 3)</sup>. The initial explanation for increasing incidence was suggested to be easy availability and high lethality. However despite the restriction on sale and distribution of this agent, imposed by authorities has failed to reduce its use as suicidal agent.

### **Conclusion:**

This study has brought forth the following issues that there is a need:

- (01) This study shall form a basis to suggest need of toxicological analytical Center at a hospital.
- (02) For centralized facility to manage poisoning cases.
- (03) To evolved measure for checking the increasing incidence and mortality Due to O.P. Poisoning.
- (04) Psychologically counseling

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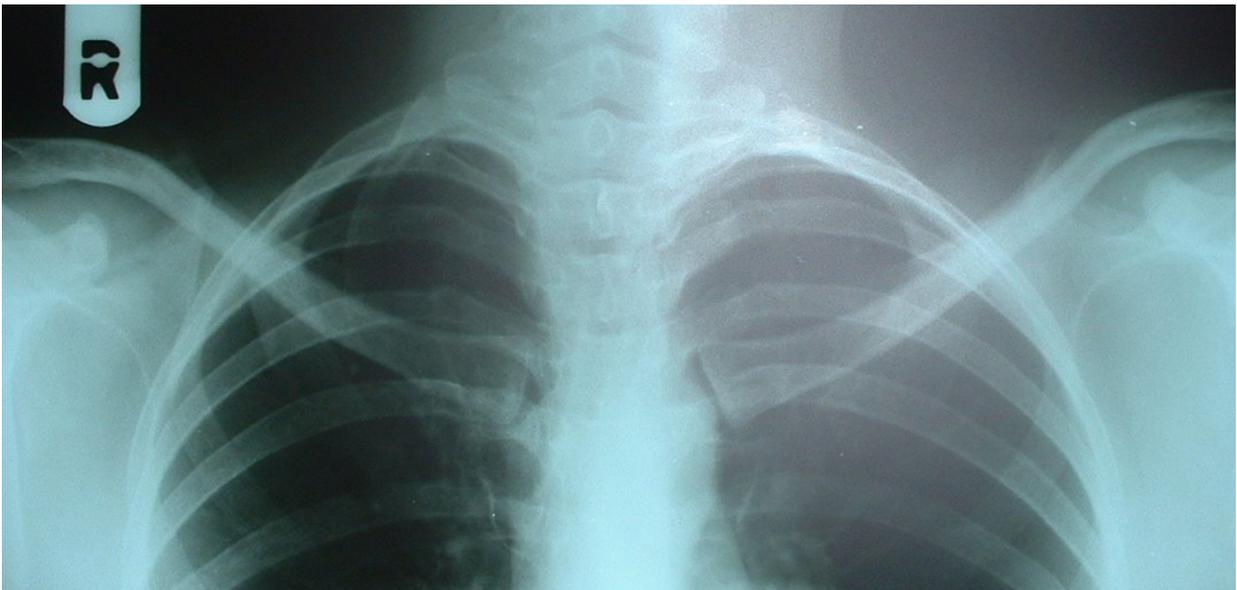
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## CERVICAL RIB

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### Introduction:



### Abstract:

Cervical rib is a supernumerary rib. It is one of the deformities of the musculoskeletal system. According to Terves and Keith, there is always a rudiment of a cervical rib in the fetus which usually disappears but in 1-2 %, it persists throughout life. Only a part of this percentage has symptoms. Genetic Factors may play a role.

#### Clinical important:

It causes pressure on brachial-plexus or subclavian artery. These structures are entrapped between the cervical rib and scaleneus muscle. There is positive Adson's sign i.e. radial pulse is lost in the arm during abduction and external rotation of the shoulder.

There is compression of brachial plexus which causes weakness of muscles of the hand near base of the thumb. This is known as THORACIC OULET SYNDROME.

A supernumerary rib develops from anterior tubercle of cervical vertebra- like Meckel's Diverticulum.

Incidence 5 – 6 % .Mostly an incidental finding

5]

## **CORRELATION OF MUSCULAR FITNESS WITH INTELLIGENCE IN SCHOOL CHILDREN**

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### **ABSTRACT:**

The present study was carried out to correlate muscular fitness (as measured by Kraus-Weber Tests) in Indian school children with their intelligence quotient (as measured by Porteus Maze Test). These tools have been tried and tested successfully in previous studies, don't require sophisticated equipment and are easier to administer than traditional tests like EMG (for muscular fitness) and Wechsler Tests (for intelligence quotient). The present study found a significant positive correlation between intelligence quotient and muscular fitness. Failures in Kraus-Weber Tests tend to have a lower Intelligence Quotient and vice versa.

### **KEYWORDS:**

<b>Kraus-Weber Tests</b>	<b>EMG</b>	<b>Flexibility</b>	<b>Intelligence</b>
<b>Porteus Maze Tests</b>	<b>Intelligence Quotient</b>	<b>Chi-Square Test</b>	<b>Stress</b>
<b>Meditation</b>	<b>Muscular Fitness</b>		

### **INTRODUCTION:**

A level of strength and flexibility of particular key muscular groups is necessary for the function of the body below which the health of the individual seems to be in danger<sup>1</sup>. Kraus and Hirschland prepared a battery of 6 muscular strength tests after 18 years of clinical experience<sup>1</sup>. These **Kraus-Weber Tests** can be easily administered anywhere to anybody (without much pre-procedure preparation) by anyone (with a little training) with no apparent cost. They do not require any special equipment and the subject does not have to undergo a long and painful ordeal as in other more sophisticated tests like **EMG**<sup>2</sup>. Each of these tests is a pass or fail test with a 'fail' in any of the 6 test items constituting a whole test failure<sup>3</sup>.

- ✓ Test 1 is a test of the strength of Abdominal and Psoas muscles.
- ✓ Test 2 is a further test of Abdominal muscles without Psoas.
- ✓ Test 3 is a test for the strength of Psoas and Lower Abdominal muscles.
- ✓ Test 4 is for the strength of the Upper Back muscles.
- ✓ Test 5 is the test for the strength of the Lower Back muscles.

✓ Test 6 tests the length of Back and Hamstring muscles and is a test of **flexibility**.

In fact, it was also reported that those who failed in these tests appeared to be sick, emotionally imbalanced and having constant strain in them<sup>4</sup>. These Kraus-Weber Tests have been proved as an effective screening device to mark unfit subjects (especially in the pediatric age-group) by earlier studies<sup>1,5,6,7,8</sup>. In fact, they can be used as indicators of overall health in this age group.

**Intelligence** is the most valuable wealth of humans. Thurnstone<sup>9</sup> (1946), Griffith<sup>10</sup> (1933) and Piaget<sup>11</sup> (1983) have all come up with their definitions of intelligence but perhaps the pioneer in this field is David Wechsler. He defined intelligence as the aggregate or global capacity of an individual to act purposefully, to think rationally and so to deal effectively with his environment. It helps an individual to consciously adjust his thinking to new requirements. Thus, it is a general mental adaptability to new problems and conditions of life.

Majority of people are average, a few very bright and a few very dull. The main purpose of education is to develop child's intellect in a well-designed environment. Vertical growth of intelligence ceases at 16-20 years of age, but accumulation of knowledge and acquisition of skills continue throughout the life span of an individual. Therefore the so-called "tapping intellectual resources" means an effective advance in the function of the brain<sup>12</sup>.

The aim of the present study is to correlate muscular fitness with intelligence in healthy school-going children between 9 to 12 years of age (older pediatric age-group).

#### **MATERIALS AND METHODS:**

The study was conducted on 320 randomly selected students (studying in standards 3<sup>rd</sup> to 8<sup>th</sup>) of a Government School in India half of whom were of either sex. The area and school were chosen keeping in mind the composition of Indian society with due consideration to various parameters (like socio-economic status<sup>13,14</sup>) so as to get an unbiased representative sample. Out of the 160 boys (or girls), 40 each were 9, 10, 11 and 12 (completed) years of age. This is the age group in which the rate of growth and development is maximal. Also, dynamic conclusions have been drawn in this age group in earlier studies<sup>1,5,6,7,8</sup>. Confirmation of age was done from school registers. The selected children were subjected to general clinical medical examination to rule out any major mental or physical illness or disability. Informed consent was taken from the principal and parents after explaining them the aim and nature of the study and their wards' role in it.

Kraus-Weber Tests<sup>2,3</sup> were performed on the participating children after proper explanation and alleviating their anxiety. Tests were carried out in a well lighted and ventilated room. Participants were instructed to remove their belts or any other tight clothing. Female students were tested in the presence of a female attendant. There was no warming-up before the children underwent the tests. Tests were administered on an adequately large table covered by a clean table cloth. The subjects were shown how to do each test item correctly and then they were asked to perform the same. Following is a short description of the 6 Kraus-Weber Tests:

1. Test 1 (A+P): "Abdominals Plus Psoas" - The subject was made to lie supine with hands behind the neck. The feet were held by the examiner. The subject was instructed (on command) to roll up into a sitting position.(Figure-1)

2. Test 2 (A-P): “Abdominals Minus Psoas” - The subject was made to lie supine with hands behind the neck and knees bent. The feet were held by the examiner. The subject was instructed (on command) to roll up into a sitting position. .(Figure-2)
3. Test 3 (P): “Psoas (Lower Abdomen)” - The subject was made to lie supine with hands behind the neck and legs extended. He was instructed (on command) to lift the feet 25 cm (10 inches) above the ground and maintain this position for 10 seconds. .(Figure-3)
4. Test 4 (UB): “Upper Back” - The subject was made to lie prone with hands behind the neck and a pillow under the abdomen (far enough down to give a see-saw effect). He was instructed to raise his chest, head and shoulders and maintain them in this position for 10 seconds while the examiner holds down the feet. .(Figure-4)
5. Test 5 (LB): “Lower Back” - The subject was made to lie prone over a pillow with head resting on his hands. He was instructed to lift his legs up without bending in the knees and maintain this position for 10 seconds while the examiner holds down his chest. .(Figure-5)
6. Test 6 (B +H): “Back and Hamstrings” - The subject was made to stand erect with his hands at sides and feet together. He was instructed (on command) to lean down slowly to touch the floor with his fingertips. The knees were kept straight and the leaning down position was maintained for 10 seconds. No bouncing was allowed to touch the floor. .(Figure-6)

Only if a child could perform all the above test items successfully was he declared as having passed the Kraus-Weber Tests. Failure in even one test item was deemed as failure in the Kraus-Weber Tests.

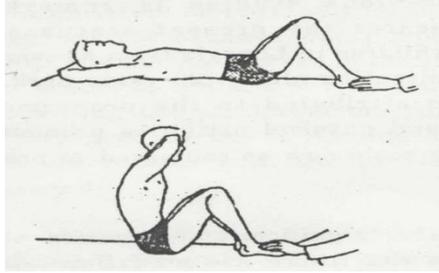


Figure 1 Figure 2

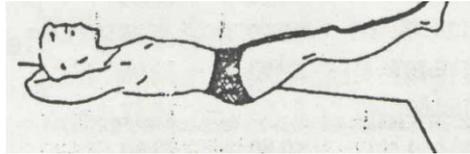


Figure 3

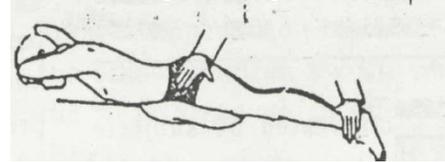


Figure 4

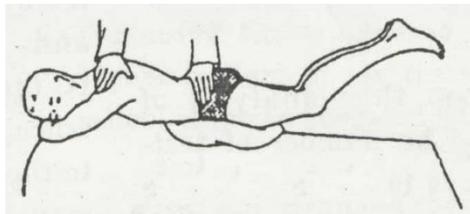


Figure 5

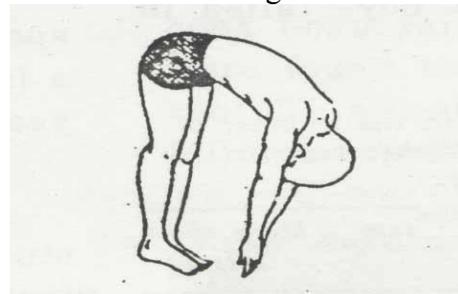


Figure 5

**Intelligence Quotient (IQ)** was assessed using The Porteus Maze Tests<sup>15</sup> (**Figures 1 to 10**) for various ‘mental’ ages. These paper-pencil tests consist of successive puzzle charts of increasing levels of difficulty. The age inscribed on the toughest test chart which a subject was able to solve successfully was taken as his mental age. Then his IQ was calculated as:

$$\text{IQ} = (\text{Mental age}) / (\text{Chronological age}) \times 100$$

Participants were graded<sup>12</sup> according to their IQ levels as follows:

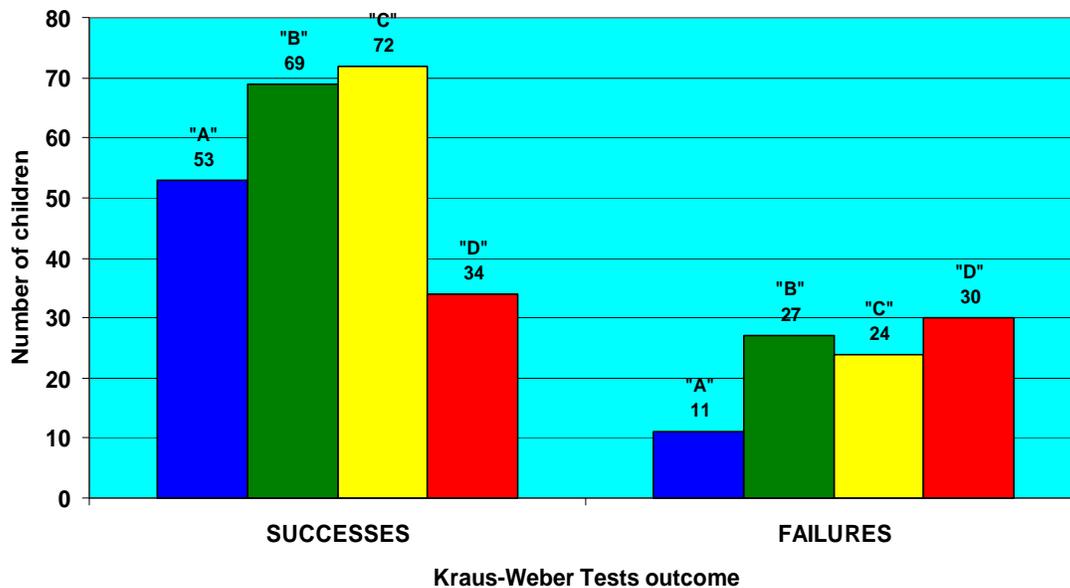
Marks	Grade
✓ > 115	A
✓ 100 - 115	B
✓ 85 - 100	C
✓ < 85	D

Observations were recorded after taking due care to reduce instrument and observer errors to a minimum. Correlation of success or failure in the Kraus-Weber Tests was done with Intelligence Quotient using **Chi-Square Test**<sup>16</sup>.

## RESULTS AND OBSERVATIONS:

Distribution with respect to Intelligence Quotient (IQ) of Kraus-Weber Tests Successes (S) and Failures (F):

IQ	KRAUS-WEBER TESTS		TOTAL	EXPECTED VALUES		CHI-SQUARE VALUES			P VALUE
	S	F		S	F	S	F	TOTAL	
"A"	53	11	64	45.6	18.4	1.2	2.98	15.12	<0.01 (Significant)
"B"	69	27	96	68.4	27.6	0.01	0.01		
"C"	72	24	96	68.4	27.6	0.19	0.47		
"D"	34	30	64	45.6	18.4	2.95	7.31		
<b>TOTAL</b>	228	92	320						



### DISCUSSION:

Statistical comparison of Intelligence Quotient (IQ) reveals a significant difference in the intelligence between the successes and failures of Kraus-Weber Tests. Successes have been found to be significantly more intelligent than failures. Intelligence may be genetically determined but it is molded by the environment, whether physical, social or cultural. Also, it is known that muscular fitness as determined by Kraus-Weber Tests depends not only on physical fitness but also to a great extent on mental stress and strain on the individual<sup>17</sup>. It follows that, if a person is subjected to a stressful environment he/she is more than likely to possess a lower intelligence quotient and fail in the Kraus-Weber Tests<sup>18</sup>. This could be a possible explanation for lower IQ levels in failures of Kraus-Weber Tests. However, nature of the stress affecting IQ level and success in Kraus-Weber Tests should also be elucidated and considered. Meanwhile, it suffices to conclude that known **stress** ‘busters’ like **meditation** and soothing music could help enhance one’s intelligence to the level determined by one’s genes and be the answer to success in Kraus-Weber Tests<sup>5</sup>. It would certainly help if the effect of such stress busters on individual components of IQ and test items of Kraus-Weber Tests is considered and reported further.

### CONCLUSION:

Intelligence has been found to have a positive correlation with **Muscular Fitness** (as measured by Kraus-Weber Tests) of healthy school-going children between 9 years to 12 years of age (older pediatric age-group). Failures in Kraus-Weber Tests tend to have a lower Intelligence Quotient and vice versa.

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### **IMMUNOGLOBULINS IN LIVER DISEASES**

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#### **Abstract:**

Immunoglobulin are not produced in normal liver, but in chronic hepatic disease, they have been identified in the lymphoid and plasma cells infiltrating portal areas and parenchyma. It is reported that IgG appears to be the predominant Ig synthesized by

mesenchymal cell in active chronic hepatitis and the IgM is the predominant Ig synthesized by lymphoid aggregates around the damaged bile ductules in primary biliary cirrhosis. In present study significant rise in the levels of IgA and IgM are observed in viral hepatitis patients.

**INTRODUCTION:**

Immunoglobulins are a specialized group of proteins, which are mostly associated with gamma- globulin fraction of plasma proteins. They are heterogeneous group of molecules that constitute 20% of the plasma proteins. They are heterogeneous with respect to their antigen specificity, amino acid sequence and migration within an electrical field and functions. The B-lymphocyte or B-cells (that mature in the bone marrow) are responsible for the production of immunoglobulins. Humoral immunity is mediated by immunoglobulins. Humoral immunity protects the body against viral and bacterial infections.

Liver is the principal organ of the body synthesizing most body proteins, except the gamma – globulins. Under normal conditions, the rate of synthesis of each protein equals its rate of degradation since its concentration in plasma remains constant. In acute chronic liver disease abnormalities in serum protein is observed (Tomasi and Tisdale, 1984). Acute viral hepatitis is often accompanied by hypoalbuminemia and slight to moderate degree of polyclonal gammopathy (Osserman, 1963;Ogryzio M.A. et.al, 1959,) Significant hypoalbuminemia and polyclonal gammopathy also characterize post necrotic or portal cirrhosis. Gamma globulins are elevated 5 to 7 times as compared to the normal levels as reported by Wall R. L.( 1958). Gamma globulin levels to a great extent reflect antibody like protein levels, the hyperglobulinemia in liver disease is likely to be a part of immunologic response. Hence, the present study is undertaken to study the level of various immunoglobulin (Igs), in particular the IgA, IgM and IgG, in patients suffering from viral hepatitis a

**MATERIALS AND METHOD**

Serum immunoglobulins level were estimated by the radial immunodiffusion kits provided by HOECHST. Immunoglobulins level were studied in serum samples obtained from 22 normal healthy blood donor subjects; 15 cirrhosis patients and 7 viral hepatitis patients being treated at S.S.G. Hospital, Baroda.

**RESULTS**

	Normal controls Mean and S.D.	Viral Hepatitis pts Mean and S.D.	Cirrhosis pts. Mean and S.D.
IgA (mgs%)	230+29	285+97**	371+95***
IgM (mgs%)	110+12	367+143***	320+130***
IgG (mgs%)	1500+167	1697+657	2327+820***

\*\*=P<0.01, \*\*\*=P<0.001

**Discussion:**

Immunoglobulins may be increased non-specifically in a wide variety of infection and also in auto-immune disease. Immunologic processes are incriminated in hepatocellular necrosis and in the explanation of chronicity of hepatitis. The importance and interplay of humoral and cellular mechanisms in the reaction against viral products in the liver cell as the basis of this disease is not clarified.

In present study significant rise in the levels of IgA and IgM are observed in viral hepatitis patients. Similar rise in Ig levels in these patients were observed by Kelkar S.S. et.al. (1981) and Iwarsong S. and Holmogren J.(1972). Significant increase in IgG and IgM levels in acute viral hepatitis is observed by Giles and Krugman (1969), Lee (1965). Peter and Aschavai (1970) found no significant difference in the Ig levels in the different forms of hepatitis, they suggested that difference in the strains of viruses might account for the disparity in result. Ajdukiewicz et al (1972) reported serum Ig changes in a localised epidemic of infective hepatitis and found that the IgM levels were often raised during the first week of illness and declines significantly during convalescence. The rise of Igs in hepatitis appears to be because of slower breakdown of Igs by the damaged liver.

In cirrhosis patients, the level of IgA, IgG and igM are all markedly elevated. Similar results reported by Feizi T et al (1968). Kutteh W.H. et al (1982) reported marked rise in IgA levels. It has been reported that polymeric form of IgA are efficiently cleared, from the serum, by the liver and transported into the bile by a receptor mediated pathway and also by independent mechanism. Secretory IgA is the characteristic and predominant Ig of the mucosal immune system. It participates in immunological protection at the mucous membrane surface.

Immunoglobulin are not produced in normal liver, but in chronic hepatic disease, they have been identified in the lymphoid and plasma cells infiltrating portal areas and parenchyma. It is reported that IgG appears to be the predominant Ig synthesized by mesenchymal cell in active chronic hepatitis and the IgM is the predominant Ig synthesized by lymphoid aggregates around the damaged bile ductules in primary biliary cirrhosis.

#### **Conclusion:**

It is observed that in both these diseases the changes are rarely selective and varying degrees of elevation are found in each of the three major Igs. Thus, the diagnostic value of quantitative Ig determination is limited.

Immunoglobulin measurement can give information on immune response to infection. Serial study of Ig level can be of help in following the progression of disease or in monitoring of treatment.

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### **HAEMATOLOGICAL PARAMETERS IN MALARIA**

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#### **Abstract:**

Malaria accounts for majority of the cases of acute febrile illness with predominance of *P.falciparum* during the malaria transmission period. Alterations in hematological parameters in the form of anemia and thrombocytopenia are frequently encountered in malaria, especially *P.falciparum* malaria. Low hemoglobin value and thrombocytopenia increase the probability of malaria in cases of acute febrile illness. Platelet count below 150,000 cells/cu.mm in cases acute fever is single most important parameter indicative of malaria.

#### **INTRODUCTION:**

Malaria is one of the most common parasitic infection resulting in 300-500 millions cases each year.<sup>1</sup> The disease is distributed as a natural infection in man in tropical areas between 40°N 30°S. About 40% of the world population lives in the malaria endemic zone which includes south east Asia, India, Pakistan, Bangladesh, Africa, areas of middle east, central and south America.<sup>1</sup> Prompt and accurate diagnosis is the key to effective management of malaria. Clinical diagnosis is the most widely used approach to the diagnosis of malaria in the tropics. However, clinical diagnosis is unreliable especially in tropics on account of the difficulty in differentiation of malaria from other causes of acute febrile illness like respiratory infections, viral fever, typhoid, etc. and because of the diverse clinical manifestations of the disease.

A variety of haematological alteration like progressively increasing anemia, thrombocytopenia, leucopenia or leukocytosis and even DIC especially in plasmodium falciparum malaria have been reported. This study is done to know that can haematological parameters discriminate malaria from non-malarious acute febrile illness. Haematological Alterations in Malaria: It has now become fairly clear that the malarial parasite produce haematological dysfunction. The term Malarial Haematopathy attempts to describe the involvement of one or more hematopoetic cells lines and includes the

endothelial dysfunction that can give rise to a thrombotic microangiopathy that may evolve into a consumptive coagulopathy.<sup>7,2</sup>

There is destruction of red blood cells (both parasitized and non-parasitized) and bone marrow dyserythropoiesis. The cause of dyserythropoiesis is believed to be related to intramedullary cytokine production.<sup>2,9,10</sup>

Thrombocytopenia is a common occurrence in acute malaria. Thrombocytopenia is a result of peripheral destruction and consumption<sup>8</sup>. The mechanism of thrombocytopenia in malaria is uncertain. Immune-mediated lysis, sequestration in the spleen and a dyspoietic process in the marrow with diminished platelet production<sup>5</sup> are the possible reasons. Malaria is also associated with leucocytosis, although leucopenia may also occur, occasionally leukemoid reaction may be observed. Leukocytosis usually reflects severe diseases.<sup>2</sup>

#### METHOLOGY:

The study was carried out in S.S.G. Hospital, Baroda. The study includes 125 patients with acute febrile illness of less than seven days duration without any obvious localizing signs. These patients consisted of both suspected malaria and non-malaria cases. Blood was collected in EDTA bulbs, the Hematological parameters of the patients were done in an automated cell counter. Simultaneously 1 thick and 1 thin smear were prepared with Giemsa Stain. Investigations for the causes other than malaria included, S.bilirubin, SGPT, SGOT, widal titers, S. electrolytes, urine routine & microscopic examination, chest X-ray & CSF where it was clinically indicated. Four hematological parameters were taken as index tests (Hemoglobin, total leukocyte count, and platelet count). Patients, in whom only gametocytes were detected, were excluded from the study.

#### OBSERVATION & RESULTS:

This is a study of alterations in Haematological Parameters (Haemoglobin, Total leukocyte Count, Platelet Count.) & it's utility in Malaria.

All the patients of acute febrile illness were investigated with complete blood counts, thick & thin smear for malaria, widal titers for S.typhi infections (Typhoid) & Widal titers greater than 1:160 are considered significant for enteric fever, chest X-ray for respiratory infections, urine routine & microscopic examination, Serum electrolytes, S.bilirubin, S.cretinine and liver functions tests. All the above investigations were done to rule out any localizing cause of illness other than malaria.

There were 70 (56%) patients diagnosed as malaria, 17 (13.6%) had Typhoid, 18 (14.4%) had Respiratory infections, 15 (12%) had probable viral fever, and 05 (4%) had urinary tract infection.

Patients were divided in different age groups, the age of patients of malaria ranged from 1 month to 66 years. The peak incidence of malaria was in the age group of 31-40 years in our study. However, malaria can occur at any age. The mean age for malaria positive cases was 26.8 years with SD 13.5years. There were 44 males & 26 females among the cases of malaria in the present study.

The species of the malaria were studied by thick & thin smear examination showed that 54 (77.14%) were diagnosed as P. Falciparum malaria & 14 (20%) cases as P. Vivax malaria while 2 (3.86%) cases showed mixed infections with both species.

Table: 1–No. & Percentage of Malaria cases with Alterations of Hematological parameters:

Species	No. of Positive cases by Microscopy	Hematological parameters Altered	Hematological parameters Unaltered
P. Falciparum	54 (77%)	40	14
P. Vivax	14 (20%)	02	12
Mixed	02 (3%)	02	00
Total	70	44 (63%)	26 (37%)

Out of the total 70 slide positive cases, 44 (63%) patients had their Hematological parameters altered, while in 26 (37%) patients it remained unaltered.

Table: 2–Comparison of Haematological Parameters in Malaria & Non-Malaria Fever:

Sr. No	Variable	Malaria (70)				Non-Malaria (55)	
		PF (54)	PV (14)	MIXED (02)	(%)	No. Of cases	(%)
1	Anemia	30	02	02	48%	07	13%
2	Thrombocytopenia	40	02	02	63%	03	06%
3	RDW > 15	12	01	01	20%	02	04%
4	Leucopenia	16	01	01	26%	05	10%

Alteration in Hematological parameters was more commonly seen with Malaria than in the non-malarial cases with fever due to other causes. Most of the malaria cases were associated thrombocytopenia (63%) and Anemia (48%). RDW was less frequently altered in Malaria. In non-malaria cases Anemia (13%) and leucopenia (10%) were more common.

Table: 3 – Severity of Anemia in Malaria & Non-Malaria cases:

Hemoglobin level	<i>Anemia in Malaria (N=34)</i>				<i>Anemia in Non-Malaria (N=07)</i>	
	PF	PV	MIXED	Total in (%)	No. of cases	Total in (%)
Mild (Hb < 10 mg/dl)	11	01	00	36%	05	63%
Moderate (Hb 5-8 mg/dl)	10	01	01	36%	02	37%
Severe (Hb<5mg/dl)	09	00	01	28%	00	00%

Anemia is more common with P.falciparum as compared to P.vivax; in two cases with mixed infection anemia was moderate in one and severe in the other. Anemia was also observed in total 07 cases with non-malarious fever which was either mild or moderate.

Among the total 70 malaria cases, 12 (36%), 12(36%) & 10 (28%) had mild, moderate and severe anemia respectively. Mortality was seen in 2 patients of cerebral falciparum malaria, both with severe anemia.

Table:4--Comparison of Platelet Count (Thrombocytopenia) in Malaria & Non-Malaria:

Platelet Count	Thrombocytopenia in Malaria (N=44)				Thrombocytopenia in Non-Malaria (N=03)	
	PF	PV	MIXED	(%)	No. of cases	(%)
Mild (<150,000 - >50,000)	20	01	01	50%	03	100%
Moderate (Platelet Count >50,000 – 20,000 mm <sup>3</sup> )	14	01	00	34%	00	00%
Severe (Platelet count <20,000 mm <sup>3</sup> )	06	00	01	16%	00	00%

Thrombocytopenia was observed to be more commonly associated with malaria cases 44/70 (63%), than with the non-malarious group 03/55 (5%). Thrombocytopenia was more commonly observed with P.falciparum (74%) and less with P.vivax (14%); thrombocytopenia was also seen in two cases with mixed infection.

Half the cases (50%) of P.falciparum presented with mild thrombocytopenia while 35% of P.falciparum malaria had moderate thrombocytopenia and 15% of the patient had severe thrombocytopenia. One case each of mild and moderate thrombocytopenia was seen in the two cases P.vivax malaria. The mixed infection consisted of one case of mild and one of severe thrombocytopenia. In non-malarious group there were 03 cases of mild thrombocytopenia.

There were 44 cases of malaria with thrombocytopenia- mild (22), moderate (15) & severe (07) thrombocytopenia, among this mortality was observed in 2 cases with severe thrombocytopenia where the platelet count < 20,000. The two fatal cases were both of falciparum cerebral malaria and developed bleeding from the injection site, gums.

DISCUSSION:

Malaria is global health problem and responsible for nearly 3 million deaths annually and it on the rise world wide.<sup>12</sup> The natural history of malaria is variable mainly due to host factors – immunity being most important of them. In immune adult belonging to an endemic zone, parasitemia may not be accompanied by fever or illness even in phase of heavy parasitemia. In contrast, in non-immune adult primary attack can be rapidly fatal.<sup>3</sup>

Early and prompt diagnosis of malaria should facilitate identification of the subjects. During the present study 125 cases were analyzed in respect to their clinical presentation with acute febrile illness (fever of less than seven days) with other cause of fever being ruled out. An automated cell counter was used to measure the hematological parameters of the patients.

The mean age for malaria is 2<sup>nd</sup> and 3<sup>rd</sup> decade of life and that there is male preponderance in malaria. Although sex is not a direct factor in malaria but it may influence rates through occupation, the type of clothing used or relative mobility.<sup>11</sup>

Anemia is a common feature of acute malarial infection. It may develop rapidly, taking a serious turn in P.falciparum malaria due to heavy parasitemia. Both immuno-hemolytic and destruction of RBC's may be responsible.<sup>3</sup> Hence anemia was found to be more common with P.falciparum as compared to P.vivax malaria.

Thrombocytopenia is almost invariable in malaria and so may be helpful as sensitive but nonspecific marker. It is not associated with severity, although; somewhat

paradoxically contribute to disease pathology in human malaria.<sup>1</sup> A person with platelet count <150,000/cu.mm were 12-15 times more likely to have malaria than persons with >150,000/cu.mm.<sup>8</sup> Other causes of thrombocytopenia are sepsis and viral fevers, but a strong association of platelet count <150,000 in patients with slide positive malaria, as compared to others argues for recognition of thrombocytopenia as an important predictor of malaria.<sup>6</sup> Higher frequency of thrombocytopenia was observed in patients of malaria, so thrombocytopenia is of diagnostic help, as it raises its suspicion.<sup>2</sup>

In malaria endemic area, an acutely febrile patient with low platelet count and reduced WBC count, irrespective of malaria smear report, should always be thoroughly re-evaluated for malaria.<sup>8</sup> Both leucopenia and leukocytosis have been described in malaria.

The present study being a hospital based study could have contributed to more severe cases being included in the study, resulting in a greater proportion of patients with thrombocytopenia in our study. The strong association of platelet count less than 150,000 cells/cu.mm in patients with slide positive malaria, as compared to the others argues for recognition of thrombocytopenia as an important parameter which may be associated with malaria.

Patel.U, et.al in their study evaluated the role of platelet count for predicting malaria in fever patients<sup>13</sup>. A finding of thrombocytopenia should increase the suspicion of malaria and should lead to a more diligent search for the parasite in the smear.<sup>4</sup>

Hemoglobin level and platelet counts were significantly lower in the patients with slide positive malaria in comparison to other fevers.<sup>1</sup> Lalitha,et.al in their study observed that presence of anemia, low leukocyte count, or high RDW had a poor sensitivity and specificity in diagnosis of malaria. Low platelet count (<150,000) was 60% sensitive and 88% specific for the diagnosis of malaria. This was the only discriminator parameter.<sup>3</sup>

They also found that combination of anemia and thrombocytopenia had higher sensitivity (69%). The alterations in hematological parameters was found in 44/70 (63%) case of the malaria. It was observed in 40/54 (74%) cases of *P.falciparum* malaria, as against in 02/14 (14%) *P.vivax* cases. Anemia was observed in 48% (34/70) cases of malaria, majority of which were *P.falciparum* malaria

#### Conclusion:

. The mean hemoglobin was  $8.9 \pm 2.7$  gm%. Thrombocytopenia was observed in 63% of our cases of malaria with 34% showing moderate thrombocytopenia 16% with severe thrombocytopenia. The present study demonstrates that low hemoglobin and low platelet count are the two hematological variables that increase the probability of malaria.

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## SERUM LIPOPROTEINS IN LIVER DISEASES

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### Abstract:

Agarose gel electrophoresis is a rapid technique yielding dependable results than any other conventional older ones, more cases in shorter time can be conveniently studied using this technique. In cirrhosis and hepatitis patients the alpha lipoprotein and the pre beta lipoprotein are found to be lower than that of normal healthy subjects.

### INTRODUCTION

Lipoproteins are macromolecular complexes of lipids and proteins. These are composed of mainly free and esterified cholesterol, triglycerides, phospholipids and a family of proteins called apoproteins. Several different classes of lipoproteins exist, whose structure and function are closely related. There are four classes of lipoproteins, named according to their separation by ultracentrifugation technique of Svedberg and depending on their density, Goffman et al (1949); Gottfried et al (1954). Lipoproteins are classified into i) Chylomicrons (CM), ii) Very low density lipoproteins (VLDL), iii) Low density lipoproteins (LDL) and iv) High density lipoproteins (HDL).

The percentage composition of lipoproteins are :

Name	Proteins	Apoproteins	Triglycerides	Phospholipids	Cholesterol Free	Cholesterol Esterified
CM	1	B <sub>48</sub> , A-1, C-11,E	88	08	01	03
VLDL	7	B <sub>100</sub> , C-11,E	56	20	08	15
LDL	20	B <sub>100</sub>	20	25	10	45
HDL	50	A-1, A-11	05	25	05	15

Liver is the site of synthesis of apoproteins, triglycerides, cholesterol, cholesterol derivatives like bile acids.

CM is the largest lipoprotein, synthesized by gut after a meal. It is not present in normal fasting plasma. It is the main carrier of dietary triglycerides.

VLDL is synthesized in the liver. It is the main carrier of endogenously produced triglycerides.

LDL is generated from VLDL in the circulation and it is the main carrier of cholesterol.

HDL is the smallest but most abundant lipoprotein. It has protective function as it takes cholesterol from extra hepatic tissues to the liver for excretion.

Plasma lipoproteins were first separated by electrophoresis by Jenks & Durrum (1955) and the fractions were classified based on their mobility in electric fields, as chylomicrons (at origin), beta lipoproteins ( $\beta$ ), pre-beta (pre- $\beta$ ) and alpha lipoproteins ( $\alpha$ ) corresponding to LDL, VLDL & HDL respectively.

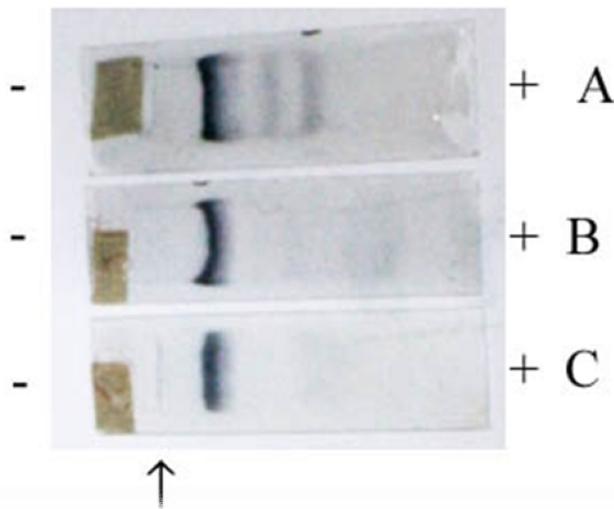
In present study, the lipoprotein patterns and their levels are studied in patients suffering from hepatitis and cirrhosis.

**MATERIALS AND METHODS**

Serum samples were collected from 22 healthy blood donors, 12 patients suffering from hepatitis and 7 cirrhosis patients. Serum lipoprotein fractions are studied by agarose gel electrophoresis. For quantitative analysis, the slides are scanned in a densitometer. By manual scanning of the gel, graphs were obtained and the area under the peaks was measured by triangulation.

**RESULTS**→→

Electrophoretograms



A → Electrophoretogram of normal healthy subjects.

B → Electrophoretogram of hepatitis patient.

C → Electrophoretogram of cirrhosis patient.

Mean values of lipoprotein fractions:

	$\beta$ – lipoproteins	Pre – $\beta$ lipoproteins	$\alpha$ – lipoproteins
Normal	81.30 + 6.80	6.38 + 2.28	11.98 + 5.62
Cirrhosis	87.50 + 8.20	9.21 + 9.29	1.85 + 1.39***

Hepatitis	91.65 + 8.73**	5.03 + 5.73 ***	3.30 + 4.26***
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\*\* = P<0.01, \*\*\* = P<0.001

### Discussion:

Liver is the site of synthesis of apoproteins, VLDL and HDL. In liver diseases, hepatic production of various apolipoproteins, enzymes and proteins involved in lipoproteins metabolism are impaired. The extent of impairment is dependent on the extent of hepatocellular damage.

In advance liver failure, the liver is unable to synthesize and secrete any of the lipoproteins that are normally produced by the liver. Hence, low levels of all the endogenous classes occur i.e. the pre- $\beta$  (VLDL) and  $\alpha$  - lipoprotein (HDL).

Various other studies have also reported low levels of HDL in liver diseases, Kushner et al 1956, Russ et al 1956. Pierce and Goffman, 1951 (by ultra centrifugation technique) found normal level of LDL in cirrhosis patients and Pierce et al 1954 found no high amount of LDL in patients suffering from hepatitis. Our study showed difference in  $\beta$  lipoprotein level in hepatitis patients.

According to McIntyre HDL changes in paranchymal liver disease are related to deficiency of lecithin – cholesterol acyl transferase enzyme. Further it is also stated that in patients with LCAT deficiency have an abnormal lipoprotein, named Lp – X (Siedel et al 1969, 70), Switzer and Satenstein, 1967. VLDL levels were also depressed in these patients and they attributed these low levels due to damage of the cells. The LDL ( $\beta$ ) levels were not reduced, probably due to reduced LDL catabolism.

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## **ISOMETRIC HAND GRIP TEST: A TOOL TO EVALUATE AUTONOMIC SYMPATHETIC FUNCTION IN PREGNANCY**

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### Abstract:

**The study is the response to isometric hand grip test in 30 healthy pregnant volunteers in 20<sup>th</sup> to 29<sup>th</sup> weeks of singleton pregnancy with a mean of 25.2 gestational weeks. The increase in both the systolic and diastolic blood pressure was significantly lower in the pregnant group than in the control group. Both groups showed similar heart rate responses to isometric hand grip stress.**

**Key words: pregnancy, isometric exercise, heart rate, blood pressure**

### Introduction

**Physiology of pregnancy is a virgin field; vast advances in knowledge have been made in the physiology of pregnant and non-pregnant women during the recent past. It is impossible to fathom and deliberate all the knowledge concerning cardiovascular system in pregnancy, as reflexes associated with the autonomic nervous system are complex in nature. The earliest extensive survey of investigations related to the cardiovascular changes occurring during pregnancy refers to monograph 'Physiology of human pregnancy' by Hytten and leitch (1971).**

**The isometric hand grip test is used to study the hemodynamic effect of hand grip exercise non- invasively in pregnant women. The initial heart rate increased during isometric contraction is due to vagal withdrawal. The subsequent slower increase in the heart rate is partially mediated by cardiac sympathetic stimulation.**

### Materials and methods

**The test was performed by randomized selection of 30 women with singleton pregnancy attending the antenatal clinic of new civil hospital Surat in their 20<sup>th</sup> to 29<sup>th</sup> gestational weeks with a mean of 25.2 weeks as the maximum haemodynamic alterations occur at mid term of pregnancy. The control group comprised of equal number of subjects in reference to comparable age and accessibility. The mean ages in the control and cases were 26.8 years (range 19 – 38) and 25.2 years (range 20 – 35) respectively. 30 cases in each group were considered to be adequate for statistical inference as the study being quantitative in nature. The variations regarding physical fitness, body weight for height, haematocrit & hemoglobin level (within limits) were allowed in both groups.**

**The subjects were familiarized with the laboratory surroundings, equipments and examination procedures to minimize the fluctuations in values caused by anxiety. The recordings were taken between 10A.M. – 12 Noon .There was a minimum gap of two hours between the breakfast and the recording of observations.**

**The blood pressure was measured by the pneumatically inflated micro computerized Vital max 800 non – invasive pulse blood pressure monitor. The observations were corroborated by the standard auscultatory Riva-Rocci method with the help of a pneumatically operated mercurial type syphgmanometer. The appearance (phase I) and**

**the apparent disappearance (phase V) of the Korotkoff's sound marked the systolic and diastolic pressures respectively.**

**Isometric hand grip test: The subject's maximal voluntary contraction force was observed on maximal compression of the hand dynamometer by the dominant hand. The subjects were made to hold hand dynamometer for a maximum duration of 5 minutes in sitting posture, with one third of maximal voluntary contraction force. Blood pressure and heart rate were measured by a calibrated micro-computerized sphygmomanometer before commencement of the exercise, then after at an interval of 1 minute during hand grip and 1 minute after termination of the exercise. Increases in the systolic and diastolic blood pressures as well as in the heart rate were measured.**

**The data obtained was statistically analyzed by using unpaired student's 't' test.**

Observations and result:

**The general parameters in pregnant and non pregnant woman were found to be statistically insignificant which confirmed that both the groups drawn by random and purposive sampling were from the same population (Table I). The resting heart rate was observed to be higher in the pregnant than in the non- pregnant group, the difference was statistically significant. Both systolic and diastolic pressures were significantly lower in pregnant women than in controls (Table 2).**

Table 1: General parameters in pregnant & non-pregnant groups

VARIABLES	PREGNANT		NON-PREGNANT		P<0.05SIGNIFICANT(*)
	Mean	± S.D.	Mean	± S.D.	
Age (yrs)	25.23	3.41	26.77	5.6	0.2
Height(cms)	151.67	5.74	152.07	4.44	0.77
Weight(Kg)	48.43	8.15	50.27	7.86	0.383
Gestational Weeks	25.23	2.11	-	-	-
Hemoglobin (gm %)	9.88	1.05	10.57	1.21	0.1

Table 2: The resting heart rate & blood pressure in pregnant and non-pregnant groups

VARIABLES	PREGNANT		NON-PREGNANT		P<0.05 SIGNIFICANT(*)
	Mean	± S.D.	Mean	± S.D.	
RESTING VALUES					
Heart rate(beats/min)	88.77	14.13	77.87	9.43	< 0.001*
Systolic B.P.(mm of Hg)	104.27	10.45	111.17	9.46	< 0.01*
Diastolic B.P. (mm of Hg)	68.57	7.16	74.33	7.2	< 0.0008*

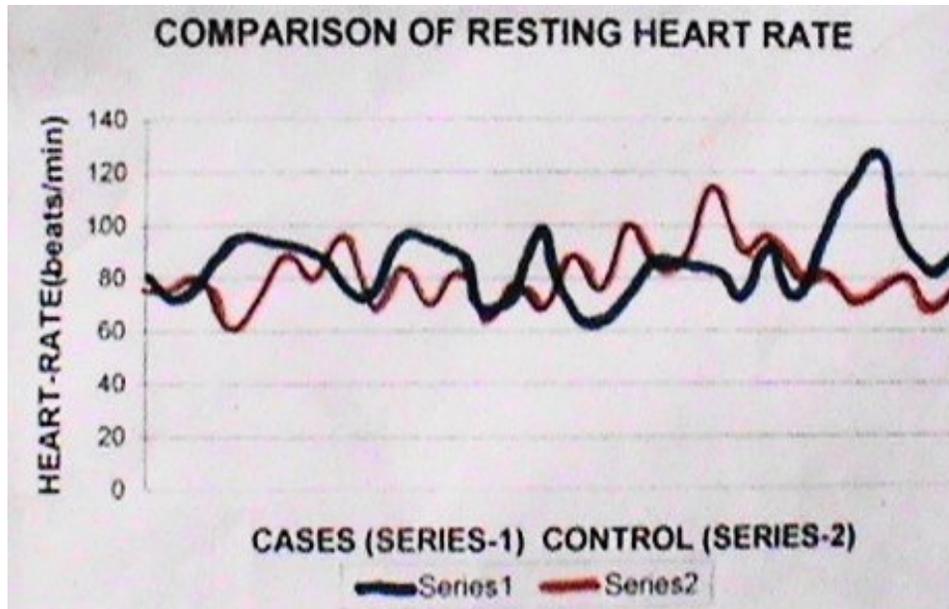


Fig 1

Table 3- The heart rate and blood pressure responses to isometric handgrip test in pregnant and non-pregnant groups

VARIABLES	PREGNANT		NON-PREGNANT		P<0.05 SIGNIFICANT(*)
	Mean	± S.D.	Mean	± S.D.	
Isometric Hand Grip Test					
↑Heart rate(beats/min)	14.5	6.66	16.4	8.54	0.341
↑Systolic B.P.(mm of Hg)	16.63	8.62	22.3	12.74	0.048*
↑Diastolic B.P. (mm of Hg)	15.3	9.44	15.8	7.76	0.017*

The increase in both the systolic and diastolic blood pressure was significantly lower in the pregnant group than in the control group (table3).

Discussion: In the study of the isometric hand grip test, the heart rate responses were similar in both the groups but the blood pressure responses were significantly lower in the pregnant women. Sympathetic stimulation mediates the cardiovascular responses to isometric hand grip test (Page & Watkins 1977). An increase in the cardiac output and change in total sympathetic resistance achieve the pressure response caused by isometric hand grip. The changes in heart rate were similar in both the groups. This indicates that the isometric hand grip test causes a small increase in the total vascular resistance. As there is no change in the concentration of the catecholamine levels in the pregnancy, the reduction in the blood pressure response could be due to an antagonist effect of the products of uteroplacental unit, such as progesterone or a diminished contractile response of the blood vessels to adrenaline. The response to the isometric hand grip test seems to be conflicting in pregnancy. Longitudinal studies starting before pregnancy have shown that the heart rate response to the isometric hand grip test is unaltered (Matthews et al 1992) and the blood pressure response has been reported to be diminished (Matthews et al 1992) corroborating with our studies. The blood pressure response has been reported to be unchanged by Ekholm et al in a longitudinal study in 1994, but cross sectional study conducted by the same author in 1993 reported at diminished response.

Conclusion: The study concludes that both the groups showed the similar heart rate responses to isometric hand grip stress. The both systolic and diastolic blood pressure

responses to isometric hand grip test were significantly smaller in the pregnant women, which could be attributed to the antagonizing effects of the products of the uteroplacental unit such as progesterone or a diminished contractile response of the blood vessels to adrenaline.

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### COMPARATIVE STUDY OF EFFECTS OF EXERCISE AND YOGA ON CARDIO-RESPIRATORY PARAMETERS

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#### ABSTRACT:

Both Physical exercises and yogasanas are accepted by people to remain fit. The present study is conducted to find out the efficacy of the practice in human beings by comparing the cardio-respiratory parameters with that of subjects not performing any of these two. 30 male age, height and weight matched subjects were selected in each group viz. Control, Exercise and Yoga groups. Their Cardio-respiratory parameters were taken and compared between the groups. The results showed decrease in Pulse rate, Systolic as well as Diastolic blood pressure, and respiratory rate in subjects of exercise and yoga groups compared to that of control group. Significant increase in Respiratory capacities, % of Forced expiratory volume in 1<sup>st</sup> second, Maximum expiratory pressure and Peak expiratory flow rate are seen in both the groups. The results showed reduction in Respiratory minute volume significantly more in yoga group compared to exercise group while increase in Inspiratory capacity is significantly more in exercise group compared to yoga group.

**KEY WORDS:** Cardio-respiratory, Exercise and Yoga, Oxygen utilization,  
**INTRODUCTION:**

The twenty first century has been called the age of anxiety. Today's human is facing man-made disasters of environmental pollution, the overhanging threat of third world war, mechanization, cut-throat competition, insulation, isolation and alienation. He feels unable to cope with the demands of life and its hectic pace and faces stressful situations. He is trying to adopt by different ways viz. physical exercise, yoga, meditation, relaxation, hypnosis, auto-suggestions, psychotherapy, medication<sup>1</sup>. Physical exercise is good for physical health while yoga has its effects on both physical as well as mental health. Though Patanjali's "Astanga Yoga" has eight fold aspects like Yama, Niyama, Asana, Pranayama, Pratyahar, Dharna, Dhyana and Samadhi, the modern generation has accepted it as Yogasanas. Both the types of adopting behaviors have their beneficial effects on cardio-respiratory parameters. The present study is designed to find out differences in changes occurred in people practicing yoga and those who are practicing only physical exercises.

#### METHODOLOGY:

The subjects were selected from the Yoga institute "Yoga Niketan", Vadodara; Yoga Kendra, Ahmedabad and Rassi health club Ahmedabad. Total number of subjects included in the present study was 90. All were males and practicing either yoga or physical exercises, minimum for 3 months practice. There were 30 regular participants of yoga classes, 30 were of regular attendants of gymnasium of health club and 30 subjects who were not practicing any of these two practices. After their consent, their cardio-respiratory parameters were recorded in morning hours (between 8 to 9 am). All the parameters taken were compared statistically (unpaired 't' test) to find out the significance of the study and efficacy of the practices of yoga and physical exercise.

#### RESULT ANALYSIS:

We have tried to keep age, height and weight match between the groups.

Table: 1 Showing mean and SD values of age, height and weight of subjects.

Group	Age (yrs)	Height (cms)	Weight (kg)
Control (n=30)	27.10 (5.59)	169.53 (4.80)	62.52 (5.36)
Exercise gr. (n=30)	28.00 (6.10)	169.83 (4.50)	61.58 (4.49)
Yoga gr. (n=30)	31.40 (8.70)	168.37 (4.99)	63.98 (3.44)

Table: 2 Showing comparison of cardio-respiratory parameters between the groups.

Parameters	Control v/s Exercise gr.		Control v/s Yoga gr.		Exercise gr. v/s Yoga gr.	
	<b>Pulse rate (per min)</b>	85.33 (6.00)	79.53*** (5.65)	85.33 (6.00)	77.60*** (4.47)	79.53 (5.65)
<b>Systolic Blood Pressure (mmHg)</b>	126.47 (5.55)	122.07** (4.47)	126.47 (5.55)	122.87* (5.65)	122.07 (4.47)	122.87 (5.65)
<b>Diastolic Blood Pressure (mmHg)</b>	84.87 (5.42)	78.93*** (3.85)	84.87 (5.42)	80.47** (4.54)	78.93 (3.85)	80.47 (4.54)
<b>Respiratory Rate (per min)</b>	19.23 (3.88)	16.17*** (2.49)	19.23 (3.88)	14.07*** (2.26)	16.17 (2.49)	14.07** (2.26)
<b>Tidal Volume (ml)</b>	459.01 (70.53)	541.00*** (65.99)	459.01 (70.53)	558.33*** (47.86)	541.00 (65.99)	558.33 (47.86)
<b>Respiratory Minute Volume (ml/min)</b>	8755.33 (1971.41)	8752.67 (1788.93)	8755.33 (1971.41)	7543.33** (1190.12)	8752.67 (1788.93)	7543.33** (1190.12)

<b>Inspiratory capacity (ml)</b>	1515.67 (241.11)	1868.67*** (253.09)	1515.67 (241.11)	1737.00*** (151.89)	1868.67 (253.09)	1737.00* (151.89)
<b>Expiratory Capacity (ml)</b>	1304.67 (207.87)	1583.00*** (157.42)	1304.67 (207.87)	1530.70*** (178.77)	1583.00 (157.42)	1530.70 (178.77)
<b>Vital Capacity (ml)</b>	2566.0 (629.70)	2910.67* (359.50)	2566.0 (629.70)	2897.33* (380.27)	2910.67 (359.50)	2897.33 (380.27)
<b>Forced Expiratory Volume % (1<sup>st</sup> sec.)</b>	83.15 (7.04)	87.95** (4.54)	83.15 (7.04)	86.87* (4.39)	87.95 (4.54)	86.87 (4.39)
<b>Maximum Breathing Capacity (liter/min)</b>	97.40 (24.41)	108.50 (20.46)	97.40 (24.41)	110.27* (16.24)	108.50 (20.46)	110.27 (16.24)
<b>Peak Expiratory Flow rate (liter/min)</b>	478.67 (103.35)	638.67*** (67.96)	478.67 (103.35)	631.67*** (60.06)	638.67 (67.96)	631.67 (60.06)

\*=p<0.05, \*\*=p<0.01 and \*\*\*=p<0.001

### DISCUSSION:

Table 2 shows the mean and SD values of individual cardio-respiratory parameters of subjects of Control group, Exercise group and Yoga group. It also reveals the comparison of such parameters between the groups. There are significant changes are seen in the parameters like Pulse rate (PR) per minute, Systolic (SBP) as well as Diastolic Blood Pressures (DBP) in mmHg, Respiratory rate (RR) per minute, Tidal Volume (TV) in ml, Inspiratory (IC) as well as Expiratory (EC) Capacities in ml, Vital Capacity (VC) in ml, % of Forced Expiratory Volume in 1<sup>st</sup> second (FEV1%) , Maximum Expiratory Pressure (MEP) in mmHg, and Peak Expiratory Flow rate (PEFR) in liter per, of the subjects performing physical exercise regularly while changes in Respiratory Minute Volume (RMV) in ml per minute and Maximum Breathing capacity (MBC) in liters per minute are not significant. Similar type of significant changes can be seen in the parameters of subjects practicing yoga regularly except Maximum Breathing Capacity, the change in which is not significant. On comparison of parameters between Exercise group and Yoga group, it showed that Respiratory rate and Respiratory Minute Volume in Yoga group are lowered significantly and Inspiratory Capacity is significantly more in Exercise group.

There are significant reductions in the values of PR, SBP, DBP and RR in both exercise and yoga group when compared with the values of control group. Though there is significant increase in TV in both groups, there is significant reduction in RMV in yoga group due to significant reduction in RR in yoga group than exercise group. The RMV is the indirect method to find out the oxygen utilization, which is reduced significantly in yoga group. The significantly increased values are seen in IC, EC, VC, FEV1%, MBC and PEFR of subjects practicing either exercise or yoga when compared with the subjects of control group who were not performing either of these. The increase in the IC is significantly more in exercise group.

**CONCLUSION:** With the help of the results obtained in the present study we could conclude that both the practices, exercise and yoga are beneficial for the maintenance of health, but the yoga practice definitely reduces the oxygen utilization in the practitioner compared to subjects doing exercises.

References: To be published next issue

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## PREVALENCE OF ANEMIA IN PREGNANCY

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### **Abstract**

Pregnancy anaemia is one of the important public health problem not only in India but also in most of the South East Asian countries anaemia in pregnancy has effects may have deleterious to mothers and fetuses.

**Aims:** The present study was conducted to find the prevalence of anemia in pregnancy and to investigate causes of anemia in pregnancy in and around Raichur. .

**Study design:** Prospective and descriptive study.

### **Material and Methods:**

The study is carried out in Navodaya Medical College and Hospital and Govt. District Hospital, Raichur, during the period 01-09-2008 to 31-10-2008. During this period 185 patients visited at OBGYNE OPD were included in the study.

The subjects included in the study were clinically examined is rule out any other systemic illness in pregnancy and those subjects were obtained informed consent regarding following lab investigations mentioned below,

2 ml. of venous blood is obtained from each subject for Hb % estimation and peripheral smear examination.

The values obtained after the examination were tabulated and compared between trimesters with the standard values of WHO recommendation.

All the parameters were measured and analyzed by descriptive statistics.

### **Result:**

The current study showed that the prevalence of anaemia is high (88.64%) and severe degree anaemia is also seen in high incidence. The knowledge about anaemia in pregnant women and complications occurring during pregnancy due to anaemia, is very poor i.e. 6.48% of cases only have this knowledge & 93.5% are not having this knowledge.

### **Conclusion:**

Mild degree of anaemia seen (49.18%), the type anaemia is Microcytic hypochromic anaemia (63.24%), which is mainly due to iron deficiency anaemia of nutritional anaemia. Multi gravida is seen (68.03%), minimum gravida 1 and maximum gravida 5. severe anaemia seen in multi

gravida that is gravida 4 & 5. The knowledge about anaemia in pregnancy & its complications in the patients is very low (6.48%). And 94.59 % of pregnant women in 3<sup>rd</sup> trimester attended the antenatal care 1<sup>st</sup> time. 48.64% of cases lie between the age group 18-24 years and shows early pregnancy. By all these conclusions, still more research are to be undertake in Raichur district, to prevent the complication of anaemia in the pregnant women's to have the healthy society.

**Key words:** Anemia, Pregnancy, Trimester, Knowledge

**Introduction:** -

In India, majority of pregnant women report to antenatal clinical only in second and third trimesters, time available for correction of moderate anaemia is limited. Also bioavailability of iron in Indian diet is very low (3-5%) and so even oral administration of 240mg of elemental iron, along with folic acid and vitamin B12 under supervision, did not result in correction of moderate anemia. Many women discontinue oral medication, especially higher doses because of minor persistent gastrointestinal effects. Because of all these problems, moderate anaemia in pregnancy continues to be a major problem in India and parenteral iron therapy remains the optimal mode of moderate anaemia in mid trimester. Intramuscular iron therapy for treatment of moderate anaemia though in use in some medical college hospitals and has not been operationalized in primary health centre settings.

Anaemia is a condition in which a person's blood has a lower than normal number of red blood cells of the RBC's haemoglobin is an iron rich protein that gives the red colour to blood and carries oxygen from the lungs to the rest of the body. WHO has accepted up to 11 gm% as the normal hemoglobin level in pregnancy. Therefore any hemoglobin level below 11 gm% in pregnancy should be considered as anaemia. However in India and most of the other developing countries the lower limit is often accepted as 10 gm%<sup>1</sup>. People with anaemia feel tired along with other symptoms, because reduced oxygen supply and nutrient to body. In severe cases of anaemia lack of oxygen in the blood can cause serious and sometimes fatal complications.<sup>2</sup> The estimated incidence in south east Asia is 50-70 % where as severe anaemia is closely related to risk of mortality. Supplementation of iron to pregnant women remains the cornerstone policy in reducing incidence of anaemia in reproductive age because of increased demands during pregnancy and breast feeding are associated with malnutrition<sup>3</sup>. Pregnancy anaemia is one of the important public health problem not only in India but also in most of the South East Asian countries anaemia in pregnancy has effects may deleterious to mothers and fetuses. Indeed, it is known risk factor for many maternal and fetal complications.<sup>1</sup>

Raichur, is one of the developing district of North Karnataka (India). Where literacy rate is less, where ignorance of personal hygiene and nutrition is more. Prevalence and complications of anaemia in pregnancy are more, thus this condition is alarming and calls for judicious planning and implementation of such projects and because of these evidence, we have undertaken the study.

**Material and Methods**

The study is carried out in Navodaya Medical College and Hospital and Govt. District Hospital, Raichur, during the period 01-09-2008 to 31-10-2008. During this period 185 patients visited at OBGYNE OPD were included in the study.

**Laboratory investigation:**

Patients were evaluated clinically collecting the 2ml of venous blood is obtained from each subject for Hb % estimation and peripheral smear examination. The values got during the study are compared but in trimesters of pregnancy the Hb gm% lower limit is different as suggested by WHO as follows,

**Stages of Pregnancy**

I Trimester ( 0 – 12 weeks )  
 II Trimester ( 13 – 28 weeks )  
 III Trimester ( 29 weeks to term )

**Anaemia if less than g/dl<sup>10</sup>**

11.0  
 10.5  
 11.0

**Degree of Anaemia<sup>11</sup>**

On the basis of Hb gm %

Mild is ( 9 - 11 )  
 Moderate is ( 7 – 9 )  
 Severe is ( 4 – 7 )  
 Very severe is ( < 4 )

**Statistical analysis**

The data was analyzed by descriptive statistics.

**Results****Table – 1 : Incidence of Anaemia**

Criteria	No. of Pregnant women	Percentage
Normal	21	11.35 %
Anaemic	164	88.64 %
Total	185	

**Table – 2 : Distribution of degree of anaemia in cases**

Degree of anaemia	Hb %	No. of pregnant women	%
Normal	> 11 gm %	21	11.35
Mild	9-10 gm %	91	49.18
Moderate	7-9 gm %	55	29.72
Severe	4-7 gm %	18	09.72
Very severe	< 4 gm %	00	00.00
Total		185	

**Table – 3 : Distribution of degree of anaemia according to different age groups**

Age (yrs) / Degree of anaemia	Normal	Mild	Moderate	Sever	Total
18 -21	03	20	15	07	45 (24.3 %)
21-24	06	28	09	02	45 (24.3 %)
24-27	07	30	15	04	56 (30.3 %)
27-30	04	08	14	05	31 (16.8 %)
30-33	01	01	00	00	02 (1.1 %)
33-36	00	02	01	00	03 (1.6%)
36-39	00	00	01	00	01 (0.5 %)
39-42	00	01	00	00	01 (0.5 %)
42-45	00	01	00	00	01 (0.5 %)
Total	21	91	55	18	185

**Table – 4 : Distribution of cases in their Triminister**

<b>Triminister</b>	<b>No. of pregnant women</b>	<b>Percentage</b>
First	05	02.7
Second	07	03.7
Third	173	94.6
Total	185	

**Table – 5 : Distribution of degree of anaemia according to different Gravida**

<b>Degree of anaemia</b>	<b>Gravida 1</b>	<b>Gravida 2</b>	<b>Gravida 3</b>	<b>Gravida 4</b>	<b>Gravida 5</b>
Normal	02	12	04	02	01
Mild	38	35	14	01	03
Moderate	15	22	11	05	02
Severe	06	04	02	04	02
Very severe	00	00	00	00	00
Total	61	73	31	12	08

**Table – 6 : Distribution of Degree of Anaemia according to their Type of Diet**

<b>Degree of anaemia</b>	<b>No. of Pregnant women of vegetarian diet</b>	<b>No. of Pregnant women of mixed diet</b>
Normal	05	16
Mild	15	76
Moderate	13	42
Severe	06	12
Very severe	00	00
Total	39	146

**Table – 7 : Percentage Distribution of type of blood picture among cases**

<b>Type</b>	<b>No. of Pregnant women</b>	<b>%</b>
Hypochromic Microcytic anaemia	117	63.24
Normocytic Normochromic blood picture	68	36.76
Total	185	

**Table – 8 : Knowledge about Anaemia in Pregnancy and its complications among cases**

<b>Knowledge about anaemia in pregnancy</b>	<b>No. of pregnant women</b>	<b>%</b>
Yes	12	06.48
No	173	93.51
Total	185	

Incidence of anaemia in Raichur is 88.64% which shows high incidence(table1) similar studies conducted in Multhan, Pakistan were found 96% (<11 gm/dl,Hb%)<sup>7</sup>. which is higher than present study & in Bangladesh is similar study shows 50% (<11gm/dl,Hb%)<sup>8</sup>. And another

similar study conducted in Delhi, were found to be 87.8% (<11 gm/dl, Hb%)<sup>6</sup> similar study conducted in Srilanka 65% prevalence of anaemia is seen.<sup>6</sup> Current study co-relates with other studies.

Mild degree of anemia is 49.18%, moderate degree is 29.72%, severe degree anemia is 9.72% (table 2). The severe anemia in plains of Nepal was found out to be as high as 15%.<sup>6</sup> The mild degree of anemia is usually common. It's due to physiological adaptation taken place in the body during the pregnancy. Mild degree of anemia can be treated but the severe degree of anemia will cause very serious problems and severe anemia should be treated in tertiary health centre immediately. Multhan study shows 44% of mild degree of anemia, 48% moderate degree of anemia & 8% severe degree of anaemia.<sup>7</sup> Delhi study shows mild degree anemia is 67.4%, moderate degree anemia is 20.1%, and severe anemia is 0.3%. Compare all the values with other studies, mild degree anemia shows high prevalence.

48.64% of pregnant women belong to the age group 18-24 years, 24.32% of cases belong to the age group 18-21 year, and this teenage pregnancy also one fourth in total cases (table 3) total 18 number of patients belongs to severe anemic, but in severe anaemic cases 7 belongs to age group between 18-21 year. This result clearly shows that the early marriages & socio economic status. Girls often have less education than boys, which denies them the opportunity to develop their full potential. In setting where early marriage are common early childbearing put adolescent girls health & survival at risk and risk & curtails their education economic opportunities.<sup>12</sup>

That's why early age pregnancy leads to anemia and late pregnancy after 35/45 years also found to be anemic, due to multiple pregnancies.

Presentation of antenatal care at 3<sup>rd</sup> trimester is seen as high as 94.59% (table 4) since the micronutrients is maximum during the last trimester, this could be the one factor underlying a high prevalence of anemia. Developing country like ours, micronutrients supplements are needed right from first trimester, Multhan studies shows that 88% of the cases presenting antenatal care at 3<sup>rd</sup> trimester.

Multiple pregnancies seen in current study, maximum gravida is 5 & minimum gravida is 1. In multhan study maximum gravida is 11 & minimum gravida is 1. This could be one of important factor underlying high prevalence of anaemia. Gap between pregnancy is less & then deplete the micronutrient stores of the mother, to the extent that she becomes anaemic even in the 1<sup>st</sup> trimester in next pregnancy. This brings more severe outcome for both mother & baby. The severe anaemia is mainly seen in the gravida 4&5 (table- 5)

In our study 21.08% are pure vegetarians & 78.91 are having mixed type diet. 15.38% severe anaemia is in vegetarian cases & 08.21% case of mixed diet seen as severe anaemic condition. Here this result clearly shows that severe and moderate anemia is high prevalence in vegetarian type of diet cases ( table 6) Mild degree anaemia seen more in mixed diet, by this result vegetarians have less iron supplementation in their diet than mixed diet. Red meat is good contains of iron, but often this is the problem in vegetarian, they can be aware of other foods containing iron. In severe anaemic condition oral & intravenous iron therapy should be given.

63.24% of cases are seen in microcytic hypochromic anaemia. 36.75% of cases belong to normocytic normochromic blood picture (table-7) Multhan study shows microcytic hypochromic anaemia is 76%. When Hb concentration less than 10.4 g% the true reduction in RBC mass is likely present, however because of variations in the magnitude of the hydremia, a fixed dividing line between the normal & abnormal is difficult place in pregnancy<sup>9</sup>. Microcytic hypochromic anaemia resulting from iron deficiency is the most frequent form of anaemia.

The knowledge about anaemia in pregnant women and complications occurring during pregnancy due to anaemia, is very poor in the cases 6.48% of cases only have this knowledge & 93.5% are not having this knowledge. Thus mainly due to the uneducated & early pregnancy (Tab-8)

### **Conclusion**

The current study showed that the prevalence of anaemia is high. (88.64%) and severe degree anaemia is also seen in high incidence. Mild degree of anaemia seen (49.18%), the type anaemia is Microcytic hypochromic anaemia (63.24%), which is mainly due to iron deficiency anaemia of nutritional anaemia. Multi gravida is seen (68.03%), minimum gravida 1 and maximum gravida 5. severe anaemia seen in multi gravida that is gravida 4 & 5. The knowledge about anaemia in pregnancy and its complications in the patients is very low (6.48%). And 94.59 % of pregnant women in 3<sup>rd</sup> trimester attended the antenatal care 1<sup>st</sup> time. 48.64% of cases lie between the age group 18-24 years and shows early pregnancy. By all these conclusions, still more research are to be undertake in Raichur district, to prevent the complication of anaemia in the pregnant women's to have the healthy society.

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## **A REVIEW ARTICLE**

**13]**

### **MOTORCYCLE AMBULANCE: A CHEAPER AND FASTER ALTERNATIVE.**

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**ABSTRACT:**

**The article review feasibility of the Motorcycle Ambulance or “Medical Emergency Motorcycle”(MEM) as an Emergency Response vehicle for its operation in a country like India. We reviewed several works done on the subject internationally. Some of the results that came up from these studies are as follows: 1) Response times: In 63% of the 1,972 cases, MEM arrived before the other emergency vehicles. 2) Cost: The hourly cost of running the MEM was 29 Euro as compared to the 75 Euro for a car ambulance. 3) Safety: Of the 3,626 MEM calls, 12 non-fatal motorcycle falls were reported with 3 injuries. We have also tried and elucidate on some of the shortcomings including of safety concerns, patient privacy, engineering restrictions etc.**

**INTRODUCTION:**

It is a common sight on the roads of the Ahmedabad city these days to spot EMRI “108” service ambulances zooming through the heavy traffic in a frantic bid to save lives of the patients. While this service has certainly proved to be a boon for the citizens of Gujarat, the perennial traffic woes of the big cities do hamper it in some way. Is there a better way? Using helicopters is certainly the swiftest option but not the most feasible one. So this compels us to think of some other means and for a city that boasts of being amongst the leaders in two-wheeler usage, we need not look any further.

**DEFINITION:**

Medical Emergency Motorcycle (MEM) or what is more commonly called as the motorcycle ambulance is a type of emergency vehicle which is either used to carry a solo paramedic or first responder to the patient; or is used with a trailer or a side car to transport the patient to the hospital.

**BENEFITS:**

**1. Reduces response times –**

In an emergency medical service system, response time is an important factor in determining the prognosis of a victim. Till date the results from several studies do validate the fact that the MEMs indeed reduce the response times especially in high traffic urban settings and even in rural areas. In a study by Oliveira M et al at National Medical Emergency Institute, North Delegation, Porto, Portugal, a prospective analysis was done for the data relating to MEM calls from July 2004 to Dec 2005. There were 1972 calls and in 63% of the cases, MEM arrived before the other emergency vehicles where as in 18% cases there was no need of any transport.

In yet another study by Lin CS et al, Department of Emergency Medicine, Shin Kong Wu Ho-Su Memorial Hospital, Taipei, Taiwan, response times of motorcycle and the ambulance were prospectively assessed and compared in 274 emergency cases over a period of 3 months. It was found that during the rush hours, the response times of the motorcycle and ambulance were 4.9+/-

3.0 minutes and 6.3+/-3.4 minutes ( $P < .05$ ), respectively, and in non-rush hours, 4.2+/-2.1 minutes and 5.1+/-2.5 minutes ( $P < .05$ ), respectively. It was concluded that using motorcycles significantly reduced response time compared with a standard ambulance in a congested urban setting.

A study by Hofman JJ et al, Liverpool School of Tropical Medicine, UK was conducted in rural Malawi for referral of obstetric emergencies and it was observed that the median referral delay was reduced by 2 to 4.5 hours (35% to 76 %) depending on different settings. However, large prospective studies are still required to determine the impact on patient outcome of shorter response times using motorcycles.

## **2. Reduces costs –**

MEM is a more cost-effective alternative to the traditional car/van ambulance on two counts, firstly in terms of purchase price and secondly in terms of fuel efficiency and maintenance cost. Again citing the study by Nakstad AR et al at Oslo University Hospital, Norway, the hourly cost of running the MEM was 29 Euro as compared to the 75 Euro for a car ambulance.

Once more referring to the study by Hofman JJ et al, purchase price of a motorcycle ambulance was 19 times cheaper than for a car ambulance. Annual operating costs were US dollars 508, which was 24 times cheaper than for a car ambulance. These numbers do validate the usefulness of MEM especially in resource poor countries where there is felt need for cheaper infrastructure.

## **3. Safety –**

Motorcycle ambulances by the virtue of their unstable nature do raise a safety concern. However, it is found that with appropriate usage of protective equipment and safety measures, acceptable safety levels can be achieved. A study on this subject was undertaken by Kiefe CC et al, National Medical Emergency Institute, Porto, Portugal where by 3626 MEM calls were prospectively analyzed from July 2004 to January 2007. Over this period of time 12 motorcycle falls were reported and 3 MEM drivers were injured and no fatality was registered. Undergoing an emergency driving course and wearing protective equipment was mandatory during the study and this may have influenced the low rates of accidents seen.

## **4. Reaches difficult to access areas –**

In various urban settings, rural and geographically difficult terrain its often difficult for the conventional ambulances to gain access to the target location. MEMs with their extra maneuverability and lightweight structure provide better solutions and this is aptly proven by the study done in the rural Malawi. The lighter side car rigs were better able to cope with poor roads and areas that become impassable to heavier cars and trucks during the rainy season.

## **5. Reduces number of unnecessary car ambulance admissions –**

An important functionality of a MEM is its operation in the role of a first responder. In the study by Nakstad AR et al, MEM was used to evaluate patients when the need for emergency medical assistance was uncertain, and it was found that this practice lead to a reduced number of unnecessary car ambulance admissions. This in turn further contributes to its cost effectiveness and allows for the deployment of car ambulances where they are truly needed.

## **LIMITATIONS:**

### **1. Carries limited equipment –**

MEMs have shortage of space, which allows for the carriage of only limited amount of equipment. A standard car ambulance on the other hand may be fully equipped with ECG, ventilator, oxygen cylinders, emergency drugs, etc. In Brazil an additional MEM is deployed to carry more advanced equipment thus overcoming the limitation to a certain extent.

### **2. Carries limited number of personnel –**

Again due to its space constraint, MEMs have limited room to carry personnel. Certain situations warrant the presence of a doctor, paramedical staff and even the patient's relative, which limits the utility of MEM in its role of an ambulance.

### **3. Safety concerns –**

In spite of the fact that the studies have showed adequate safety results with the usage of MEMs, they do raise concerns with safety. In the studies, drivers were adequately trained and the usage of safety equipment was mandatory which may have contributed to excellent results in terms of safety.

### **4. Rendered unusable in certain weather conditions –**

Weather conditions such as extreme heat, cold, rain, storm etc limit the use of MEMs. This is especially true for the countries receiving snow fall which do not permit the use of MEMs 12 months a year. Specially designed side cars with water proof hoods may still allow for their use during rain which could be employed effectively in countries like India.

### **5. Compromises with patient's comfort –**

MEMs by the virtue of their structure are unstable and prone to be bumpy which may cause inconvenience to both, the patient and paramedics. Open sidecar also compromises with patient's privacy.

### **6. Lack of studies to determine the effects of shorter response times on patient outcomes-**

Although there are impressive figures with respect to shorter response times with the use of motorcycle as ambulance, its impact in terms of clinical outcomes for the patients is yet to be determined. Large prospective studies are probably required to achieve this.

### **SCOPE IN INDIA:**

In India, health care authorities face major challenges in the execution of Emergency Medical Service (EMS) at both urban and rural levels. Poorly maintained narrow or congested roads, traffic load, stray animals, social functions & processions, road encroachment by street vendors, on-going roadside constructions & poor traffic sense amongst the general public - all undermine effective functioning of the EMS. In rural areas too, poor infrastructure and difficult terrain pose a tough challenge for these services. Another concern is lack of resources in terms of finance and infrastructure. MEMs appear to be an effective solution to these problems.

The MEMs are already operational in countries like Brazil, Malawi and Sudan and in India, the Indraprastha Apollo Hospitals, New Delhi, have implemented the concept. The bike medic team under this service serves as a first responder, carries enough equipment to the emergency site while awaiting the response of a transporting ambulance. A similar service was also launched in Coimbatore in 2009.

#### **CONCLUSION:**

It is apparent from various studies mentioned above that Medical Emergency Motorcycles indeed have quicker responses than the conventional car ambulances especially in crowded urban scenarios. If we look at the cost effectiveness, then MEMs are stated to be almost 24 times cheaper than its counterpart. The lightweight models of MEM are useful even in rural settings with poor quality roads and hard to access regions. Appropriate safety measures and usage of safety equipment can overcome the concern for safety raised due to the inherent unstable nature of the motorcycles.

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## **EVOLUTIONARY DIFFERENCE OF BRAIN OF MALE AND FEMALE**

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### **Abstract:**

The difference between male and female brain is age old mystery. Recently CT ,MRI and especially PET and fMRI and other brain mapping studies, it was found that the gender differences in brain were far from just expected. As the major difference between male and female is reproductive system ,there is expected differences reproductive system in representation in brain .especially in hypothalamus and limbic system. The reviews the differences are beyond that due evolutionary functional role the gender play. The most signifying differences are in language and communication area i.e. Wernick' and Braca' areas of brain, Prefrontal lobe, inferior parietal lobules, Straight gyrus ,amygdale , pain perception and oxytocin mediated stress responses. Though certain facts generate controversy more research will give better high light understanding the gender differences of brain structure and function.

Both male and female brains begin with female brain in embryo. At the 8<sup>th</sup> week of intra uterine life, a surge of testosterone from testes in male make a brain, which has characteristic of male brain.

It is evident that reproductive systems i.e. primary and secondary sex characters in male and female of male and female are different. So we do expect gender differences in brain also. In past various studies done by autopsies and very recently with the development of modern equipments i.e. CT ,MRI ,PET and fMRI and brain mapping studies, it was found that the gender differences in brain were far from just expected . In 1861, Paul Broca examined 432 human brains and found that the brains of males had an average weight of 1325 grams, while the brains of females had an average weight of 1144 grams. A 1992 study of 6325 found that men's brains had an average volume of 1442 cm<sup>3</sup>, while the

women averaged 1332 cm<sup>3</sup>. It has been observed that men often have slightly larger brains than women do. It has been attributed to the fact that men tend to have larger bodies and the larger size of brain has nothing to do with intelligence [i.e. large brain mean more I.Q.]. As scientists continue to unravel the mysteries of the brain it will be interesting to see if the functional and behavioral differences often noted between men and women are in fact the result of physical and structural differences in brain.

Although women may have smaller brains than men may, they appear to have greater neuron density in their prefrontal area, the area functionally is involved in planning, judgment, and language, although men still have higher absolute grey matter volume than women in their prefrontal lobe.

It was also found that female brain have larger Wernick' and Braca' areas . Female can communicate more effectively ,uses more body languages, utilizes non-verbal cues such as tone, emotion, and empathy .It was found that in communication and relationship , female uses both the sides of cerebral hemisphere .The problem solving is more creative and intuitive in female compared to male .As man use mainly left side, the problem solving is more logical. Women process language in both hemispheres. This difference offers a bit of protection in case of a stroke. Women may be able to recover more fully from a stroke affecting the language areas in the brain while men may not have this same advantage. In Man large left inferior Parietal lobule probably explains why men frequently perform higher in mathematical tasks than do women. Interestingly, this is the same area of Einstein's brain that was discovered to be abnormally large. Larger right inf. Parietal lobule in women allows them to focus on, "specific stimuli, such as a baby crying in the night' because this area also analyze sensory phenomenon.

In 2005, Haier et al. reported that compared with men, women show more white matter and fewer grey matter in areas related to intelligence. Using brain mapping, women have nearly ten times the amount of white matter related to general intelligence than men. Gray matter is used for information processing, while white matter consists of the connections between processing centres. In short men and women apparently achieve similar IQ results with different brain regions irrespective of size of the brain.

In other study it has been found interesting and significant difference in Inferior-Parietal Lobule. The Left inferior-parietal lobule is larger in male and right inferior-parietal lobule is larger in female brain. The inferior-parietal lobule in left side contributes to an individual's ability to judge speed, time, arithmetic calculation, three dimension visualization and spatial intelligent and is known to have been very large in many physicists and mathematicians, including Albert Einstein. The right side of the inferior-parietal lobule contributes to the way in which a person understands emotions, sensation and information received from the body's senses and is larger in female brain.

In study carried out by Peg Nopoulos, Jessica Wood et al., it was found that one subdivision of the ventral prefrontal cortex-an area involved in social cognition and interpersonal judgment-is proportionally larger in women, compared to men. (Men's brains are about 10 percent larger than women's, overall, so any comparison of specific brain regions must be scaled in proportion to this difference.) This subdivision, known as the STRAIGHT GYRUS (SG), is a narrow strip of cerebral cortex running along the midline on the undersurface of the frontal lobe. Wood and colleagues found the *SG to be about 10 percent larger in the thirty women they studied*, compared to thirty men (after correcting for males' larger brain size). They found that the *size of the SG correlated with a widely-used test of social cognition*, so that individuals (both male and female) who scored higher in interpersonal awareness also tended to have larger SGs. Wood and colleagues speculate about the *evolutionary basis for this sex difference*. Perhaps, since women are the *primary child-rearers*, their brains have become programmed to develop a larger SG, to prepare them to be sensitive nurturers. Prenatal sex hormones are known to alter behavior and certain brain structures in other mammals. Perhaps such *hormones-or sex-specific genes-may enhance the development of females' SG* (or dampen the development of males') leading to inborn differences in social cognition.

All this studies actually functionally translated in to human physiology In reference to reaction to stress, men tend to have a "fight or flight" response to stress situations while women seem to approach these situations with a "tend and befriend" strategy. Psychologist Shelley E. Taylor coined the phrase "tend and befriend" after recognizing that during times of stress women take care of themselves and their children (tending) and form strong group bonds (befriending). The reason for these different reactions to stress is rooted in hormones. The hormone oxytocin is released during stress in everyone. However, estrogen tends to enhance oxytocin resulting in calming and nurturing feelings whereas testosterone, which men produce in high levels during stress, reduces the effects of oxytocin. Though Larger deep limbic system is that it also opens women up to depression, especially during times of hormonal shifts such as after childbirth or during a woman's menstrual cycle.

In reference to limbic system, it is worth to mention that interestingly Men and women perceive pain differently. In studies, women require more morphine than men to reach the same level of pain reduction. Women are also more likely to vocalize their pain

and to seek treatment for their pain than are men. The area of the brain that is activated during pain is the amygdala. It has been found that in men, the right amygdala is activated. In women, the left amygdala is activated. The right amygdala has more connections with areas of the brain that control external functions while the left amygdala has more connections with internal functions. This difference probably explains why women perceive pain more intensely than do men. It is further observed that preoptic nucleus of hypothalamus is larger in man compared to female and is functionally related to mating behaviors.

There are some disorders that men and women are susceptible to in different ways. Men are more likely to suffer to have dyslexia or other language problems. While handedness is not a disorder, these brain tendencies also explain why more men are left-handed than are women. Men are also more likely to be diagnosed with autism, ADHD, and Tourette's Syndrome. This can be explained on basis of abundant language areas in female brain compared to male brain. Women, on the other hand, are more susceptible to mood disorders such as depression and anxiety due to difference in limbic system.

We can look to understand brain differences in males and females from evolutionary roles they had to play. Creating social unity, harmony and nurturing became the domain of the female while hunting and food gathering became that of the male. This sort of behaviour pattern shows up in some primate species.

Recently concept of Brain plasticity a theory that has developed around studies that show the brain adapts to its environment, growing new brain connections to learn a new skill and decreasing them if it is not needed. This theory is applicable at all the stages of development of human brain male and female both. The theory of plasticity explain some major exception in structure and function of brain of each gender we observe.

Neuroscience has made great discovery of concrete, scientifically proved anatomical and physiological differences between the brains of males and females. While this knowledge could in use theory to justify prejudice against women. In fact, this new knowledge may help physicians and scientists to discover new ways to explore the brain differences in the benefit of the treatment of diseases, the personalized action of drugs...i.e. pain, depression. Sometime it is difficult to understand both the gender to each other and create lots of familial and marital issues and issues related to personal relationship in home and organizational environment. This can be understand by evolutionary difference of brain. After all, males and females differ only by one Y chromosome, but this makes a real impact upon the way we react to so many things, including pain, hormones, etc including stress. Human responses are learned responses.

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**MESSAGE  
OF WORLD HEALTH DAY 2010  
CAMPAIGN: 1000 CITIES, 1000 LIVES**

**Abstract:**

April 7 of each year marks the celebration of World Health Day. From its inception at the First Health Assembly in 1948 and since taking effect in 1950, the celebration has aimed to create awareness of a specific health theme to highlight a priority area of concern for the World Health Organization.

This year, World Health Day focuses on urbanization and health, in recognition of the effect urbanization has on our collective health globally and for us all individually.

**World Health Day 2010 campaign 1000 Cities, 1000 Lives**

With the campaign 1000 cities, 1000 lives, events will be organized worldwide during the week of 7 – 11 April 2010. The global goals of the campaign are:

1000 cities: to open up public spaces to health, whether it be activities in parks, town hall meetings, clean-up campaigns, or closing off portions of streets to motorized vehicles.

1000 lives: to collect 1000 stories of urban health champions who have taken action and had a significant impact on health in their cities.

**Some facts on urbanization**

- \* Over 3 billion people live in cities.
- \* In 2007, the world's population living in cities surpassed 50% for the first time in history.
- \* By 2030, six out of every 10 people will be city dwellers, rising to seven out of every 10 people by 2050.
- \* Over 0.8 billion people live in cities in the Western Pacific.
- \* 60% of the increase in the global population in the next 20 years is expected to be in the Asia Pacific.
- \* It is estimated that half a billion people live in informal settlements in Asia, and five out of six newly poor are in cities.

**Message of the Regional Director,  
Dr Shin Young-soo, for World Health Day**

Rapid and unplanned population growth in urban areas is a global reality, particularly in developing countries. And the Western Pacific Region is no exception. While urbanization has in some cases created better opportunities for employment, greater access to education and social services, improved housing and living conditions, and higher socioeconomic development, it has also brought a number of problems that directly impact health. In most instances, solutions to these problems must go beyond the traditional domain of the health sector and require the involvement of non-health sectors such as education, trade, industry, transport and urban planning, as well as participation at the community level.

In recognition of the profound impact of urbanization on our collective health and for all of us individually, the focus of this year's celebration of World Health Day on 7 April, 2010 is Urbanization and Health. With the global campaign "1000 cities, 1000 lives", cities will close streets, organize physical-activity events, promote local culture and safe food and conduct other events to raise awareness of the role of cities in promoting health. The global campaign intends to mobilize 1000 cities to sign up for the campaign and to tell their stories as well as the stories of 1000 urban health champions through a website and other forms of interactive media.

In the Western Pacific Region, we are highlighting "Environmentally Sustainable and Healthy Urban Transport" (ESHUT) as one of the approaches to achieve healthy urbanization. The policy, design and operation of urban transport systems impact the health and safety of people through air and noise pollution, greenhouse gas emissions generated by motor vehicles, road traffic injuries, exposure to second-hand smoke in confined public transport systems, and the lack of accessibility for older people and those with disabilities. Our overall objective is to promote a win-win strategy for urban transport system to achieve good urban mobility that impacts positively on health.

In celebration of World Health Day, the WHO Western Pacific Regional Office will host a Cities Forum in Manila on 7 April to showcase the efforts of five cities in the area of ESHUT. Those cities are Seoul and Changwon (Republic of Korea), Marikina (Philippines), Nagoya (Japan), and Phnom Penh (Cambodia). We hope that this Forum will be the launching pad for policies and action on environmentally sustainable and healthy urban transport within the Region and that more cities will place the environment and health at the center of their development. We urge all Member States and our partners to join us in celebration of World Health Day 2010 and in advocating for cities that promote health, development and a better quality of life for all.

Detail please visit WHO web site

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