# Health Benefits of Reducing Body Iron as a Motivational Tool for Improving Voluntary Blood Donation

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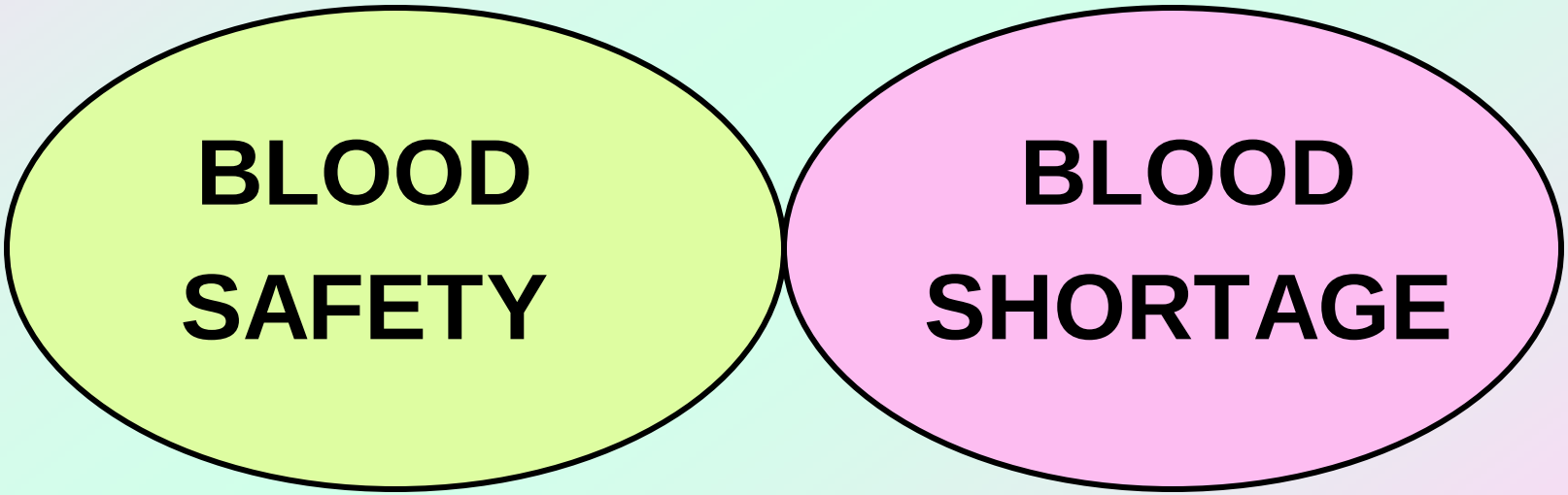
# Challenges of Blood Transfusion Services



- Window period donations are still a serious threat to blood safety
- Only solution is Voluntary Regular Donors
- 100% Altruistic blood donation- not yet attained

## Indian scenario-

- A big gap between demand and supply
- Transfusion requirements met from replacement donors most of whom are first time

- To attract and retain low risk donors ,new strategies to be formulated for achieving quality, safety and adequacy of blood products

## Evidence suggests that

- Iron accumulation leads to many pathological conditions
- Toxic effects of iron implicated in DM Neurodegenerative diseases, Atherosclerosis, Malignancy etc

- Men are prone to iron accumulation as it is not readily excreted through body's usual methods of elimination

It is hypothesized that iron induced lipid peroxidation is crucially involved in the early stages of atherogenesis

- Blood letting has many health benefits by decreasing body iron levels
- Blood donation is an effective and easy method to eliminate excess iron from body

# Aim of study

- To evaluate association between body iron levels and CAD
- To compare iron levels in regular blood donors and non-donors
- Highlight the beneficial effects of low iron levels to motivate people to become regular donors

# Materials and Methods

- Study was undertaken for a period of 2 years: 2002-2004 in a Tertiary care Teaching hospital in Trivandrum, Kerala, South India

# Study Subjects

- CAD patients
- Healthy Controls
- Regular Blood donors

# Selection Criteria for subjects

- **CAD patients**
  - Below the age of 60 years
  - No H/o acute MI within 3 months
  - No infection, inflammation or hepatic disease

# Healthy Controls

- Below 60 years
- No DM, HT
- No recent infection, inflammation or hepatic disease
- No drug intake
- No blood loss or blood donation

**Regular Donors**

- > 10 donations in the past 3 years

# Questionnaire

- Medical History
- Family history
- personal history

# Biochemical Analysis

Serum from 12 hour fasting sample used for Biochemical analysis

- Serum Iron
- Serum Ferritin
- Total iron Binding Capacity (TIBC)
- Transferrin Saturation

# Results

## Table I : Iron levels in CAD patients and control group

| Iron Parameter | CAD patient (No. 89) | Control group (No. 64) |
|---|---|---|
| Ferritin (µg/L) Mean ± SD | 124.18 ± 114.72 | 89.31 ± 91.21 * |
| TIBC (µg/dl) Mean ± SD | 283.73± 52.43 | 309.72 ± 56.63* |
| %TS Mean ± SD | 32.78±11.13 | 34.53 ± 9.25 |

*p< 0.05

# Results contd….

## Table II: Iron levels in regular donors and control group

| Iron Parameter | Regular donors (No. 102) | Control group (No. 64) |
|---|---|---|
| Ferritin (µg/L) Mean ± SD | 43.98 ± 55.79 | 89.31 ± 91.21* |
| TIBC (µg/dl) Mean ± SD | 311.66 ± 51.90 | 309.72 ± 56.63 |
| %TS Mean ± SD | 26.91 ± 8.34 | 34.53 ± 9.25* |

*p< 0.05

# Results contd….

- Serum Ferritin levels significantly higher in CAD patients when compared to control group
- TIBC levels in CAD patients were significantly low compared to control group

# Results contd….

- Ferritin levels in regular donors is only 50% of the value in non-donors
- Transferrin saturation is significantly reduced in regular donors

# Limitations of the Study

Difference of age between CAD group and control group

# Discussion

- Iron an essential and important nutrient
- Excessive levels can lead to the formation of free radicals and cause damage to vascular endothelium

# Discussion contd…

- Oxidative cell damage is proportional to free and ferritin bound iron
- Oxidative damage to enzymatic and structural proteins of cell membranes
- Endothelial dysfunction- subendothelial accumulation and oxidation of LDL- atherogenesis

# Discussion contd…

- Findings are in agreement with documented reports correlating high ferritin value and low TIBC in CAD patients

Induction of Near Iron  Deficiency levels where serum ferritin is reduced to about 40µg is effective in reducing oxidative stress.

Inducing and maintaining NID is expected to improve NIDDM , reduce blood pressure and other cardiovascular risk factors.

Our findings have shown that men who have donated regularly, for the past 3 years have kept their serum ferritin at low levels.

Iron deprivation appears to be very efficient and feasible than any other classical antioxidant therapy.

Taking these beneficial effects into consideration Blood Transfusion Services should adopt novel strategies.

Public should be made aware of the ill effects of excess iron in the body and the benefits of keeping low iron levels

- Blood centers should function as centers of health promotion.
- Baseline ferritin values should be assessed prior to donation.

- A schedule for blood donation can be prepared to achieve and maintain Near Iron deficiency levels.
- For those with high ferritin levels more frequent donations can be considered.

They should be periodically assessed for

Hemoglobin, iron levels and other health Indices.

# Conclusion

- Public health significance of controlling Iron stores is considerable.
- We should recognize iron as a risk factor for atherosclerosis and understand the need to control our body iron levels.
- Measuring iron levels should be included among the indices to assess ones health status.

- Regular blood donation seems to be the right choice for regulating iron levels.
- This will be a boon to the developing countries like India were blood donations are few.

# Acknowledgement


- The study was done with financial support from Terumo Penpol Limited.
- Biochemical analysis was done by R&D Biological division of Terumo Penpol Ltd

# THANK YOU