A STUDY ON THE OCCUPATIONAL HEALTH STATUS OF IRON INDUSTRY WORKERS IN THANNER PANTHAL AT DINDIGUL DISTRICT

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ABSTRACT

Environmental pollution is an alarming issue at the present. It deals with every aspect of our life including birth to death. The problem is not from a pinpoint source; rather it is a wide problem which contains many more aspects beyond our imagination in air, water, land etc. Many types of health hazard are in our surroundings and they gradually exposed to us. Occupational exposure to harmful substance is a very important human health hazard Industrial empowerment worssts the problem. Check on polluting industries in Dindigul District at Thanner Panthal. A person cannot avoid this type of health hazard. Foundry industry is strongly set at Thanner Panthal and as such polluting the area and affect the life of nearby living persons and workers. An assessment has been done for the occupational hazard at iron foundry through haemoglobin concentration and total erythrocyte count. A decrement in total erythrocyte count (TLC) different leccyte count (DLC) and haemoglobin concentration (Hb. Conc.) has been found in foundry workers which is alarming to take rehabilitating steps.

Key Words: Metal pollution, Air pollution, Foundry industry, Hb. Conc., TLC, DLC.

INTRODUCTION

Foundry workers are exposed to a unique collection of environmental challenges including noise, heat, vibration, organic and inorganic chemical dusts, residue, aerosols, gases, acids and other pollutants. However, professionals in the field of occupational health have focused more on the adverse health effects resulting from exposure to physical factors. The physical...
loads, organizational factors, individual characteristics and psychosocial factors have been found to be related to various musculoskeletal symptoms, which consist of a multi-factorial mechanism of the work-related illness. The metal casting industry is regarded as a typical industry with complex work process generating almost all the risk factors of relevance. A combination of these exposures on the foundry workers are generally found anaemic due to the unhygienic conditions and pollution. Metallic manganese is used in the manufacturing of steel, carbon steel, stainless steel, cast iron, and superalloys to increase hardness, stiffness, and strength [1]. Manganese chloride is used in dyeing, disinfecting, batteries, and as a paint drier and dietary supplement. Manganese oxide (MnO) is used in textile printing, ceramics, paints, colored glass, fertilizers, and as food additives. Manganese dioxide is used in batteries and may also be generated from the welding of manganese alloys. Manganese tetroxide may be generated in situations where other oxides of manganese are heated in air (NIOSH Pocket Guide, 1995). Pollutants emitted from foundry work cause so much damage to blood, which carries very innocently the harmful chemicals and gases to the various organs. These substances have been shown to produce harmful effects on the blood, bone marrow, spleen and lymph nodes, since blood cells. Toxic chemicals in the air are also stimulating the immune system to activate leukocytes and macrophages that can create tissue damage, especially to the cells living the blood vessels. Blood is an important factor for maintenance of better health.

Therefore, present investigation has been made on the assessment of some haematological parameters in foundry workers at Thanner Panthal in Dindigul District.

MATERIALS AND METHODS

There are about 10 permanent workers employed in the Iron industries. Out of this, 5 industrial workers who have been working for more than 20 years were selected for blood analysis.

The following were the “Criteria” followed for the inclusion for blood analysis.

• Those who were directly employed in rubber manufacturing operations.
• Those who have been working in the industrial units for more than ten years and above.
• Male workers in the age group of 40-60 years.

PARAMETERS ANALYSED

• Total Leukocyte count (TLC)
• Differential Leukocyte count (DLC)
• Erythrocyte sedimentation rate (ESR)
• Hemoglobin levels (Hb)

BIO-CHEMICAL PARAMETERS
(a) Total serum protein  (b) Albumin, Globulin and
(c) Albumin/globulin ratio.

RESULTS AND DISCUSSIONS
In order to assess the health hazards associated with chemicals used in the leather industry
Blood samples were collected from the persons in iron industry in order to diagnosis diseases
like lungs disorder, gastro intestinal tract infection. Hexavalent chromium causes dermatitis,
allergic skin reaction and skin veneration.

The acceptable standard level of Blood Parameters for human beings as given below

IRON INDUSTRY
Sample-1 (S1) - Mrs. Muthulakshmi
Sample-2 (S2) - Mr. Alagarsamy
Sample-3 (S3) - Mrs. Pappathi
Sample-4 (S4) - Mr. Muthu
Sample-5 (S5) - Mr. Mayilsamy

<table>
<thead>
<tr>
<th>Blood Parameters</th>
<th>Standard Value</th>
<th>Blood samples from the Iron Industry Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Groups</td>
<td></td>
<td>S1</td>
</tr>
<tr>
<td>TC (No of cells/mm³)</td>
<td>4000-10000</td>
<td>8700</td>
</tr>
<tr>
<td>DC(%) P</td>
<td>40-60%</td>
<td>65</td>
</tr>
<tr>
<td>L</td>
<td>20-40%</td>
<td>33</td>
</tr>
<tr>
<td>E</td>
<td>Up to 6%</td>
<td>2</td>
</tr>
<tr>
<td>M</td>
<td>2-10%</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>Up to 2%</td>
<td>2</td>
</tr>
<tr>
<td>ESR(mm/hr)</td>
<td>5-20</td>
<td>25/50</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>14-16%gms</td>
<td>10.8</td>
</tr>
<tr>
<td>Protein</td>
<td>6.5</td>
<td>7.4</td>
</tr>
<tr>
<td>Albumin</td>
<td>4.1</td>
<td>4.0</td>
</tr>
<tr>
<td>Globulin</td>
<td>2.4</td>
<td>3.4</td>
</tr>
<tr>
<td>A/G Ratio</td>
<td>1.7</td>
<td>1.2</td>
</tr>
</tbody>
</table>

TC: Total Count  L: Lymphocytes  B: Basophile
DC: Differential Count  E: Eosinophiles
PATHOLOGICAL INVESTIGATION

• Polymorphs
The polymorphs counts of the five samples are varied from 64 to 70 but the normal value are 40-60%. Here there is a increase of polymorphous from 64-70% indicating infection of the lungs to workers.

• Lymphocytes
The Lymphocytes counts of selected samples are varied from 28 to 40% and the normal values range from 28 to 40% and the normal values range from 20 to 40% indicating infective disease

• Eosinophiles
The Eosinophile counts of the selected samples varied from 2 to 6% but the normal values up to 6% The result of the various blood samples of the tannery workers with age group of 40-46 are presented and discussed.

From the table I the following result obtained for various blood samples are discussed.

• TC(Total Leucocyte Count)
The TC values for selected five samples varied from 8500 to 9800 cells/mm$^3$. Whereas the normal values range from 4000 to 10000. There results come under normal values.

• Differential Count (DC)
Differential count includes the percentage of polymorphs, lymphocytes, eosinophiles, monocytes and basophils.

• Hemoglobin (Hb)
The Hb values of the given samples are varied from 7 to 10 gms. But the normal values range from 14 to 16 gms. The deviation is due to Anaemia of the Tannery workers.

BIOCHEMICAL INVESTIGATION

• TOTAL PROTEIN
The normal values of control samples is 6 to 8 gms/dl but the observed values for five samples are in the range of 6.8 to 7 gms indicating the normal values of the workers.
These results are not within the standard limit. The deviation is due to allergic and asthma condition of the workers.

**MONOCYTES**
The Monocytes of the selected samples are varied from 1 to 2% and the normal values are 2 to 10% and there is a decrease in monocytes due to T.B infection.

**ERYTHRO SEDIMENTATION RATE (ESR)**
The ESR values of five samples are varied from 15mm/hr to 60mm/hr but the normal values in 5 to 20. The deviation indicates the presence of T.B among Tannery workers.

**ALBUMIN**
The normal albumin values range from 3.2 to 5 gms/dl but the observed values for five samples range from 3.4 gms/dl to 4.5. The values are within the normal limit.

**GLOBULIN**
The normal globulin values range from 2.3 to 3.6 gms/dl but the experimental values for the five samples from 2.4 to 3.5 indicating the values are within the normal limit.

**A/G RATIO**
The normal value of A/G ratio is 1 to 1.38 gms/dl. But the observed values are 0.9 to 1.8 indicating there is a deviation from the normal values indicating malnutrition of the tannery workers.

**REFERENCES**


