IRON PROFILE STATUS IN PSORIASIS PATIENTS AND THEIR CORRELATION WITH THE DEGREE OF SEVERITY OF DISEASE

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INTRODUCTION
Psoriasis is a chronic, recurrent, relapsing, remitting autoimmune systemic inflammatory skin disease [1-4] with varying degrees of severity and disability affecting both adults and the pediatric population [5,6]. For assessment of the severity and extent of psoriasis, the current gold standard tool is psoriasis area and severity index (PASI) [3,5,7,8]. For assessment of the severity and extent of psoriasis, the PASI Score as was divided into mild, moderate, and severe type of psoriasis.

METHODS
A comparative observational study was performed on 100 subjects of age group of 18–60 years with 50 cases (who presented to the Dermatology OPD in our institute with Psoriasis) and 50 controls (normal healthy individuals) from January 2021 to July 2022. A preformed pro forma was filled for each patient after taking written consent. Ferritin was evaluated using fully automated chemistry analyzer; iron and TIBC were evaluated by semi-autoanalyzer and Hb by Automated Hematology Cell Counter. Statistical analysis was done using Epi-info software. Students unpaired 't' test was used to compare the levels of ferritin, Iron, TIBC, and Hb between psoriasis patients and controls. Correlation of PASI Score with continuous variables was assessed using the Pearson Correlation Coefficient. A statistically significant p<0.05.

Inclusion criteria
- All participants from 18 to 60 years.

Exclusion criteria
- Patients not giving consent
- Patients having any active infections
- Pregnancy and lactation
- Other inflammatory conditions.

RESULTS
Male predominance was observed in both cases and controls as compared to female.

Severity of psoriasis was decided according to PASI Score as was divided into mild, moderate, and severe type of psoriasis.
DISCUSSION

This study conducted at the Department of Biochemistry and Department of Dermatology, Gandhi Medical College and Hamidia Hospital Bhopal on 100 subjects has compared iron profile in cases (psoriatics) and controls (normal healthy individuals).

The mean age of psoriasis cases in our study was 44.34±10.95, whereas that of controls was 41.46±12.12. The findings of this study were in accordance by many studies [6,14-16].

Males and females are equally affected by psoriasis [4]. Males outnumbered in our study with thirty males and 20 females in psoriatic cases, whereas 27 males and 23 females in controls. Male-to-female psoriatic patients in our study were 1.5:1. Several studies also found similar results [5,6,15-17].

We in our study had 20 cases of mild psoriasis, 12 cases of moderate psoriasis, and 18 cases of severe psoriasis. Similar results were also found in several different studies [7,14,18,19].

Serum ferritin level in psoriasis patients was 41.8±20.9 ng/mL and that of control was 167.6±102 ng/mL (p=0.0001). Our results were in concordance with many studies [5,20]. While in a study by Dilek et al [18], serum ferritin level was more in cases than controls which were not comparable to our study. We also got statistically in significant negative correlation of PASI with serum ferritin (r=−0.002, p=0.6438).

In our study, mean Hb among cases was 9.3±1.8 mg/dL, whereas among control was 13.3±2.0 mg/dL (p=0.0001). Our results were not in accordance with a study by Mahajabeen and Nidhi [5]. Hb was more in cases as compared to controls. We discovered a slight but positive connection between Hb and PASI (r=0.118, p=0.4102). We found statistically insignificant positive correlation of PASI with Hb (r=0.118, p=0.4102).

We also found mean serum iron concentration 60.18±27 µg/dL in cases, whereas 154.5±55 in controls with statistical significant difference with p<0.0001. Our results were in favor by many studies [10,21]; our results were not in favor by two studies Mohamad [22] and Ghosh et al [23], both these studies got high serum iron in cases than controls.

Table 1: Distribution of cases and controls according to age (n=50)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Frequency (%)</th>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>2 (4)</td>
<td>2 (4)</td>
<td></td>
</tr>
<tr>
<td>21–30</td>
<td>3 (6)</td>
<td>10 (20)</td>
<td></td>
</tr>
<tr>
<td>31–40</td>
<td>15 (30)</td>
<td>10 (20)</td>
<td></td>
</tr>
<tr>
<td>41–50</td>
<td>14 (28)</td>
<td>15 (30)</td>
<td></td>
</tr>
<tr>
<td>&gt;50</td>
<td>16 (32)</td>
<td>13 (26)</td>
<td></td>
</tr>
<tr>
<td>Mean±SD</td>
<td>44.3±10.05</td>
<td>41.4±12.12</td>
<td></td>
</tr>
</tbody>
</table>

SD: Standard deviation

Table 2: Distribution of patients according to sex (n=50)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Frequency (%)</th>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30 (60)</td>
<td>27 (54)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>20 (40)</td>
<td>23 (46)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Distribution of cases according to severity of psoriasis

<table>
<thead>
<tr>
<th>Severity</th>
<th>PASI score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>0–7</td>
</tr>
<tr>
<td>Moderate</td>
<td>7–12</td>
</tr>
<tr>
<td>Severe</td>
<td>12–72</td>
</tr>
</tbody>
</table>

Table 4: Comparison of iron profile of cases and control group

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Cases (n=50)</th>
<th>Control (n=50)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferritin (ng/mL)</td>
<td>41.8±20.9</td>
<td>167.6±102</td>
<td>0.0001</td>
</tr>
<tr>
<td>Iron (µg/dL)</td>
<td>60.18±27</td>
<td>154.5±55</td>
<td>0.0001</td>
</tr>
<tr>
<td>TIBC (µg/dL)</td>
<td>475±104</td>
<td>334±128</td>
<td>0.0001</td>
</tr>
<tr>
<td>Hb (g %)</td>
<td>9.3±1.8</td>
<td>13.3±2.0</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

TIBC: Total iron binding capacity, Hb: Hemoglobin

Fig. 1: Age distribution of cases and controls (percentage)

Fig. 2: (a) Distribution of cases according to sex. (b) Distribution of controls according to sex

Fig. 3: Distribution of cases according to severity of psoriasis
Iron is an essential micro element in the human body due to its wide range of functions. Iron deficiency frequently occurs in human aging process which seem to be strongly connected with neutrophil activation, oxidative stress, and worsening of psoriasis. Routine Hb, ferritin, and iron including TIBC estimation will be helpful in accessing and describing the severity of psoriasis.

Serum iron profile has some diagnostic and prognostic significance in psoriasis and also the levels of these parameters are in relation to how severe the psoriasis is. Hence, we conclude iron profile should be done in earliest stages of psoriasis to help in severity assessment, treatment, prognosis of the disease, monitoring, and follow-up of treatment modalities. We suggest that these parameters should be included in the investigation profile of psoriasis and further research on more number of patients should be done to give a definitive investigation profile.

CONCLUSIONS
Iron is an essential micro element in the human body due to its wide range of functions. Iron deficiency frequently occurs in human population and complicates natural course of chronic diseases. We found a reduced level of iron and ferritin in our cases in comparison to healthy individuals concluding that iron and ferritin should be estimated in psoriasis, and if found anemic proper diet including iron and treatment of anemia should be given. We found increased TIBC in our study. Our data show reduced hemoglobin concentration which may be due to reduction in the number of erythrocytes in psoriasis patients and present several changes denoting an enhanced damage and/or aging process which seem to be strongly connected with neutrophil activation, oxidative stress, and worsening of psoriasis. Routine Hb, ferritin, and iron including TIBC estimation will be helpful in accessing and describing the severity of psoriasis.

Serum iron profile has some diagnostic and prognostic significance in psoriasis and also the levels of these parameters are in relation to how severe the psoriasis is. Hence, we conclude iron profile should be done in earliest stages of psoriasis to help in severity assessment, treatment, prognosis of the disease, monitoring, and follow-up of treatment modalities. We suggest that these parameters should be included in the investigation profile of psoriasis and further research on more number of patients should be done to give a definitive investigation profile.

AUTHOR’S CONTRIBUTIONS
Sheetal Rathore- Preparation of manuscript, literature search, review of literature. Anuradha R Jain- Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Manish Kumar Kain- Have made a substantial contribution to the concept or design of the article; or the acquisition, analysis, or interpretation of data for the article. Nitin Pandya- Drafted the article or revised it critically for important intellectual content. Tripti Saxena- Approved the version to be published.

CONFLICTS OF INTEREST
Nil.

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