

**Case Study**

**Panduroga as a risk factor of kamala in 180 participants -  
A case control study**

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[Received: - 11-11-2023, Accepted:-16-12-2023 Published 18-12-2023]

**Abstract –**

Panduroga (Iron deficiency Anemia) is a group of sign and symptoms including pale colored skin, Palpitation, loss of strength, drowsiness, body ache, anorexia, mild fever and giddiness. In Ayurveda texts, Kamala is described in the same chapter of Panduroga. If Panduroga remain untreated then it leads to Kamala. Yellow discoloration of skin, nails, eyes, urine and faecal matter, Burning sensation, indigestion, weakness, body ache are the sign and symptoms of Kamala. As per sign and symptoms, Kamala can be correlated with Jaundice. This study aimed to assess association of Panduroga (Anaemia) and Kamala. 60 cases of Kamala and 120 controls have been studied for analysis.

**Key Words-** Panduroga, Kamala, Anemia, jaundice

**Introduction-**

Panduroga (Iron deficiency Anemia) is a group of sign and symptoms including pale colored skin, Palpitation, loss of strength, drowsiness, body ache, anorexia, mild fever and giddiness.<sup>[1]</sup> According to samhitas, a main feature of Panduroga is the pallor on the skin which occurs due to deficiency of raktu dhatu (blood tissue) either in the form of deficiency of haemoglobin or red blood cells (RBCs). Considering Panduta (pallor) as the predominant sign, the disease is termed

as Pandu roga. The nearest correlation of Pandu roga, can be made with of iron deficiency anaemia (IDA) because of the predominance of Panduta or pallor in the whole body. In Ayurveda texts, Kamala is described in the same chapter of Panduroga. If Panduroga remain untreated then it leads to Kamala. Yellow discoloration of skin, nails, eyes, urine and faecal matter, Burning sensation, indigestion, weakness, body ache are the sign and symptoms of Kamala. As per

sign and symptoms, Kamala can be correlated with Jaundice.

Incidence of Iron Deficiency Anaemia in India is very high. According to National Family Health Survey (NFHS) III data, the incidence of anaemia in urban children is 71%, rural is 84%, and overall is 79%.<sup>[2]</sup> Jaundice is a prevalent condition in Intensive Care Unit Patients. The incidence of jaundice is approximately 40,000 per 100,000 individuals of ICU patients<sup>[3]</sup>. The Primary objective behind this study was to rule out Panduroga as a risk factor for Kamala. This study aimed to assess association of Panduroga (Anaemia) and Kamala. 60 cases of Kamala and 120 controls have been studied for analysis.

#### **Review of literature –**

Jaundice is a disorder presenting yellowness (icterus) of Skin, Mucous Membrane due to hyperbilirubinemia. The annual incidence of jaundice in 1997 was 2.76/1000 population in India<sup>[4]</sup> and in 2015 Prevalence of viral hepatitis is noted 11.5%<sup>[5]</sup>. The incidence of Jaundice in critical patients of Intensive care unit is 40000 cases per 100000 cases<sup>[6]</sup> The big number reflects severity of disease. The Disease Kamala in Ayurveda literature is described with signs and symptoms like yellowish discoloration of Skin, Mucosa, Urine and fecal matter<sup>[7]</sup>. These sign and symptoms are similar with Hepatocellular Jaundice.

Acharya Charaka explains step by step development of various types of Kamala in Pandu Roga Adhyaya [7].

**First step** is Pandu (anemia) – 5 types – Vataj, Pittaj, kaphaj, sannipatj, Mrudbhakshanjanya.

**Second step** – Type 1- Kamala (Jaundice) – Pandu rogi, or even without Pandu roga (anemia) when one indulges in Ateeva Pittavardhaka Ahara (food that causes Pitta vitiation), it leads in step 2 that is Kamala. Pittaj pandu with added Pitta produces Koshtashrit (Bahupitta) Kamala.

Type 2- Shakhashrit Kamala- Margavrodh (obstruction) due to vata & Kapha causes Shakhashrit or Rudhhapath Kamala. Type 3 – Halimaka - Vataja pandu with added Pitta produces Halimaka; Type 4 – Kumbha Kamala - Kaphaja Pandu with added Pitta produces Kumbhakamala.

#### **Sushrut Samhita –**

In Uttartantra, Under Pandu Rog Pratishedh adhyaya, Sushrutacharya mention Kamala as next step of Pandu. He mentioned Kumbhasavha, Laghrak, Halimaka as complications of Kamala<sup>[8]</sup>, Ashtanga Hridaya – Increase Rakta dhatu is cause of Kamala<sup>[9]</sup> Kashyap Samhita – Yellowness of eyes, nails, face, feces, and urine, indigestion are the signs and symptoms of Kamala in Infants mentioned in Sutrashan, 25th chapter, Vedanadhyaya, of Kashyap Samhita<sup>[10]</sup> Virechana is told as the best treatment for Kamala. Yogratnakar- Causes, signs, symptoms, treatment is mentioned in detail in Yogratnakar.<sup>[11]</sup>

In infants, Kamala is due to Pittaj Stanya Dushti. Guduchi, Patol, Nimba twak etc all Tikta rasatmak dravyas treatment for mother and infant. Description of Kamala Vyadhi is under Pandurogadhya in Charak<sup>[12]</sup> and Sushrut Samhitas<sup>[13]</sup>. Because Kamala is next step of Panduroga. If Patients of Panduroga remains untreated then they may lead to Kamala. Panduroga (Iron deficiency Anemia) is a group of sign and symptoms including pale coloured skin, Palpitation, loss of strength, drowsiness, body ache, anorexia, mild fever and giddiness.<sup>[12]</sup>

#### **Methodology –**

Type of study – Case Control study, Study centre – Sumatibhai Shah Ayurved Mahavidyalaya, Hadapsar, Pune, India, Sample size – 60 cases of Jaundice and 120 hospital-based controls were selected in 1:2 ratio.

Inclusion criteria for cases- Age – 18 – 60 years, Total Serum bilirubin level- more than 1.2 mg/dl (As Normal total serum Bilirubin is 1.2mg/dl<sup>[14]</sup> and it is increased in Jaundice)

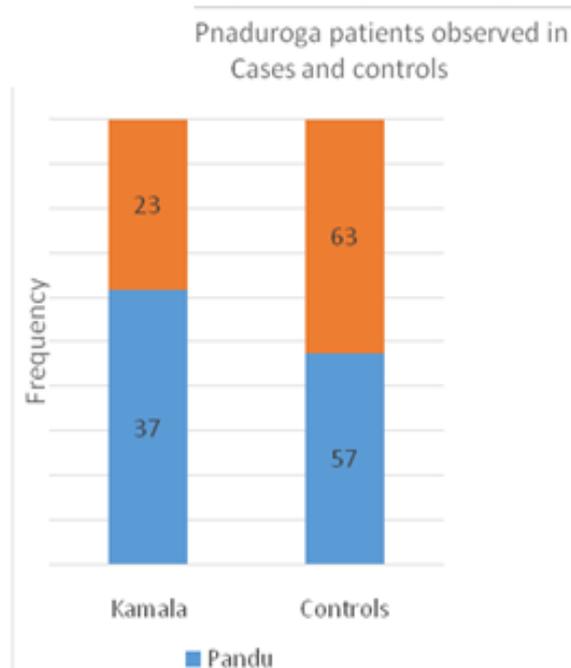
Inclusion criteria for Controls- Age group – 18-60 years, Patients other than Kamala from same hospital were selected. History of both groups have been taken, previous (within last 1 year) medical reports collected. Outcome observed for HB% , Anemia was defined by an Hb <13.0 g/dL in men and Hb <12.0 g/dL in women<sup>[15]</sup>

**Observations and results-**

Out of 60 cases of Kamala 37 cases have been observed anemic as per their previous reports.

Out of 60 cases of Kamala, 23 cases have been observed Non-anemic or having normal HB% as per their previous reports.

Out of 120 Controls 57 have been observed anaemic and 63 were having normal HB% or non anaemic as per their previous reports.



**Fig1:** Patients observed in cases and control

**Analysis-**

	Anemic	Non Anemic	Total
Kamala (Cases)	37	23	60
Other than Kamala (Controls)	57	63	120

**Table1:** Patients of Anemic and Non-Anemic cases.

$$\text{Odds Ratio} = \frac{37 \times 63}{23 \times 57} = 1.77$$

**Interpretation-**

Odds of exposure among cases are higher than control. It means exposure is positively associate with disease.

**Conclusion-** Certainly! When the odds ratio is greater than 1, it indicates an increased likelihood of the event (in this case, Kamala) occurring in the presence of the exposure (Panduroga). A value greater than 1 suggests a positive association between the two variables. In more detail, in this study the odds ratio is 1.77 it means that the odds of developing Kamala are higher among individuals with Panduroga compared to those without Panduroga. This strengthens the argument that Panduroga could be considered a risk factor for Kamala, as the presence of Panduroga appears to be associated with an elevated risk of developing the disease. It means exposure that is Panduroga (Anemia) is positively associated with disease Kamala. Panduroga is a one of the risk factors for Kamala.

**Authors' Contribution**

All authors contributed equally research to drafting, or revising the article, have agreed on the journal to which the article is submitted.

**Consent for publication**

Consent was taken from the participants before the study.

**Ethics Approval**

The ethics approval for conducting this study was obtained from the Ethical Review Committee.

**Availability of data and materials**

The authors declare that the data supporting the findings of this study are available within the paper. Should any raw data files be needed in another format they are available from the corresponding author upon reasonable request.

**Funding:** None.

**Conflict of interest:** The authors declare no conflict of interest.

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