Research Article

A STUDY ON DIFFERENT TYPES OF *PANDU ROGA* WITH SPECIAL REFERENCE TO SOME COMMON LABORATORY PARAMETERS

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ABSTRACT

Pandu is a disease which is explained by almost all our *Acharyas* where the color of the body of the patient alters like the polen grain of the *Keteki* flower. Due to its similarity we can co- relate the *Pandu roga* with the disease anaemia. On the basis of pathophysiology and morphology of RBC different types of anaemia has been classified and accordingly treatment is given. Similarly there are five types of *Pandu roga* along with its specific *Cikitsa* for its types has been explained in the *Samhitas.* This work has been done to establish any relationship of different types of *Pandu roga* with some common laboratory parameters which are done to diagnose anaemia. For the study 500 patients of *Pandu roga* are clinically diagnosed and some common laboratory parameters were investigated. Finally a conclusion has been drawn showing different ranges and findings of the laboratory parameters corresponding to the types of *Pandu Roga.*

KEYWORDS: *Pandu*, anaemia, laboratory parameters.

INTRODUCTION

Pandu Roga is a disease where the lusture of the body diminished and the color of the skin become pale, which is explained as *Vaivarna, Keteki Dhuli Sannibha* [1] etc. by our ancient classics. The main diagnostic feature of *Pandu roga* is the change of colour in the body which is *Pandura Varna. Panduta* or pallor in the skin which occurs due to vitiation of *Rakta Dhatu* in the body [2].If we consider Pallor is the main character of *Pandu roga* we can co relate the disease with anemia .

According to Ayurvedic Acharyas there are main five types of *Pandu Roga*[2].

1. *Vataja Pandu*
2. *Pittaja Pandu*
3. *Kaphaja Pandu*
4. *Tridoshaja Pandu (Sannipataja Pandu)*
5. *Mridbhakshanaja Pandu*

There are number of definitions of Anemia but the strict definition is an absolute decrease in RBC mass. To measure the RBC mass the haematocrit or the hemoglobin in the blood is measured. Anemia is typically diagnosed on complete blood count where RBC count, hemoglobin concentration, PCV, MCV, MCHC, are calculated and compared to the value adjusted for age and sex. Again PBS study is done to see any abnormal RBC.[3]

In conventional medicine various forms of treatment are used for treating the cases of Anemia but some of these have their noted adverse affect. Owing to the gravity of the situation need is felt for search of safe and effective Ayurvedic treatment. But due to lack of proper investigative methods a case of *Pandu roga* become difficult to diagnose for its different types. So we cannot provide proper Ayurvedic treatment as per its different types mentioned in the *Samhitas*. Keeping a view a study on different types of *Pandu roga* in relation to various laboratory parameters is very essential for proper diagnosis so that we can apply the specific treatment as mentioned in Ayurvedic classics for 5 different types of *Pandu roga.* Thus the present study is on to study the different types of *Pandu roga* with some common haematological parameters.

The entire study have been performed over 500 patients of *Pandu roga* from the OPD and IPD of Govt. Ayurvedic college and hospital which were selected on the basis of *Samanya lakshanas* of *Pandu roga* mentioned by our classics and those were investigated by some common haematological parameters.

AIM & OBJECTIVES

To observe the relation of different types of *Pandu Roga* with special reference to some common Laboratory Parameters. The parameters are Hemoglobin %, Total Red Blood Cell Count, Total White Blood Cell Count, Pack Cell Volume (PCV), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), Platelets Count and Peripheral Blood Smear (PBS) Study.

MATERIALS & METHOD

The study was conducted at Govt. Ayurvedic collage and Hospital, Guwahati-14, under strict protocol to prevent bias & reduce the error in study.

Sample size

The study was performed in 500 patients of Pandu Roga.

Selection of Patients

All the patients were randomly selected from:
- Central laboratory Govt. Ayurvedic Collage and Hospital, Guwahati-14
- OPD & IPD of Govt. Ayurvedic Collage and Hospital.

Inclusion Criteria
- Patient having *Samanya lakshana* of *Pandu Roga* as per Ayurvedic Classic were included under the study.

- Patient having *Visistha lakshanas* mentioned as per classics for different types of *Pandu Roga* were included under study.
- All age group above 2 years irrespective of any sex, community and locality were included for the study.

Exclusion Criteria

- Children below 2 years were excluded.
- Anemia due to Malignancy, Tuberculosis etc. were excluded.
- Anemia due to acute blood loss were excluded from the study.
- Patients having Seropositive for HIV, HBsAg, HCV etc. were excluded.

Routine Examination & Assessment

a. The full details of screening, history physical examination of patents were recorded in specially designed format to diagnose different types of *Pandu Roga* according to Ayurvedic Classics.

b. All the selected patients were investigated for the proposed hematological laboratory parameters like Hemoglobin %, Total Red Blood Cell Count, Total White Blood Cell Count, Pack Cell Volume, Mean Corpuscular Volume, Mean Corpuscular Hemoglobin, Mean Corpuscular Hemoglobin Concentration, Platelets Count and Peripheral Blood Smear Study.

Assessment Criteria[3-6]

The results of the objective parameters were assess as follows:

Haemoglobin Range

- ≤5 gm/dl…….severely decrease
- 5.1-7.9 gm/dl……moderately decrease
- 8.0-12.5 gm/dl…..mild decrease (female)
- 8.0-13.5 gm/dl….. mild decrease (male)
- 12.6-16.5 gm/dl….normal (female)
- 13.6-18.5 gm/dl…….normal (male)

RBC Range

- ≤1.5mil/cumm…………………… Severely decrease
- 1.6 – 2.5mil/cumm ……………… Moderately decrease
- 2.6 – 3.9mil/cumm………….. … Mild decrease (female)
- 2.6 – 4.4mil/cumm……………… Mild decrease (male)
- 4.0 – 5.5mil/cumm……………… Normal (female)
- 4.5 – 6.2mil/cumm……………… Normal(male)

PCV Range

- (36-52)%………. normal
- (26-35)%………. mild decrease
- (25-16)%……….. moderately decrease
- <15%…………. Severely decrease

MCV Range

- (80-100) fl ………Normal Range
- <80 fl……………Decrease Range
- >100 fl…………Increase Range

MCH Range

- (27-31) pg………….. Normal Range
- <27 pg………….........Decrease Range
- >31 pg ……………….. Increase Range

MCHC Range

- (32-36)%…….. Normal Range
- <32%………….Decrease Range
- >36 %…….. Increase Range

WBC Range

- 4000-11000 /cumm…… normal range
- <4000 /cumm……………. leucopenia
- >11000/cumm …… ……leucocytosis

Platelets Count Range

- 1.5-4.5 lakh/cumm………normal range
- <1.5 lakh/cumm ……………………thrombocytopenia

Reticulocyte Count Range

- upto2%……..normal range
- >2%……….increase range

Peripheral Blood Smear Study

Conventional method

Observations & Statistical Analysis

Data of clinical symptoms & objective tests were tabulated & analyzed using appropriate statistical tools.

Table 1: Types of *Pandu* Over 500 Patient

Pandu types	No. of Patient	Percentage
Vataj	30	6%
Pittaj	25	5%
Kaphaj	290	58%
Sannipataj	152	30.4%
Mridbhoksanajya	3	0.6%

Figure 1: Types of *Pandu* Over 500 PT

In the study *Kaphaja pandu* shows highest predominant.

Table 2: Range of Hb% - in Different Types of *Pandu* Over 500 Patient

Sl. No.	*Pandu*	*Vataj*		*Pittaj*		*Kaphaj*		*Sannipataj*		*Mridbhoksanaj*	
		No	%	No	%	No	%	No	%	No	%
1.	Normal	0	0	0	0	13	25	16	10.5	0	0
2.	Mild decrease	20	66.6	20	80	202	62.9	116	76.3	0	0
3.	Moderately decrease	10	33.3	5	20	65	22.4	20	13.1	2	66.6
4.	Severely decrease	0	0	0	0	10	3.4	0	0	1	33.3

Table 3: Mean & SD Of Hb% Range in Different Types of *Pandu*

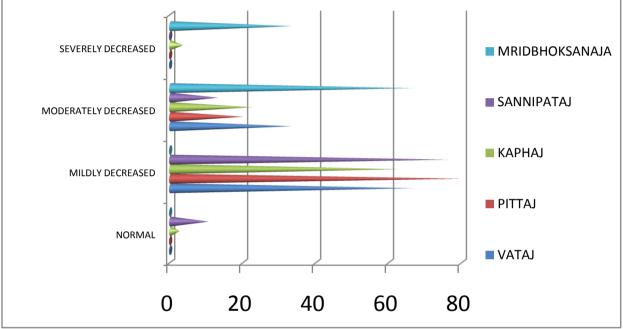|	*Vataj*	*Pittaj*	*Kaphaj*	*Sannipataj*
	Mean & SD	Mean & SD	Mean & SD	Mean & SD
Hb% (Total)	8.6±2.2	9.9±1.9	8.8±1.9	9.8±1.9
Moderately decrease	9.4± 0.7	10.7 ±1.27	9.5 ± 1.1	9.9 ± 1.3
Mildly decrease	6.3 ± 0.8%	6.9 ± 0.5	7.0 ± 0.5	6.7 ± 0.7

Figure 2: Range Of Hb% in Different Types of *Pandu*

Almost all the types of *Pandu* are seen in predominant in mild & moderately decrease Hb range %. *Mridbhoksanaja* types shows predominant in severely decrease range

Table 4: RBC Range According to Different Types of Pandu

	Vataja Pandu		*Pittaja Pandu*		*Kaphaja Pandu*		*Sannipataja Pandu*		*Mridbhoksanaja Pandu*	
	No	%	No	%	No	%	No	%	No	%
Normal	0	0	0	0	10	34	15	9.8	0	0
Mild Decrease	27	90	22	88	230	79.3	130	85.5	0	0
Moderately Decrease	3	10	3	12	40	13.7	12	7.89	2	66.6
Severely Decrease	0	0	0	0	10	3.4	0	0	1	33.3

Table 5: Mean & SD of RBC Range

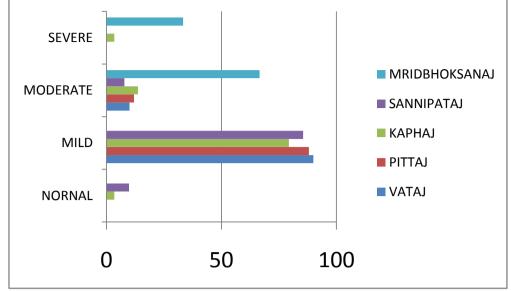|	*Vataj pandu*	*Pittaj pandu*	*Kaphaj pandu*	*Sannipataj pandu*
Moderately decrease	3.4 ± 0.4	3.8 ±0.4	3.27 ± 0.5	3.4 ± 0.4
Mildly decrease	2.3 ± 0.2	2.2 ± 0.4	2.18 ± 0.3	2.3 ± 0.3

Figure 3: RBC Range % According to Types of *Pandu*

Almost type of *Pandu* shows mild and moderately decrease RBC range, *Mridbhoksanaja* type and *Kaphaja* type shows severely decrease RBC range.

Table 6: PCV Range in Different Types of *Pandu*

	Vataja		*Pittaja*		*Kaphaja*		*Sannipataja*		*Mridbhoksanaj*	
	No	%	No	%	No	%	No	%	No	%
Normal	3	10	2	8	18	65	36	17.1	0	0
Mild Decrease	18	72	18	72	192	66.2	73	69.0	0	0
Moderately Decrease	5	33.3	5	20	80	27.5	28	9.8	2	66.6
Severely Decrease	0	0	0	0	0	0	9	39	1	33.3

Table 7: PCV Range Mean & SD

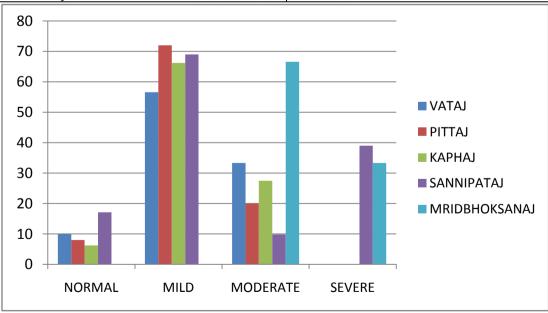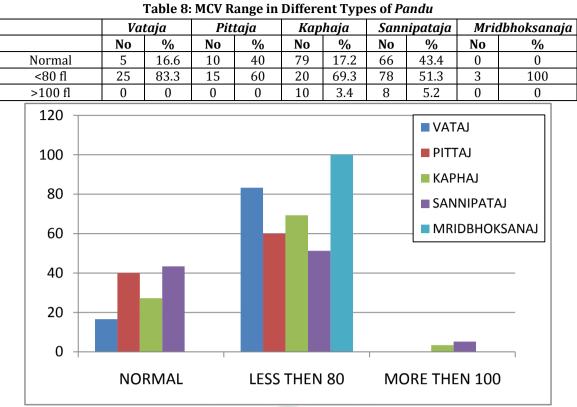| PCV	Mean & SD
Mild Decrease	30 ± 2.3
Mild Decrease (*Kaphaja*)	23 ± 2.3
Mild Decrease (*Sannipattaj*)	30 ± 2.6
Moderately Decrease	23 ± 2.3

Figure 4: PCV Range % According to Types of *Pandu* Types

Almost all the verities of *Pandu* are seen in the mild, moderately decrease & normal range of PCV in mild decrease of PCV predominancy of *Pittaja* is seen. In moderately decrease PCV range *Mridbhoksanja* & in severely decrease PCV range *Sannipattaja* predominancy is more.

Table 8: MCV Range in Different Types of *Pandu*

	Vataja		*Pittaja*		*Kaphaja*		*Sannipataja*		*Mridbhoksanaja*	
	No	%	No	%	No	%	No	%	No	%
Normal	5	16.6	10	40	79	17.2	66	43.4	0	0
<80 fl	25	83.3	15	60	20	69.3	78	51.3	3	100
>100 fl	0	0	0	0	10	3.4	8	5.2	0	0

Figure 5: MCV Range % According to Types of *Pandu*

All varieties are seen in <80fl of MCV range predominancy of *Mridbhokasanaj*a followed by *Vataj, Kaphaj, Pittaj, Sannipattaj.* MCV more than 100 fl are seen only in *Sannipataj & Kaphaj* types.

Table 9: MCH Range in Different Types of *Pandu*

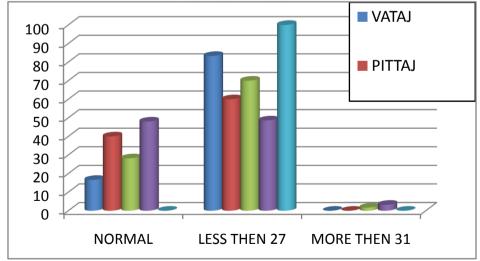|	*Vataja*		*Pittaja*		*Kaphaja*		*Sannipataja*		*Mridbhoksanaja*	
	No	%	No	%	No	%	No	%	No	%
Normal	5	16.6	10	40	82	28.2	73	48.0	0	0
<27 pg	25	83.3	15	60	203	70	74	48.6	3	100
>31 pg	0	0	0	0	5	1.7	5	3.2	0	0

Figure 6: MCH Range % in Types of *Pandu*

All the types of *Pandu* are predominant in less than 27pg range

Table 10: MCHC Range in Different Types of *Pandu*

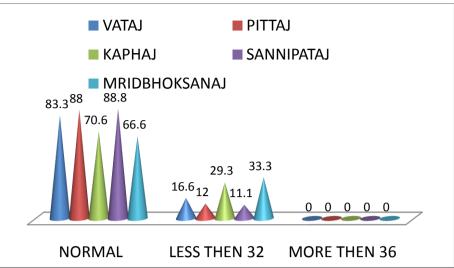|	*Vataja*		*Pittaja*		*Kaphaja*		*Sannipataj*		*Mridbhoksanaj*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	25	83.3	22	88	205	70.6	135	88.5	2	66.6
<32	5	16.6	3	12	85	29.3	17	11.1	1	33.3
>36	0	0	0	0	0	0	0	0	0	0

Figure 7: MCHC Range % According to Type of *Pandu*

Almost all the types are seen in the MCHC range in normal and <32 % range.

Table 11: (PBS Study) RBC Morphology in Different Types of *Pandu*

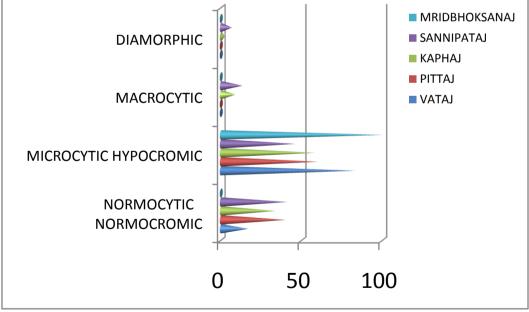|	*Vataja*		*Pittaja*		*Kaphaja*		*Sannipataj*		*Mridbhoksanaja*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Normocytic Normochromic	5	16.6	10	40	97	33.4	62	40.7	0	0
Microcytic Hypochromic	25	83.3	15	60	168	57.9	70	46.0	3	100
Macrocytic Normochromic	0	0	0	0	25	8.6	20	13.1	0	0
Diamorphic	0	0	0	0	6	2.0	10	6.5	0	0

Figure 8: RBC Morphology % Acc. to Type of *Pandu*

Microcytic Hypochromic RBC morphology shows predominancy of all variety but having *Mridbhoksanaja & Vataja Pandu* more predominant

Table 12: Abnormal RBC

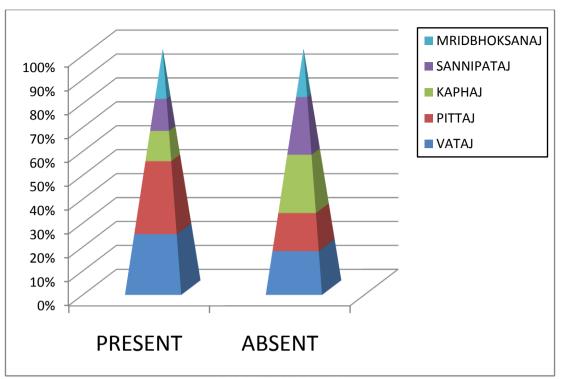| Abnormal RBC	No. of Patients	%
Present	115	23
Absent	385	77

Figure 9: Abnormal RBC % acc. to Type of *Pandu*

Pittaja & Vataja Pandu types shows more predominancy of having abnormal.

Table 13: WBC Range in Different Types of *Pandu*

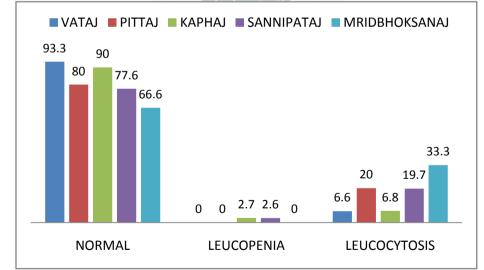|	*Vataj*		*Pittaj*		*Kaphaj*		*Sannipataj*		*Mridbhoksanaj*	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Normal	28	93.3	22	80	262	90	118	77.6	2	66.6
Leucopenia	0	0	0	0	8	2.7	4	2.6	0	0
Leucocytosis	2	6.6	5	20	20	6.8	30	90.7	1	33.3

Figure 10: WBC Range% according to Type of *Pandu*

All the types shows the predomanancy in normal range.

Table 14: Platelets Range in Different Types of *Pandu*

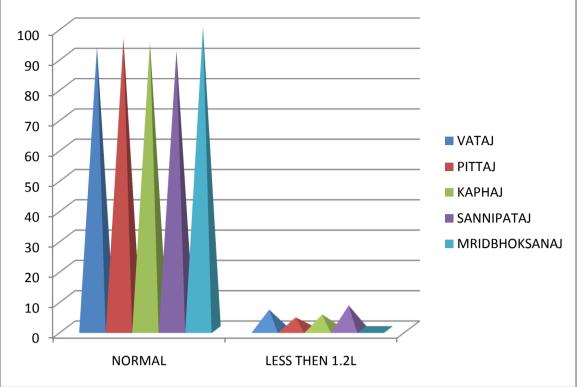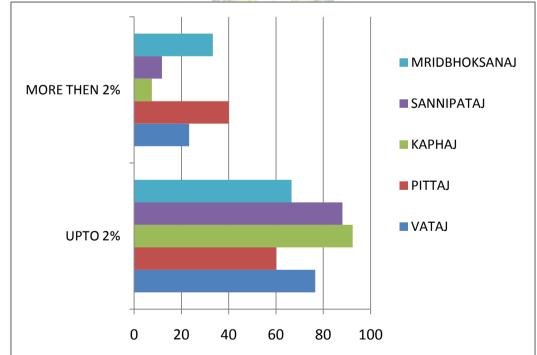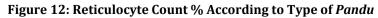|	*Vataj*		*Pittaj*		*Kaphaj*		*Sannipataj*		*Mridbhoksanaj*	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Normal	28	93.3	24	96	276	95	140	92	3	100
Thrombocytopenia	2	6.6	1	4	14	5	12	8	0	0

Figure 11: Platelets Range % acc. type of *Pandu*

All the types shows the predomanancy in normal range.

Table 15: Reticulocyte Count Range in Different Types of *Pandu*

	Vataj		*Pittaj*		*Kaphaj*		*Sannipataj*		*Mridbhoksanaj*	
	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	23	76.6	15	60	268	92.4	134	88.1	2	66.6
>2%	7	23.3	10	40	22	7.5	18	11.8	1	33.3

Figure 12: Reticulocyte Count % According to Type of *Pandu*

All the types of *Pandu* shows more predominant in Reticulocyte count upto 2% range.

Table 16: different types of *Pandu* in relation with the Haematological Parameters

	Vataja pandu	*Pittaja pandu*	*Kaphaja pandu*	*Sannipataja pandu*	*Mridbhoksanaj pandu*
Hb%(gm/dl)	8.6±2.2	9.9±1.9	8.8±1.9	9.8±1.9	
RBC (mil/cumm)	3.5±0.5	3.5±0.5	3.2±0.7	3.6±0.6	
PCV(%)	27.6±5.5	29.4±5.2	27.8±4.9	31±5.4	
MCV(fl)	78.4±3.5	79.4±3.8	79.7±5.9	80.3±6.4	
MCH(pg)	26.2±3.1	22.7±9	26.2±1.7	26.3±2.4	
MCHC(%)	32.5±1.2	33±0.28	32.7±0.7	32.7±0.6	
RBC Morphology	All Variety, Predominant In Microcytic Hypoch-Romic	All Variety, Predominant In Microcytic Hypochromic & Normocytic Normochromic	All Variety, Predominant in Microcytic Hypochromic & Macrocytic Normochromic	All Variety	Microcytic Hypochromic
WBC	Normal	Normal	Normal	Normal	Normal
RC	Normal/ Increase	Normal /Increase	Normal/ Increase	Normal/ Increase	Normal/ Increase
Platelet Count	Normal/ Decrease	Normal/ Decrease	Normal/ Decrease	Normal/ Decrease	Normal/ Decrease

DISCUSSION

1. Relation of the Different Types of *Pandu* with Hb%

The present study shows the prevalence of different types of *Pandu* in mild and moderate decrease range of Hb% & few severely decrease & normal range of Hb%.

The mean and SD of *Vataja Pandu* is (8.6±2.2) gm/dl, *Pittaja Pandu* is (9.9±1.9) gm/dl, *Kaphaja Pandu* is (8.8±1.9) gm/dl and for *Sannipataja Pandu* is (9.9±1.9) gm/dl.

In mild decrease range of Hb% *Pittaja Pandu* shows the prevalence (80%) followed by *Sannipataja* (76.3%), *Vataja* (66.6%) *Kaphaja* (62.9%) & *Mridbhaksa-najanya (*0.0%). Here the mean of *Vitaja Pandu* is 9.4 & SD is 0.7, so the expected range of *Vataja Pandu* is said to be (9.4 ±0.7)gm/dl. In *Pittaja Pandu* the mean is 10.7 & SD is 1.27 & so the Hb% range is said to be (10.7± 1.27) gm/dl, similarly in *Kaphaja Pandu* mean is 9.5 and SD is 1.1, so the probable Hb range is (9.5±1.1) gm/dl. And in *Sannipataja Pandu* the mean is 9.9 and SD is 1.3, so the Hb% range is said to be (9.9± 1.3) gm/dl.

In, moderately decrease *Vataja Pandu* range of Hb% *Mridhaksanajanya Pandu* shows the predominance 66.6% followed by *Vataja (*33.35), *Kaphaja* (22.4%) *Pittaja* (13.1%) & *Sannipataja* (13.1%). Here the mean of *Vataja Pandu* is 6.3gm/dl & SD is 0.8, so the expected range of is said to be(6.3± 0.8) gm/dl and in *Kaphaj Pandu* the mean is 7.0 & 0.5 Similarly in *Sannipataja Pandu* the mean is 6.7 & SD is 0.7.

In Severely decrease Hb range *Mridbhaksanajanya* Pandu shows predomimency with (33.3%) and followed by *Kaphaja Pandu* with (3.4%) but there is no case recorded in *Vataja & Sannipataja Pandu* with severly decrease Hb% range.

With (10.5%) *Sannipataja* & (2.5%) *Kaphaja Pandu* shows normal Hb% range. But there is no case found with normal Hb% in *Vataja, Pittaja & Mridbhaksanjanya Pandu*.

2. Relation of Different Types of *Pandu* with RBC

In the study the mean and SD of RBC range in *Vataja Pandu* is (3.5± 0.5) mil/cumm, *Pittaja Pandu* is 3.5±0.5, *Kaphaja Pandu* 3.2±0.7 and for *Sannipataja Pandu* it is (3.6± 0.6) mil/cumm.

In the study 82% cases seen with mild decrease range of RBC with mean of 3.3 & SD 0.5. Out of the mild decrease range 86.5% female with mean 3.2 & SD 0.48 and 23.5% male cases of *Pandu* with mean 3.5 & SD is 0.56. Here *Vataja Pandu* type shows predominance of mild decrease range of RBC (90%) followed by *Pittaja* (88%), *Sannipataja* (85.5%), then *Kaphaja* (79.3%), but there is no prevalence of existence of *Mridbhaksanjanya Pandu* in mild RBC range. Here *Vataj Pandu* shows mean of 3.46 with SD 0.48, *Pittaja Pandu* mean 3.8 with SD 0.4, *Kaphaja Pandu* having mean 3.27 with SD 0.5 & *Sannipataja Pandu* with mean 3.4 & SD 0.4.

Again 18% *Pandu* cases shows moderate type of RBC range with mean 2.3 & SD 0.35. Out of the moderately decrease RBC range predominancy shows in *Mridbhaksanajanya Pandu* (66.6%) followed by *Kaphaja* (13.7%), then *Pittaja* (12%) and *Vataja Pandu* (10%). Here *Vataja Pandu* shows mean of 2.3 with SD 0.2, *Pittaja Pandu* having mean of 2.2 with SD 0.4, *Kaphaja Pandu* mean 2.18 with SD 0.3 and *Sannipataja Pandu* shows mean 2.3 with SD is 0.3 in the study.

In severely decrease RBC range *Mridbhoksha-njanya Pandu* & *Kaphaja Pandu* shows predominancy with (33.3%) & (3.4%) respectively. But no case recorded in *Vataj, Pittaj* and *Sannipataj* type.

Again a few cases are also found in *Sannipataj* (9.8%) and *Kaphaj* (3.4%) *Pandu* type in normal RBC range.

3. Relation of Different Types of *Pandu* With PCV Range

Out of 500 cases *Pandu* 13% lies in normal PCV range, 60% lies in mild decrease PCV range, 25% lies in moderately decrease PCV range and 2%cases belongs to

severely decrease PCV range. Expected range of *Vataja Pandu* is (27.6±5.5)%, *Pittaja Pandu* (29.5±5.2)%, *Kaphaja Pandu* 27.8±4.9)% and *Sannipataja Pandu* is (31±5.4)%.

Sannipataja Pandu shows predominancy in normal PCV range (17.1%) followed by *Vitaja* (10%), *Pittaja* (8%), then *Kaphaja* (6.2%), but *Mridbhaksanjanya Pandu* has no predominance in normal PCV value in the study.

Except *Mridbhakshanjanya Pandu* all other types shows its predominance in mild type of decrease PCV range accordingly *Pittaja* (72%) followed by *Sannipataja* (69%), then *Kaphaja* (66.2%), then *Vataja Pandu* (56.6%)

Similarly *Mridbhakshanjanya Pandu* shows its predominancy (66.6%) followed by *Vataj* 33.3%, *Kaphaja* 27.5% then *Pittaja* 20% and *Sannipataja* 9.8%. Only *Sannipataj & Mridbhaksanajanya Pandu* shows predominancy in severely decrease PCV range with 39% & 33.3% respectively. But No cases found in *Vataja, Pittaja & Kaphaj* types of *Pandu* in the study.

Out of the 500 cases of *Pandu* 60% cases lies in mild decrease range of PCV with mean 30 & SD 2.3. Again 25% cases lies in moderately decrease PCV range with mean 23 & SD is 2.36, Again among the mild decrease range of PCV *Kaphaja* type of *Pandu* shows the mean 30 & SD 2.6 and *Sannipataja Pandu* with mean of 29.8 and SD = 2.6 in the study.

4. Relation of Different Types of *Pandu* With MCV Range

In the study out of 500 case 64.4% *Pandu* cases having MCV<80 and 32% with MCV in normal rang (80-100) fl and only 3.6% cases have MCV > 100 ie in maximum *Pandu* cases the MCV range lies< 80 fl range. Where the mean is 76.69 and SD Value is 2.6. So we can say that maximum cases of this range lies within (76.69 ± 2.6)fl. Similarly MCV within normal range (80-100) fl, the mean is 84.5 & SD is 2.02 so we can say that maximum cases of this group lies within (84.5 ± 2.02)fl.

In the study the expected range in *Vataja Pandu* is (78.4±3.5) fl, *Pittaja* (79.4±3.8) fl, *Kaphaja Pandu* (79.7±5.9) fl, *Sannipataja Pandu* (80.3±6.4) fl.

In normal range of MCV *Sannipataj Pandu* types shows highest prevalence with (43.45%) followed by *Kaphaja* (27.2%), then *Pitatja* 40%, *Vataja* (16%). But there is no prevalence of *Mridbhoksanajanya* type of *Pandu* (0%).

Again, in <80 fl. MCV range all the types of *Pandu* shows having its predominance, *Vataja* 83.3%, *Pittaj* 60% *Kaphaja* 69.3%, *Sannipataja* 51.3%. But *Mridbhoksha-njanya* type of *Pandu* with highest predominancy among all with 100% of <80fl MCV range.

In MCV >100 fl range only *Kaphaja* (3.4%) and *Sannipataja* (5.2%) shows its existence but other *Pandu* types are not found in this range.

5. Relation of Different Types of *Pandu* With MCH Range

In the study 65% cases shows MCH range <27 with mean 25.3 and SD 1.23. i.e., maximum numbers of this group lies within (25.3±1.23) pg. Again 34% cases shows

MCH range normal (27-31) pg with mean 28.5 and SD value 1.14.

The expected range in *Vataja Pandu* is (26.2±3.1) pg, *Pittaja* (22.7±9) pg, *Kaphaja Pandu* (26.2±1.7) pg, *Sannipataja Pandu* (26.3±2.4).

In normal range of MCH *Sannipataj* type of *Pandu* shows highest number of its predominance with 43.4% followed by *Pitta* 40%, *Kaphaja* 27.2% & *Vataja* 16.6% but there is no prevalence of *Mridbhokshanajanya* type of *Pandu* in this range.

Again all the types of *Pandu* shows its predominancy in MCH range <27pg *Vataja* 83.3%, *Pittaja* 60%, *Kaphaja* 70%, *Sannipataja* 48.6%, but *Mridbhokshanjanya Pandu* type shows highest prevalence with 100% of MCH <27pg range.

In the study *Kaphaja & Sannipataja* type of *Pandu* shows its existence in MCH range >100 with only 1.7% & 3.2% respectively, other types are not found in this range of MCH.

6. Relation of Different Types of *Pandu* with MCHC Range

In the study 77.8% type of *Pandu* shows in normal (32-36%) range of MCHC. With mean 32.9 and SD 0.5 and 22.2% *Pandu* shows MCHC range <32%. With mean 30.6 & SD 0.8. There is no existence is seen in MCHC range >36%.

The expected range in *Vataja Pandu* is (32.5±1.2)%, *Pittaja* (33±0.28)%, *Kaphaja Pandu* (32.7±0.7)%, *Sannipataja Pandu* (32.7±0.6)%.

In both the group of MCHC (normal & <32%) all type of *Pandu* shows its existence. In normal range of MCHC *Sannipataja* type of *Pandu* shows its highest prevalence with 88.8% followed by *Pittaja* 88% *Vataja* 83.2% then *Mridbhokshanjanya* 66.6%. Again in MCHC <32% *Mridbhokshanjanya* types of *Pandu* shows highest prevalence with 33.3% than *Kaphaja* 29.3%, *Vataja* 16.6% *Pittaja* 12% then *Sannipataja* 11.1%.

7. Relation of Different Types of *Pandu* with RBC Morphology (Pbs Study)

In the study maximum 56.2% *Pandu* cases shows Microcytic Hypochromic RBC followed by 34.8% Normocytic Normochromc RBC then 9% with Macrocytic Normochromic RBC then, 9% with Macrocytic Normochromic type of RBC. Only 3.2% *Pandu* cases shows Diamorphic type of RBC.

Among then Normocytic Normochromic RBC *Sannipataja* type of *Pandu* shows highest number of prevalence with 40.7% then followed by *Pittaja* 40% *Kaphaja* with 33.4% and *Vataja* 16.6%.

All the types of *Pandu* shows its prevalence in Microcytic Hypochromic RBC with 60% in *Pittaja,* 57.9% *Kaphaja*, 83.3% *Vataja* and 46% in *Sannipataja*, but *Mridhokshanajanya* shows highest prevalence with 100% Microcytic Hypochromic RBC morphology.

Again only *Kaphaja & Sannipataja* type shows its existence in Macrocytic RBC with 8.6% & 13.1% respectively, similarly (2%) *Kaphaja* & (6.5%) *Sannipataja Pandu* shows there existence in Diamorphic RBC morphology. The other types of *Pandu* has no existence in these two types of RBC morphology classification.

Again 77% *Pandu* cases shows presence of abnormal RBC and 23% cases shows no abnormal RBC in PBS study. In the study 48% cases of *Pittaja Pandu* shows presence of abnormal RBC followed by 40% in *Vataja,* 33.3% in *Mridbhokshanajanya* and 20% in *Kaphaja.*

8. Relation of Different Types of *Pandu* with WBC Range

In the study no Abnormal WBC found in any type of *Pandu* cases. Again 86% cases shows normal WBC range & 11.6% shows leucocytosis & only 2.4% shows leucopenia.

All the types of *Pandu* shows its existence in normal WBC range & in leucocytosis range. But only *Kaphaja & Sannipataja* shows its existence in leucopenia range of WBC with 2.7% & 2.6% respectively.

In normal range of WBC *Vaitaja* shows highest predomince with 93.3% followed by *Kaphaja* with 90%, *Pittaja* with 80% and *Sannipataja* with 77.6% & *Mridbhoksnajanya* shows 66.6%.

In Leucopenia range of WBC all types of *Pandu* shows with their existence in lower percentage i.e., *Vataja* 6.6%, *Pittaja* 20% *Kaphaja* 6.8%, *Sannipataja* 19.7% and highest percentage shows in *Mridbhokshanjanya Pandu* with 33.3% of WBC.

9. Relation of Different Types of *Pandu* with Platelets Count

In the study 94.2% *Pandu* cases shows platelets count in normal range & 5.8% shows platelets count <1.2 Lakhs/cumm.

Except *Mridboksanjanya Pandu* other types shows its existence in the range of platelets <1.2 lakhs/cumm with *Vataja* 6.6%, *Pittaja* 4%, *Kaphaja* 5% & *Sannipataja* with 8%.

10. Relation of Different Types of *Pandu* with Reticulocyte Count

In the study 88.4% cases of *Pandu* shows normal range of Reticulocyte count (<2%) & 11.6% shows high Reticulocyte count (>2%). All the types of *Pandu* shows its

existence in both the group. Among all the types *Pittaja Pandu* shows the highest prevalence with 40% in high reticulocyte count followed by *Mridbhoksanajanya* type 33.3%, *Vataja* 23.3%, *Sannipataja* 11, 8% then *Kaphaja* with 7.5%.

The study shows very few cases of *Mridbhokshamjanya Pandu* where the relationship established as per the present statistical data. But a final conclusion can only be drawn if higher number of *Mridbhakshanjanya Pandu* cases are studied in future.

CONCLUSION

The study shows very few cases of *Mridbhokshamjanya Pandu* so the relationship with Hb% RBC count, PCV, MCV, MCH, MCHC could not be drawn. Whereas the relationship of RBC morphology, WBC Count, RC, Platelets Count are established as per the present statistical data. But a final conclusion can only be drawn if higher number of *Mridbhakshanjanya Pandu* cases are studied in future.

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