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**ORIGINAL RESEARCH ARTICLE**

# A Comparative Clinical Trial for Comparative Efficacy of *Bhringraj Panchanga Taila Abhyanga* and *Nasya* in *Khalitya*

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**ABSTRACT**

**Background:** *Khalitya* (hair fall) is a common disease in the present era associated with an unhealthy diet and lifestyle. *Khalitya* involves the Shiro as the *Roga Adhishtana* (Site of Disease). *Shiro Abhyanga* with *Taila Kalpana* is effective for all *Shirorogas. Bhrungaraja* has been explained as *Keshya* in *Dhanwanthari Nighantu* and *Kaiyyadeva Nighantu.* Hence, by taking the reference as *Keshya*, *Bhrungaraja Taila* can be made using *Sneha Paka Vidhi* and given to *Shiro Abhyanga* and *Nasya Karma* in cases of *Khalitya*.

**Objectives:** To evaluate the comparative efficacy of *Bhringraja Panchanga, Taila Abhyanga,* and *Nasya* in different routes of administration.

**Materials and Methods:** *Shiro abhyanga* was done every day with a similar method of massaging as mentioned in the classics with *Bhrungaraja* Taila for 15 days of duration in one group, and *Marsha Nasya* was administered with *Bhrungaraja Taila* for 7 days in the other group. Clinical signs and symptoms were given suitable scores according to their severity and assessed based on relief after treatment. The results with a $P < 0.05$ were considered statistically significant in this study.

**Results:** The overall assessment of the results showed that the subjects in Group B treated with *Bhrungaraja Taila Marsha Nasya* responded well compared to the subjects in Group A treated with *Bhrungaraja Taila Shiro Abhyanga.*

**Interpretation and Conclusion:** The clinical study revealed that the drug possesses the efficacy of *Bhrungaraja Taila* in *Khalitya* (hair fall), and thus the efficacy of *Bhrungaraja Taila* in this study is justified with the help of *Shiro Abhyanga* and *Nasya Karma*.

## 1. INTRODUCTION

Hair fall is a physiological phenomenon generally after the mid-forties, but it is considered a disease if it occurs before this period. For the treatment of hair fall, so many drugs are mentioned in Ayurvedic classics, and out of them, *Bhrungaraja*[1] is very well known. The drug, which is easily available and within the reach of the common man. The reason for selecting the drug *Bhrungaraja* is its availability in abundance as a fresh or dry herb, its cost-effectiveness, and its multiple uses.

Before this, no clinical work has been reported on the *Keshya* and *Rasayana* properties of *Bhrungaraja*[2] as a single drug with strong classical references. *Bhrungaraja* has been mentioned as *Keshya*[3] and *Kesh rogahara* by various ancient Ayurvedic acharyas. In *Kaidev* and *Bhavprakash Nighantu, Bhrungraja* has also been mentioned as *Keshya*,[4] *Kesh rogahara*, and *Rasayana Dravya*.[5]

Exceptionally, *Ashtanga Hridaya*[6] described *Bhrungraja* as a *Rasayana dravya* in its *Rasayanvidhimadhyay*. Hence, considering the above facts, the present drug *Bhrungraja* was selected to evaluate the comparative efficacy of *Bhringraja Panchanga Taila Abhyanga* and *Nasya*[7] in different routes of administration.

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## 2. MATERIALS AND METHODS

### 2.1. Plant Material

#### *2.1.1. Collection of drug*

The drug required for the preparation was collected from natural sources, namely Khadakwasala Dam, Pune, Maharashtra.

#### *2.1.2. Authentication of the raw drug*

The authentication of the raw drug was done at CRF KLE and Dept. of Dravyaguna, Belagavi.

#### *2.1.3. Preparation of medicine*

Taila was prepared, and the packing of Taila in a 100-mL bottle was done at Shri Shivayogeeshwar Rural Ayurvedic College and Hospital Pharmacy, Inchal. Taila was prepared as said in Sneha Kalpana of Sharangadara Samhitha,[8] and AFI, Kharapaka, and Mrudupaka of Sneha were prepared in two batches after 15 days of first batch preparation. In the present study, Mrudu Paka[9] Bhringaraja Taila was prepared for Nasya Karma, and Khara Paka Bhringaraja Taila was prepared for Shiro Abhyanga.

#### *2.1.4. Preservation*

*Tailas* are preserved in glass, polythene, or aluminum containers. Ingredients in the preparation of Bhringaraja Taila were Bhringaraja (*Eclipta alba*) whole plant and Narikela Taila (*Cocos nucifera*), i.e., coconut oil.

### 2.2. Clinical Study

#### *2.2.1. Source of data*

30 patients were selected based on the signs and symptoms of Khalitya from the out-patient department of Sri Shivayogeeshwar Rural Ayurvedic Medical College, Inchal.

#### *2.2.2. Method of collection of data*

- All patients who were selected for the study were allocated to a single group, and a detailed clinical history was done to establish Khalitya.
- Patients are assessed based on the assessment scale of Khalitya.
- A case report form was prepared with all the points of history taking, physical signs, and symptoms of Khalitya.

### 2.3. Research Design

#### *2.3.1. Sampling method*

Random sampling method, an open-labeled double-arm clinical trial at an OPD basis with a pre- and post-test design with a sample size of 30.

#### *2.3.2. Intervention*

Detailed under Table 1.

- Group A-15 patients selected for Shiroabhyanga.
- Group B-15 patients selected for Marsha Nasya.

#### *2.3.3. Diagnostic criteria*

1. For diagnosis, a detailed medical history will be taken, and a physical examination will be done according to both Ayurvedic and modern clinical methods.
2. To assess the intactness of the physical, mental, and social well-being of the patient.
3. To confirm the other medical disorders through routine hematological and urine investigations if required.
4. The quantity of hair falling and the quality of the hair will be assessed on questionnaire.

### 2.4. Inclusion Criteria

1. Patients with clinical features of hair fall occurring anywhere in the scalp.
2. Age group between 20 and 40 years.
3. Patients of either sex, irrespective of socio-economic status.
4. Patients are ready to sign informed consent form.

### 2.5. Exclusion Criteria

i. Patients with hair fall due to secondary or systemic illness
ii. Patients who have H/O chemotherapy or radiotherapy disorders.
iii. Patients under steroid medications or other drugs that are known to cause hair fall.
iv. Physiological conditions like pregnancy.

### 2.6. Objective Parameters

1. Global photographs
2. Daily hair count
3. Negative hair pull test
4. Hair pluck test
5. Serological test, (CBC, Vit-C, Vit-D, Vit-E Folic Acid, Sr. Zinc, Sr. Calcium, Biotin.).

The assessment of subjective parameters was done based on symptoms [Table 2].

Assessment of subjective parameters was done on BT and AT.

The assessment of the objective parameter was based on the changes in the hairfall count and other criteria that were assessed on BT and the 40$^{th}$ day of treatment.

### 2.7. Statistical Methods

The signs and symptoms of Khalitya are taken. Statistically analyzed with SPSS Version 23.

## 3. RESULTS AND DISCUSSION

On Day 1 BT, the participants in Group A had a mean score of 2.26 with a standard deviation of 0.70. This indicates that the initial Kesha patana level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean Kesha Patana score, reached its lowest value of 1.53, with a standard deviation of 0.51. And the *P* value is 0.001, which is <0.05, which indicates statistical significance.

This indicates that the treatments within the group have been highly effective in managing kesha patana, with a significant reduction in pain levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing kesha patana levels over time, indicating the effectiveness of the treatments in kesha patana management. On Day 1 BT, the participants in Group B had a mean score of 2.13 with a standard deviation of 0.83. This indicates that the initial kesha patana level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean kesha patana score, reached its lowest value of 0.933 with a standard deviation of 0.96. And the *P* value is 0.000, which is <0.05, which indicates statistical significance.

This indicates that the treatments within the group have been highly effective in managing kesha patana, with a significant reduction in pain levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing kesha patana levels over time, indicating the effectiveness of the treatments in kesha patana management.

The comparison reveals Group A with a mean rank of 6.00 and Group B with a mean rank of 8.00. The Mann-Whitney U test statistic, U, is 73.00, and the Z-value is -1.767. The *P*-value is more than 0.05 (0.077), indicating a not significant (MS) result. This implies that

there is no significant difference in Keshapatana between Group A and Group B, with Group B showing higher scores compared to Group A [Table 3].

At Day 1 BT, the participants in Group A had a mean score of 1.03 with a standard deviation of 0.89. This indicates that at the beginning of the study, there was relatively high, with some variability among the participants. Finally, AT, the mean score reached its lowest value of 0.40, with a standard deviation of 0.63. And the *P* value is 0.004, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Bhoomi daha, with a significant reduction in daha levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing daha levels over time, indicating the effectiveness of the treatments in daha management.

On Day 1 BT, the participants in Group B had a mean score of 1.46 with a standard deviation of 0.63. This indicates that, at the beginning of the study, there was relatively high, with some variability among the participants. Finally, AT, the mean score reached its lowest value of 0.60, with a standard deviation of 0.50 and a *P* value is 0.000, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Bhoomi daha, with a significant reduction in pain levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing Kesha Bhoomi daha levels over time, indicating the effectiveness of the treatments in Kesha Bhoomi daha management.

The comparison reveals Group A with a mean rank of 5.58 and Group B with a mean rank of 7.00. The Mann-Whitney U test statistic, U, is 87, and the Z-value is -1.207. The *P*-value is more than 0.05 (0.227), indicating a not significant (MS) result. This implies that there is no significant difference in *Kesha Bhoomi daha* between Group A and Group B, with Group B showing higher scores compared to Group A [Table 4].

On Day 1 BT, the participants in Group A had a mean pain score of 1.8 with a standard deviation of 0.56. This indicates that the initial Kesha Bhoomi Kandu level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean Kesha Bhoomi Kandu score, reached its lowest value of 0.73 with a standard deviation of 0.59. And the *P* value is 0.001, which is <0.05, which indicates statistical significance.

This indicates that the treatments within the group have been highly effective in managing Kesha Bhoomi Kandu, with a significant reduction in Kandu levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing Kandu levels over time, indicating the effectiveness of the treatments in pain management. At Day 1 BT, the participants in Group B had a mean Kandu score of 1.66 with a standard deviation of 0.72. This indicates that the initial Kandu level at the beginning of the study was relatively high, with some variability among the participants.

Finally, AT, the mean pain score, reached its lowest value of 0.80, with a standard deviation of 0.56. And the *P* value is 0.001, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing pain, with a significant reduction in Kandu levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing Kandu levels over time, indicating the effectiveness of the treatments in Kandu management. The comparison reveals Group A with a mean rank of 7 and Group B with a mean rank of 6.50. The Mann-Whitney U test statistic, U, is 105, and the Z-value is −0.342. The p-value is <0.05 (0.73), indicating a not significant (MS) result. This implies that there is no significant difference in Kandu between Group A and Group B, with Group B showing higher scores compared to Group A [Table 5].

On Day 1 BT, the participants in Group A had a mean score of 1.3 with a standard deviation of 0.72. This indicates that at the beginning of the study, there was relatively high, with some variability among the participants. Finally, AT, the mean pain score, reached its lowest value of 0.73 with a standard deviation of 0.45. And the *P* value is 0.007, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Bhoomi Rookshata, with a significant reduction in Rookshata levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing Kesha Bhoomi Rookshata levels over time, indicating the effectiveness of the treatments in Kesha Bhoomi Rookshata management. On Day 1 BT, the participants in Group B had a mean score of 1.2 with a standard deviation of 0.79. This indicates that the initial pain level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score reached its lowest value of 0.66, with a standard deviation of 0.61 and a *P* value is 0.003, which is <0.05, which indicates statistical significance.

This indicates that the treatments within the group have been highly effective in managing Kesha Bhoomi Rookshata, with a significant reduction in Rookshata levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing Rookshata levels over time, indicating the effectiveness of the treatments in Kesha Bhoomi Rookshata management. The comparison reveals Group A with a mean rank of 4.50 and Group B with a mean rank of 5.00. The Mann–Whitney U test statistic, U, is 103, and the Z-value is −468. The p-value is <0.05 (0.64), indicating a not significant (MS) result. This implies that there is no significant difference in Kesha Bhoomi Rookshata between Group A and Group B, with Group B showing higher scores compared to Group A [Table 6].

At Day 1 BT, the participants in Group A had a mean score of 1.5 with a standard deviation of 0.83. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean pain score, reached its lowest value of 1.20 with a standard deviation of 0.70. And the *P* value is 0.046, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Tanutva, with a significant reduction in Kesha Tanutva levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing Kesha Tanutva levels over time, indicating the effectiveness of the treatments in Kesha Tanutva management. On Day 2 BT, the participants in Group B had a mean score of 1.2 with a standard deviation of 0.70. This indicates that the initial pain level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score, reached its lowest value of 0.93 with a standard deviation of 0.79. And the *P* value is 0.025, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Tanutva, with a significant reduction in Kesha Tanutva levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing Kesha Tanutva levels over time, indicating the effectiveness of the treatments in Kesha Tanutva

management. The comparison reveals Group A with a mean rank of 2.50 and Group B with a mean rank of 3.00. The Mann-Whitney U test statistic, U, is 86.00, and the Z-value is −1.179. The $P < 0.05$ (0.23) indicates a not significant (MS) result. This implies that there is no significant difference in Kesha_Thanutva_AT between Group A and Group B, with Group B showing higher scores compared to Group A [Table 7].

On Day 1 BT, the participants in Group A had a mean score of 2.20 with a standard deviation of 0.77. This indicates that the initial pain level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score reached its lowest value of 1.13, with a standard deviation of 0.74. The *P* value is 0.001, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Darunaka, with a significant reduction in Darunaka levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing Darunaka levels over time, indicating the effectiveness of the treatments in Darunaka management. At Day 1 BT, the participants in Group B had a mean score of 1.93 with a standard deviation of 1.0. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score, reached its lowest value of 1.0, with a standard deviation of 0.75. And the p value is 0.001, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Darunaka, with a significant reduction in Darunaka levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing Darunaka levels over time, indicating the effectiveness of the treatments in Darunaka management. The comparison reveals Group A with a mean rank of 7.00 and Group B with a mean rank of 6.50. The Mann–Whitney U test statistic, U, is 101.5, and the Z-value is −492. The $P < 0.05$ (0.62) indicates a not significant (MS) result. This implies that there is no significant difference in Darunaka between Group A and Group B, with Group B showing higher scores compared to Group A [Table 8].

At Day 1 BT, the participants in Group A had a mean score of 1.0 with a standard deviation of 0.96. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score, reached its lowest value of 0.66 with a standard deviation of 0.72. And the *P* value is 0.014, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Kaatinyata, with a significant reduction in kaatinyatha levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing Kesha Kaatinyata levels over time, indicating the effectiveness of the treatments in Kesha Kaatinyata management. At Day 1 BT, the participants in Group B had a mean score of 1.06 with a standard deviation of 0.70. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score, reached its lowest value of 0.53, with a standard deviation of 0.63. The *P* value is 0.005, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing Kesha Kaatinyata, with a significant reduction in Kesha Kaatinyata levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing Kesha Kaatinyata levels over time, indicating the effectiveness of the treatments in Kesha Kaatinyata management. The comparison reveals Group A with a mean rank of 3.50 and Group B with a mean rank of 4.50. The Mann-Whitney U test statistic, U, is 102.0, and the Z-value is −0.484. The $P < 0.05$ (0.62) indicates a not significant (MS) result. This implies that there is no significant difference in Kesha Kaatinyata between Group A and Group B, with Group B showing higher scores compared to Group A [Table 9].

On Day BT, the participants in Group A had a mean score of 1.8 with a standard deviation of 0.67. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, the mean score reached its lowest value of 0.93, with a standard deviation of 0.70. And the *P* value is 0.000, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing the quantity of hair fall, with a significant reduction in the quantity of hair fall levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing quantity of hair fall levels over time, indicating the effectiveness of the treatments in quantity of hair fall management. On Day 1 BT, the participants in Group B had a mean score of 1.8 with a standard deviation of 0.74. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score reached its lowest value of 0.73, with a standard deviation of 0.79. And the *P* value is 0.000, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing the quantity of hair fall, with a significant reduction in the quantity of hair fall levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing quantity of hair fall levels over time, indicating the effectiveness of the treatments in quantity of hair fall management. The comparison reveals Group A with a mean rank of 16.58 and Group B with a mean rank of 24.43. The Mann–Whitney U test statistic, U, is 331.5, and the Z-value is 2.376. The $P < 0.05$ (0.017) indicates a not significant (MS) result. This implies that there is no significant difference in the quantity of hair fall between Group A and Group B, with Group B showing higher scores compared to Group A [Table 10].

On Day 1 BT, the participants in Group A had a mean score of 0.93 with a standard deviation of 0.25. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, AT, the mean score reached its lowest value of 0.53, with a standard deviation of 0.51. And the *P* value is 0.031, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing negative hair pull tests, with a significant reduction in negative hair pull test levels observed across the entire study group. The descriptive data of the group reveal a clear trend of decreasing negative hair pull test levels over time, indicating the effectiveness of the treatments in negative hair pull test management. On Day 1 BT, the participants in Group B had a mean score of 1.0 with a standard deviation of 0.00. This indicates that the initial level at the beginning of the study was relatively high, with some variability among the participants. Finally, on Day AT, the mean score reached its lowest value of 0.33, with a standard deviation of 0.48. And the *P* value is 0.02, which is <0.05, which indicates statistical significance. This indicates that the treatments within the group have been highly effective in managing negative hair pull tests, with a significant reduction in negative hair pull test levels observed across the entire study group. The descriptive data of the group reveals a clear trend of decreasing negative hair pull test levels over time, indicating the effectiveness of the treatments in negative hair pull test management. The comparison reveals Group A with a mean rank of 0.53 and Group B with a mean rank of 0.33. The

$P < 0.05$ (0.79 and 0.19) indicates a not significant (MS) result. This implies that there is no significant difference in the negative hair pull test between Group A and Group B, with Group B showing higher significance, compared to Group A [Table 11].

## 4. CONCLUSION

The study has shown the initiation of improvement almost at the end of the therapy. This necessitates further extension of the therapy. Overall assessment of the results showed that the subjects of Group B treated with *Brungraja Taila Marsha Nasya* responded well compared to the subjects of Group A treated with *Brungraja Taila Shiro abhyanga*.

## 5. ACKNOWLEDGMENTS

Nil.

## 6. AUTHORS' CONTRIBUTIONS

All authors give equal contribution while preparing this manuscript.

## 7. FUNDING

Nil.

## 8. ETHICAL APPROVALS

With due approval by the IEC, Shri Shivayogeeshwar Rural Ayurvedic Medical College & Hospital, Inchal number IEC/SSRAMC/AIEC/2020 date-25/04/2020 the study has been conducted among the patients registered for the purpose. Written consent was obtained from each patient participate in the study with prior proper information.

## 9. CONFLICTS OF INTEREST

Nil.

## 11. DATA AVAILABILITY

This is an original manuscript and all data are available for only research purposes from principal investigators.

## 12. PUBLISHERS NOTE

This journal remains neutral with regard to jurisdictional claims in published institutional affiliation.

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**Table 1:** Intervention for the present clinical study

| S. No | Groups | Pt. No. | Route of Admin | Dose | Kala | Duration | Follow up period | Total study duration |
|---|---|---|---|---|---|---|---|---|
| 1. | Group A | 15 | Shiro Abhyanga | Sufficient qty | Evening for 5 mins (Vata Kala) | 15 days | 15 days | 30 days |
| 2. | Group B | 15 | Nasya | 16 drops | Morning | 7 days | 7 days | 14 days |

**Table 2:** Assessment criteria[10,11]

| Parameters | Grading | |
|---|---|---|
| *Kandu* | 0 | Absent |
| | 1 | Occasionally |
| | 2 | Frequently |
| | 3 | Constantly |
| *Keshabhumi Rookshata* | 1 | Absent |
| | 2 | Without out discomfort on scalp |
| | 3 | With discomfort on scalp |
| *Twak sputana* | 0 | Absent |
| | 1 | Visible inside the scalp |
| | 2 | Visible over the scalp |
| | 3 | Spread over the shoulder |
| *Kesha chyuti* | 0 | Absent |
| | 1 | Occasionally |
| | 2 | Moderate loss |
| | 3 | Maximum loss |

**Table 3:** Effect on Keshapatana

| Statistical tests | Keshapatana_BT | Keshapatana_AT |
|---|---|---|
| Mann-Whitney U | 103.500 | 73.000 |
| Wilcoxon W | 223.500 | 193.000 |
| Z | −0.401 | −1.767 |
| Asymp. Sig. (2-tailed) | 0.688 | 0.077 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.713 | 0.106 |

**Table 4:** Effect on: Keshabhoomi daha

| Test statistics | Keshabhoomi Daha BT | Keshabhoomi Daha AT |
|---|---|---|
| Mann-Whitney U | 102.500 | 87.000 |
| Wilcoxon W | 222.500 | 207.000 |
| Z | −0.451 | −1.207 |
| Asymp. Sig. (2-tailed) | 0.652 | 0.227 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.683 | 0.305 |

**Table 5:** Effect on Keshabhoomi_Kandu

| Statistics test | | |
|---|---|---|
| **Statistical Tests** | **Keshabhoomi_ Kandu_BT** | **Keshabhoomi_ Kandu_AT** |
| Mann-Whitney U | 97.000 | 105.500 |
| Wilcoxon W | 217.000 | 225.500 |
| Z | −0.719 | −0.342 |
| Asymp. Sig. (2-tailed) | 0.472 | −.732 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.539 | 0.775 |

**Table 6:** Effect on Rukshatha

| Test statistics | | |
|---|---|---|
| **Statistics test** | **Keshabhoomi_ Rukshana_Bt** | **Keshabhoomi_ Rukshana_AT** |
| Mann-Whitney U | 103.000 | 103.000 |
| Wilcoxon W | 223.000 | 223.000 |
| Z | −0.428 | −0.468 |
| Asymp. Sig. (2-tailed) | 0.669 | −−.640 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.713 | −.713 |

**Table 7:** Effect on Kesha Tanutva

| Test statistics | | |
|---|---|---|
| **Statistical test** | **Kesha_ Thanutva_BT** | **Kesha_ Thanutva_AT** |
| Mann-Whitney U | 91.000 | 86.000 |
| Wilcoxon W | 211.000 | 206.000 |
| Z | −0.998 | −1.179 |
| Asymp. Sig. (2-tailed) | 0.318 | 0.239 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.389 | 0.285 |

**Table 8:** Effect on Darunaka

| Test Statistics | Dharunaka_BT | Dharunaka_AT |
|---|---|---|
| Mann-Whitney U | 97.500 | 101.500 |
| Wilcoxon W | 217.500 | 221.500 |
| Z | −0.659 | −0.492 |
| Asymp. Sig. (2-tailed) | 0.510 | 0.623 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.539 | 0.653 |

**Table 9:** Effect on Kaatinyatha

| Test statistics | Kesha_ Kaatinyata_BT | Kesha_ Kaatinyata_AT |
|---|---|---|
| Mann-Whitney U | 109.500 | 102.000 |
| Wilcoxon W | 229.500 | 222.000 |
| Z | −0.133 | −0.484 |
| Asymp. Sig. (2-tailed) | 0.895 | 0.629 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.902 | 0.683 |

**Table 10:** Effect on Quantity_of_hairfall

| Test statistics | Quantity_of_hairfall_BT | Quantity_of_hairfall_AT |
|---|---|---|
| Mann-Whitney U | 107.500 | 94.500 |
| Wilcoxon W | 227.500 | 214.500 |
| Z | −0.227 | −0.804 |
| Asymp. Sig. (2-tailed) | 0.820 | 0.421 |
| Exact Sig. (2*[1-tailed Sig.]) | 0.838 | 0.461 |

**Table 11:** Descriptive statistics

| Group | Subjective assessment | n | Mean | SD | Min | Max | Chi-square | Asy Signs |
|---|---|---|---|---|---|---|---|---|
| A | Negative_hair_pull_test_AT | 15 | 0.5333 | 0.51640 | 0.00 | 1.00 | 0.067 | 0.796 |
| B | Negative_hair_pull_test_AT | 15 | 0.3333 | 0.48795 | 0.00 | 1.00 | 1.667 | 0.197 |