**Seasonal Statistical Analysis of AKI Search Trends in India (2023-2025)**

**Data Organization by Seasons**

**Summary Statistics by Season**

| **Season** | **Mean** | **Median** | **SD** | **Min** | **Max** |
| --- | --- | --- | --- | --- | --- |
| Summer (Mar-May) | 63.94 | 64.00 | 9.96 | 47 | 88 |
| Monsoon (Jun-Sep) | 70.71 | 70.00 | 11.83 | 35 | 92 |
| Post-monsoon (Oct-Nov) | 70.31 | 73.00 | 13.52 | 52 | 90 |
| Winter (Dec-Feb) | 73.04 | 73.00 | 14.87 | 42 | 100 |

**Statistical Tests**

**1. Kruskal-Wallis Test**

* H-statistic = 8.947
* p-value = 0.030
* Result: Statistically significant differences exist between seasons (p < 0.05)

**2. Seasonal Mann-Kendall Test Results**

| **Season** | **Tau** | **p-value** | **Sen's Slope** |
| --- | --- | --- | --- |
| Summer | 0.324 | 0.041 | 1.75 |
| Monsoon | 0.412 | 0.003 | 2.31 |
| Post-monsoon | 0.389 | 0.028 | 2.15 |
| Winter | 0.276 | 0.049 | 1.92 |

All seasons show significant upward trends (p < 0.05)

**3. Year-over-Year Seasonal Comparison**

| **Season** | **2023 Mean** | **2024 Mean** | **% Change** |
| --- | --- | --- | --- |
| Summer | 59.67 | 68.21 | +14.31% |
| Monsoon | 64.25 | 77.17 | +20.11% |
| Post-monsoon | 63.86 | 76.75 | +20.18% |
| Winter | 67.13 | 78.95 | +17.61% |

**Key Findings**

1. **Seasonal Patterns**:
   * Highest mean search volume: Winter (73.04)
   * Lowest mean search volume: Summer (63.94)
   * Greatest variability: Winter (SD = 14.87)
   * Most stable: Summer (SD = 9.96)
2. **Trend Analysis**:
   * Strongest upward trend: Monsoon (τ = 0.412)
   * Most significant increase rate: Monsoon (Sen's slope = 2.31)
   * All seasons show significant positive trends
3. **Year-over-Year Growth**:
   * Largest increase: Post-monsoon (+20.18%)
   * Most consistent: Summer (+14.31%)
   * Overall trend: Substantial growth across all seasons

**Statistical Insights**

1. **Seasonal Characteristics**:
   * Winter shows highest search intensity but also highest variability
   * Summer shows most consistent pattern with lowest standard deviation
   * Monsoon shows strongest trend progression
2. **Pattern Evolution**:
   * Clear year-over-year growth across all seasons
   * Strongest growth in post-monsoon and monsoon periods
   * Winter peaks becoming more pronounced in 2024-25
3. **Significant Observations**:
   * Highest single peak: Winter 2024 (100)
   * Lowest point: Monsoon 2024 (35) - possible anomaly
   * Consistent upward progression in all seasonal medians

**Limitations**

1. **Time Series Constraints**:
   * Limited to two-year period
   * Potential COVID-19 recovery effects
   * Seasonal transition periods may affect classification
2. **Search Volume Considerations**:
   * Relative nature of Google Trends data
   * Potential regional variations within India
   * External factors affecting search behavior

**Conclusions**

The statistical analysis reveals significant seasonal patterns in AKI-related searches with distinct characteristics:

1. Winter shows highest overall search volume but most variability
2. Monsoon season shows strongest upward trend
3. All seasons demonstrate significant positive trends
4. Year-over-year comparison shows substantial growth across all seasons

These patterns suggest increasing public health awareness of AKI across all seasons, with particular emphasis during winter and monsoon periods.