



Department of Computer Science and Engineering
Data Science



Semester: Subject: Slatistics for ALLDS Academic Year: 2023-2024.

A clinical study was conducted for 3 different CovID-19 vacuienes and observed for complete immunization

by a suitable method in days as given below:

|                 |               | 2 /          |
|-----------------|---------------|--------------|
| X-Shield<br>(X) | Yo Vaxin (Y). | ZoVax<br>(Z) |
| 30              | 34            | 67           |
| 27              | 35            | 54           |
| 34              | 19            | 27           |
| 15              | 15            | 27           |
| 18              | 27            | 79           |
|                 | 78            | 85           |
|                 | 45            |              |

Use the H-Test (kruskal-Dallis Test) at the 5% level of significance whether the three covid-19 vaccines are equally effective (with reference to immunization) or not? (X0.05,2 = 5.99).

to: X,Y,Z are equally effective. I steps: Define tha: X,Y,Z are not equally effective. | Mull and attende hyptothesis.

Slep 2: - Assign rank for each value.
(P.T.O).





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| X-shield<br>(X) | Ri             | YoVarin<br>(y)                         | R2   | ZoVane<br>(Z)                          | R <sub>3</sub> .    |
|-----------------|----------------|--|------|--|---------------------|
|                 | 9 6 5 10.5 1.5 | 34<br>35<br>19<br>15<br>27<br>78<br>45 | 10.5 | 67<br>54<br>27<br>27<br>27<br>29<br>85 | 15 14 6.5 6.5 17 18 |

| 1+2 = | 1.5-   |
|-------|--------|
| 5+6+7 | 18 _26 |
| 4     | =6.5   |
| 10+11 | = 10.5 |

$$H = \frac{12}{N(NH)} \times \frac{R_1^2}{n_1} \times \frac{R_2^2}{n_2} \times \frac{R_3^2}{n_3} \dots \times \frac{R_k^2}{n_k} - 3(NH)$$

$$= \frac{12}{18*(18+1)} \left( \frac{(30.5)^2}{5} + \frac{(68.5)^2}{5} + \frac{(71)^2}{5} \right) - 3(18+1)$$

$$H = \frac{12}{342} \times \left(\frac{930.25}{5} + \frac{4032.25}{5} + \frac{5929}{6}\right) - 57.$$





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of = no. of Groups -1

Slep 4: Compare values and take

Heal = 4.25 < X2 = 5.99

The null hypothesis is accepted.

There is no difference in the effectiveness of vaccine.

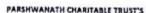
Consider there are three groups and their reaction time is measured. Check whether there is difference between

the groups. using knuskal-Wallis Test at 5% level of significance.

| Group A | Group B | Gloonb C |  |
|---------|---------|----------|--|
| 34      | 44      | 35       |  |
| 36      | 37.     | 29       |  |
| Al      | 45      | 42       |  |
| 43      | 33      | 46       |  |

Ho: There is no difference between the groups. I slipe. Ha: There is difference between the groups.

Steps : Assign Ranks





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| GroupA | $\mathbb{R}_{i}$ | Group B | R <sub>2</sub> | Group3 | RB.    |
|--------|------------------|---------|----------------|--------|--------|
| 34     | 2                | 44      | 10             | 35     | 3      |
| 36     |                  | 37      | 5              | 39     | 6      |
| 41     | 4                | 45      | 11             | 42     | 8      |
| 43     | 9                | 33      | 4              | 46     | 12     |
| n, = 4 | €R1=22           | ng=4    | £Q=27          | No=4   | €R8=29 |

Step 3: Calculate H value.

$$H = 12 \times \frac{12}{N(N+1)} \times \frac{(R_1^2 + R_2^2 + ER_3^2 + \dots + ER_k^2)}{n_1 + n_2 + n_3} + \dots + \frac{12}{n_k} - 8(N+1)$$

$$= \frac{12}{12(12+1)} * \left(\frac{(22)^2}{4} + \frac{(27)^2}{4} + \frac{(29)^2}{4}\right) - 3(12+1)$$

$$= 0.076 \times \left(\frac{484}{4} + \frac{729}{4} + \frac{841}{4}\right) - 3(13)$$

H= 0.026

Null hypothesis is accepted.

Subject Incharge: Prof. Sarala Mary Page No. ....

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