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Computer Engineering

STA 132 assignment -

A study of yellow fever disease (YFD) was conducted. The study was restricted to patients under the age of 40. One purpose was to compare the distribution of cases by age in group A to that of group B. The group data are given below.

Age	Group A	Group B
1-5	0	2
6-10	7	4
11-15	10	7
16-20	2	20
21-25	1	16
26-30	5	10
31-35	4	4

Calculate:

i) mean and standard deviation for each group.

ii) The coefficient of variation for each group.

iii) which group has less variable distribution.

Group A

C-I	f	x	fx	$ x - \bar{x} $	$ x - \bar{x} ^2$	$f x - \bar{x} ^2$
1-5	0	3	0	14.83	219.93	0
6-10	7	8	56	9.83	96.63	676.41
11-15	10	13	130	4.83	23.33	233.30
16-20	2	18	36	0.17	0.03	0.06
21-25	1	23	23	5.17	26.73	26.73
26-30	5	28	140	10.17	103.43	517.15
31-35	4	33	132	15.17	230.13	920.52
	$\Sigma f =$ 29		$\Sigma fx =$ 517			$\Sigma f x - \bar{x} ^2 =$ 2374.17

$\langle \bar{x} \rangle$

$$\text{ii) Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{517}{29} = 17.83$$

$$\text{iii) Standard deviation} = \sqrt{\frac{\Sigma f|x - \bar{x}|^2}{\Sigma f - 1}} = \sqrt{\frac{2374.17}{29 - 1}}$$

$$\text{S.D} = \sqrt{\frac{2374.17}{28}} = \sqrt{84.79}$$

$$\text{S.D} = 9.21$$

$$\text{iv) Coefficient of variation} = \frac{\text{S.D}}{\text{mean}} \times 100$$

$$\text{C.V} = \frac{9.21}{17.83} \times 100$$

$$\text{C.V} = 51.65\%$$

Group B

CI	f	x	fx	$ x - \bar{x} $	$ x - \bar{x} ^2$	$f x - \bar{x} ^2$
1-5	2	3	6	18-51	342-62	685-24
6-10	4	8	32	13-51	182-52	730-08
11-15	7	13	91	8-51	72-42	506-94
16-20	20	18	360	3-51	12-32	246-4
21-25	16	23	368	1-49	2-22	35-52
26-30	10	28	280	6-49	42-12	421-2
31-35	4	33	132	11-49	132-02	528-08
	$\Sigma f =$ 59		$\Sigma fx =$ 1269			$\Sigma f x - \bar{x} ^2 =$ 3153-46

$$\text{Mean } (\bar{x}) = \frac{\Sigma fx}{\Sigma f} = \frac{1269}{59} = 21.51$$

$$\text{Standard deviation (S-D)} = \sqrt{\frac{\Sigma f|x - \bar{x}|^2}{\Sigma f - 1}} = \sqrt{\frac{3153.46}{59 - 1}}$$

$$S-D = \sqrt{54.37} = 7.37$$

$$\text{Coefficient of Variation (C-V)} = \frac{S-D}{\text{mean}} \times 100$$

$$\text{C-V} = \frac{7.37}{21.51} \times 100$$

$$\text{C-V} = 34.26\%$$

Group B has less variable distribution.