

Question
 1) A study of yellow fever disease [] was conducted. The study was restricted to patients under the age of 15. The purpose was to compare the distribution of cases by age in groups A & that of group B. The group data are given below

Class	Group A	Group B
1-5	0	2
6-10	7	4
11-15	10	9
16-20	2	20
21-25	1	16
25-30	5	10
31-35	4	4

Solution
 Calculate (a) The mean and standard deviation for each group (ii) The coefficient of variation of each group and that group has less variable distribution

Group A

C	f	x	fx	$(x-\bar{x})^2$	$f(x-\bar{x})^2$	f^2x
1-5	0	3	0	14.8	0	0
6-10	7	8	56	9.8	68.6	68.6
11-15	10	13	130	6.8	68.0	130.0
16-20	2	18	36	0.2	0.4	0.4
21-25	1	23	23	5.2	5.2	5.2
26-30	5	28	140	10.2	51.0	140.0
31-35	4	33	132	15.2	60.8	132.0
	29		517		234.0	140.0

Mean $\bar{x} = \frac{\sum fx}{\sum f} = \frac{517}{29} = 17.8$
 The $MD = \frac{\sum f |x - \bar{x}|}{\sum f} = \frac{234}{29} = 8.07$

The $SD = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{234.0}{29}} = 2.92$

GROUP	CL	F	X	fX	$ x-\bar{x} $	$f x-\bar{x} $	$(x-\bar{x})^2$	$f(x-\bar{x})^2$
1-5	3	2	6	12	17.1	34.2	292.41	584.82
6-10	8	4	32	128	12.1	48.4	146.41	585.64
11-15	13	7	91	637	7.1	49.7	50.41	352.87
16-20	18	9	162	1458	2.1	12.9	4.41	40.68
21-25	23	10	230	2300	2.9	29	8.41	84.1
26-30	28	10	280	2800	7.9	79	62.41	624.1
31-35	32	4	128	1280	12.9	51.6	166.41	665.64
	63		1269			351.3		3055.83

Mean $\bar{X}_g = \frac{\sum fX}{\sum f} = \frac{1269}{63} = 20.1$

The m.d.g = $\frac{\sum f|x-\bar{x}|}{\sum f} = \frac{351.3}{63} = 5.55$

$S.D_g = \sqrt{\frac{\sum f(x-\bar{x})^2}{\sum f}} = \sqrt{\frac{3055.83}{63}} = 6.993274$

ii) The Coefficient of Variation (C.V.) for group A
 $= \frac{S.D_g}{\text{Mean}} \times 100$

∴ here $S.D = 7.2$, mean = 17.8
 $C.V = \frac{7.2}{17.8} \times 100 = 40.45$

Group B
 $C.V = \frac{S.D_g}{\text{Mean}} \times 100$

∴ here $S.D = 7$, mean = 20.1
 $C.V = \frac{7}{20.1} \times 100 = 34.83$

∴ The one with least Coefficient of Variation is less variable