Powerplay Wicket Analysis

Sample:
IPL Powerplay Data: IPL Matches
Model : Number of wickets fall in an inning of a powerplay..
Total number of innings = 1512

The following table shows the frequency and probability distribution of the number of wickets taken during the powerplay:

Number of Wickets	Number of Innings	Probability
0	329	0.2176
1	528	0.3492
2	416	0.2751
3	174	0.1151
4	55	0.0364
5	8	0.0053
6	1	0.0007
7	1	0.0007

Define X: Number of wickets fall in the first 36 legal deliveries (powerplay) of an inning.

$P(X=0) = 329/1512 = 0.2176$
$P(X=1) = 528/1512 = 0.3492$
$P(X=2) = 416/1512 = 0.2751$
$P(X=3) = 174/1512 = 0.1151$
$P(X=4) = 55/1512 = 0.0364$
$P(X=5) = 8/1512 = 0.0053$
$P(X=6) = 1/1512 = 0.0007$
$P(X=7) = 1/1512 = 0.0007$

Now, check whether this follows the Binomial distribution.

Let p be the probability of success.
p = P(fall of wicket in a ball)
= number of wickets fall in all the legal deliveries during powerplay of an inning / total number of balls
= 2155 / (1512*36) = 2155 / 54432 = 0.03959 ≈ 0.040

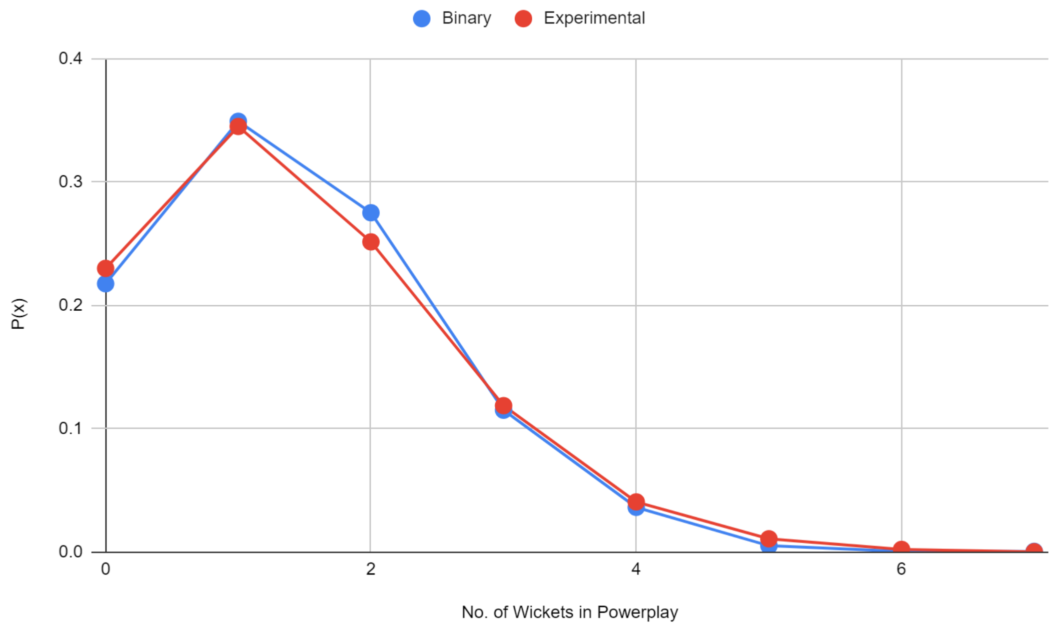
Using the Binomial distribution: n = 36, x : {0, 1, …., 36}, p = 0.040

$$P(X = k) = \binom{n}{k} p^k (1 - p)^{n-k}$$

P(X=0) = 0.2300
P(X=1) = 0.3450
P(X=2) = 0.2515
P(X=3) = 0.1188
P(X=4) = 0.0408
P(X=5) = 0.0109
P(X=6) = 0.0023
P(X=7) = 0.0004

For x>7, P(X=x) is approximately 0.

Hence, the random variable X (number of fours in first 36 legal deliveries) follows the Binomial distribution.



Conclusion:

The analysis indicates that most innings have either 1 or 2 wickets taken during the powerplay. The distribution suggests that taking 1 or 2 wickets in the powerplay is quite common, while taking 4 or more wickets is rare.