

Barnard's Exact Test

Test name: Barnard's Exact Test

Dataset: D:/DATA ANALYSIS/I Chi Square and Categorical Data Tests/Barnards Exact Test/dataset.csv

Rows in original dataset: 649

Columns in original dataset: 33

Rows used in the 2 x 2 analysis: 649

Independent grouping variable: sex

Group 0: F

Group 1: M

Binary outcome source: G3

Outcome category 1: G3 $\geq$ 10

Outcome category 0: G3 < 10

Observed 2 x 2 table: 333, 216, 50, 50

Primary method: Barnard's unconditional exact test with pooled score statistic.

Alternative hypothesis: two-sided.

Barnard statistic: 1.992745

Barnard exact p-value: 0.046533506

Decision at alpha = 0.05: Reject H0

Group 0 outcome proportion: 0.86945

Group 1 outcome proportion: 0.81203

Risk difference: -0.05742

Risk ratio: 0.93396

Odds ratio: 0.64865

Cramer's V: 0.07822

Maximizing nuisance probability: 0.5

Fisher's exact and chi-square results are included only for comparison.

Assumption note: observations should be independent and the table must be 2 x 2.

Barnard's test is unconditional and does not require both margins to be fixed.

Observed contingency table

sex	G3 >= 10	G3 < 10	row_total
F	333	50	383
M	216	50	266

Barnard and comparison tests

	test	statistic	df	p_value	primary_test	decision_alpha_0_05
Barnard	exact test	1.992745	NA	0.04653351	Yes	Reject H0
Fisher	exact test	1.540564	NA	0.05979708	No - comparison	Fail to reject H0
Pearson	chi-square	3.971035	1	0.04628932	No - comparison	Reject H0
Yates	corrected chi-square	3.542706	1	0.05980782	No - comparison	Fail to reject H0

Effect sizes

effect	estimate	ci95_lower	ci95_upper	interpretation
Group 0 outcome proportion	0.86945170	0.8320101	0.8995557695	F
Group 1 outcome proportion	0.81203008	0.7607620	0.8544140076	M
Risk difference (Group 1 - Group 0)	-0.05742162	-0.1152383	0.0003950912	Absolute probability difference
Risk ratio (Group 1 / Group 0)	0.93395651	0.8711337	1.0013098637	Relative probability
Odds ratio (Group 1 / Group 0)	0.64864865	0.4228980	0.9949091298	Relative odds
Cramer's V	0.07822210	NA	NA	2 x 2 association strength
Number needed for one additional outcome	17.41504274	NA	NA	1 / absolute risk difference













