

Chapter 41

Paired Binary (McNemar Test)

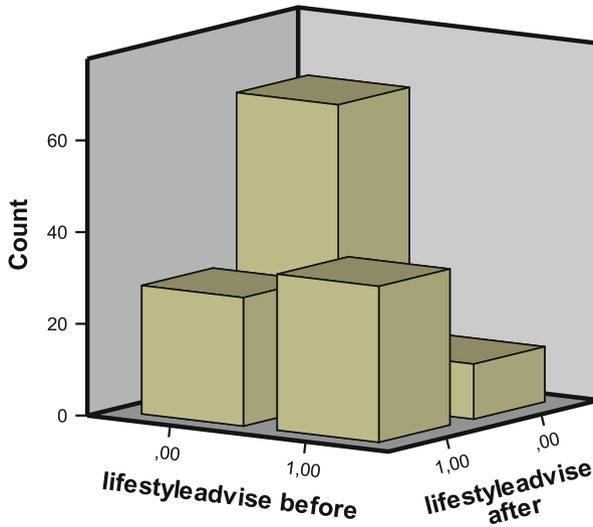
(139 General Practitioners)

1 General Purpose

Paired proportions have to be assessed when e.g. different diagnostic tests are performed in one subject. E.g., 315 subjects are tested for hypertension using both an automated device (test-1) and a sphygmomanometer (test-2). 184 subjects scored positive with both tests and 63 scored negative with both tests. These 247 subjects, therefore, give us no information about which of the tests is more likely to score positive. The information we require is entirely contained in the 68 subjects for whom the tests did not agree (the discordant pairs). McNemar's chi-square test is appropriate for analysis.

2 Schematic Overview of Type of Data File

Outcome-1 binary	outcome 2 binary
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The paired observations show that twice no lifestyleadvise was given by 65 practitioners, twice yes lifestyleadvise by 34 practitioners. Furthermore, 28 practitioners started to give lifestyleadvise after postgraduate education, while, in contrast, 12 stopped giving lifestyleadvise after the education program. McNemar's test is used to statistically test the significance of difference.

6 Data Analysis: McNemar's Test

For analysis the statistical model Two Related Samples in the module Nonparametric Tests is required.

Command:

Analyze...Nonparametric...Two Related Samples...Test Pairs...Pair 1...Variable 1: enter lifestyleadvise after...Variable 2: enter lifestyleadvise before...mark McNemar...click OK.

Lifestyleadvise before & lifestyleadvise after

Lifestyleadvise before	Lifestyleadvise after	
	.00	1.00
.00	65	28
1.00	12	34

Test statistics^a

	Lifestyleadvise before & lifestyleadvise after
N	139
Chi-square ^b	5,652
Asymp. Sig.	,018

^aMcNemar Test^bContinuity Corrected

The above tables show that the McNemar test is statistically significant at a p-value of 0,018, which is a lot smaller than 0,05. The conclusion can be drawn, that a real difference between the numbers of practitioners giving lifestyle advise after and before postgraduate education is observed. The postgrade education has, obviously, been helpful.

7 Conclusion

Paired proportions have to be assessed when e.g. different diagnostic procedures are performed in one subject. McNemar's chi-square test is appropriate for analysis. Mc Nemar's test can not include predictor variables, and is not feasible for more than two outcomes. For that purpose Cochran's tests are required (Chap. 43). The analysis of paired outcome proportions including predictor variables requires the module generalized estimating equations to be reviewed in the Chap. 42.

8 Note

More background, theoretical and mathematical information of paired binary outcomes are given in Statistics applied to clinical studies 5th edition, Chap.3, Springer Heidelberg Germany, 2012, from the same authors.