Hubungan antar variabel

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Hubungan antar variabel

- interdependensi
- asosiasi
- korelasi
- regresi

Interdependensi

χ^2

* Saling ketergantungan antara X dengan Y
* Uji X^2 (kai kuadrat = chi square)
* Tidak dapat mengetahui keeratan hubungan antara X dengan Y

Asosiasi

* Kelanjutan dari uji interdependensi

* uji : Koefisien kontingensi

  Phi

  Cramer's V

* nilai antara 0 - 1 (tak ada - berasosiasi sempurna)

* tidak menunjukkan arah hubungan (pos / neg)

Korelasi

* menunjukkan <u>arah</u> hubungan

* Uji :

  r product moment Pearson

  Spearman

  Kendall

* Nilai : -1 s/d +1

Regresi

* Mampu membuat prediksi DV dari perubahan IV

* Uji :

  - regresi sederhana

  - regresi majemuk

* Persamaan : $Y = a + b1X1 + b2X2 \ldots\ldots\ldots.biXi$

* Tidak otomatis menunjukkan sebab akibat

Chi-squared (X^2) test

Used to test whether there is an interdependence between the row variable and the column variable.

Observed number

influenza	vaccine	placebo	total
Yes	20	80	100
No	220	140	360
Total	240	220	460

Observed and expected number

influenza	vaccine	placebo	total
Yes	20 (52,2)	80 (47,8)	100
No	220 (187,8)	140 (172,2)	360
Total	240	220	460

Formula

$$X^2 = \frac{(O - E)^2}{E}$$

The greater the difference between the observed and expected numbers, the larger the value of X^2 and the less likely it is that the difference is due to chance

Continuity correction
= Yate’s continuity correction

- Is always advisable although it has most effect when the expected numbers are small
- When they are very small the alternative is

Fischer’s exact test

Larger tables

- There is no continuity correction or exact test for contingency tables larger than 2X2.

- The chi-squared test is valid provided
  less than 20% of the expected numbers are under 5 and none is less than 1

Further methods for contingency tables

- Fischer’s exact test
- Comparison of two proportions – paired case
- Mantel-Haenszel chi-squared test
- Association : phi, contingency coefficient, Cramer’s V
- Risk

Fischer's Exact test

Is used when the overall total of the tables is less than 20 or when it is between 20 and 40 and the smallest of the four expected values is less than 5.

Thus the chi squared test is valid :

-when the overall total is more than 40 regardless of the expected values

-when the overall total is between 20 and 40 provided all the expected values are at least 5

Mc Nemar's chi-squared test

Comparison of two proportions – paired case

		Kato-Katz	
		Pos	Neg
Bell	Pos	184	54
	Neg	14	63

Incorrrect layout

Result	Bell	Kato	Total
+	238	198	436
-	77	117	194
Total	315	315	630

Mantel-Haenszel chi-squared test

When confounding is present, it is important to analyze the relevant subsets of the data separately.

It is often useful, however, to apply a summary test which pools the evidence from the individual subsets, but which takes account of the confounding factor(s)

The Mantel-Haenszel chi squared test is used for this purpose when the data consist of several 2 X 2 tables

Sex combined

antibodies	rural	urban	total
yes	60	60	120
no	140	140	280
total	200	200	400

X2= 0.012, p=0,913

Male

antibodies	rural	urban	total
yes	36	50	86
no	14	50	64
total	50	100	150

X2=5.73, p=0.017

Female

antibodies	rural	urban	total
yes	24	10	34
no	126	90	216
total	150	100	150

X2=1.36, p=0.243

vit A 1 inadekuat co 30 ug/dl * def Zn 1 cut off 65 ug/dl Crosstabulation

Count

		def Zn 1 cut off 65 ug/dl		Total
		ya	tdk	
vit A 1 inadekuat co 30 ug/dl	ya	17	6	23
	tdk	28	19	47
Total		45	25	70

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.383[b]	1	.240		
Continuity Correction[a]	.829	1	.363		
Likelihood Ratio	1.422	1	.233		
Fisher's Exact Test				.295	.182
Linear-by-Linear Association	1.363	1	.243		
N of Valid Cases	70				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.21.

Crosstabs

it A 1 inadekuat co 30 ug/dl * def Zn 1 cut off 65 ug/dl Crosstabulatio

			def Zn 1 cut off 65 ug/d		
			ya	tdk	Total
vit A 1 inadekuat co 30 ug/dl	ya	Count	17	6	23
		Expected Count	14.8	8.2	23.0
	tdk	Count	28	19	47
		Expected Count	30.2	16.8	47.0
Total		Count	45	25	70
		Expected Count	45.0	25.0	70.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.383[b]	1	.240		
Continuity Correction[a]	.829	1	.363		
Likelihood Ratio	1.422	1	.233		
Fisher's Exact Test				.295	.182
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N of Valid Cases	70				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.21.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	.000	.000	.[b]	.[b]
		vit A 1 inadekuat co 30 ug/dl Dependent	.000	.000	.[b]	.[b]
		def Zn 1 cut off 65 ug/dl Dependent	.000	.000	.[b]	.[b]
	Goodman and Kruskal tau	vit A 1 inadekuat co 30 ug/dl Dependent	.020	.032		.243[c]
		def Zn 1 cut off 65 ug/dl Dependent	.020	.032		.243[c]

a. Not assuming the null hypothesis.

b. Cannot be computed because the asymptotic standard error equals zero.

c. Based on chi-square approximation

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.141	.240
	Cramer's V	.141	.240
	Contingency Coefficient	.139	.240
N of Valid Cases		70	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for vit A 1 inadekuat co 30 ug/dl (ya / tdk)	1.923	.641	5.764
For cohort def Zn 1 cut off 65 ug/dl = ya	1.241	.885	1.740
For cohort def Zn 1 cut off 65 ug/dl = tdk	.645	.299	1.394
N of Valid Cases	70		