

2월 5일

1월

	a	b	n_1
	c	d	n_2
m_1	m_2	n	

$$\chi^2 = \sum \frac{\{n_{ij} - E(n_{ij})\}^2}{E(n_{ij})}$$

$$= \frac{\left(a - \frac{n_1 m_1}{n}\right)^2}{\frac{n_1 m_1}{n}} + \frac{\left(b - \frac{n_1 m_2}{n}\right)^2}{\frac{n_1 m_2}{n}} + \frac{\left(c - \frac{n_2 m_1}{n}\right)^2}{\frac{n_2 m_1}{n}} + \frac{\left(d - \frac{n_2 m_2}{n}\right)^2}{\frac{n_2 m_2}{n}}$$

$$= \frac{n}{n^2} \left\{ \frac{(na - n_1 m_1)^2}{n_1 m_1} + \frac{(nb - n_1 m_2)^2}{n_1 m_2} + \frac{(nc - n_2 m_1)^2}{n_2 m_1} + \frac{(nd - n_2 m_2)^2}{n_2 m_2} \right\}$$

$$= \frac{1}{n} \left[\frac{n^2 a^2}{n_1 m_1} - 2na + n_1 m_1 + \frac{n^2 b^2}{n_1 m_2} - 2nb + n_1 m_2 + \frac{n^2 c^2}{n_2 m_1} - 2nc + n_2 m_1 + \frac{n^2 d^2}{n_2 m_2} - 2nd + n_2 m_2 \right]$$

$$= \frac{1}{n} \left[n^2 \left\{ \frac{a^2}{n_1 m_1} + \frac{b^2}{n_1 m_2} + \frac{c^2}{n_2 m_1} + \frac{d^2}{n_2 m_2} \right\} - 2n^2 + n^2 \right]$$

$$= n \left[\frac{a^2}{n_1 m_1} + \frac{b^2}{n_1 m_2} + \frac{c^2}{n_2 m_1} + \frac{d^2}{n_2 m_2} - 1 \right]$$

$$= \frac{n}{n_1 n_2 m_1 m_2} \left[n_2 m_2 a^2 + n_2 m_1 b^2 + n_1 m_2 c^2 + n_1 m_1 d^2 - n_1 n_2 m_1 m_2 \right]$$

정답

$$\begin{aligned}
 n_2 m_2 a^2 &= (c+d)(b+d)a^2 = a^2 b c + a^2 c d + a^2 b d + a^2 d^2 \\
 n_2 m_1 b^2 &= (c+d)(a+c)b^2 = a b^2 c + b^2 c^2 + a b^2 d + b^2 c d \\
 n_1 m_2 c^2 &= (a+b)(b+d)c^2 = a b c^2 + a c^2 d + b^2 c^2 + b c^2 d \\
 n_1 m_1 d^2 &= (a+b)(a+c)d^2 = a^2 d^2 + a c d^2 + a b d^2 + b c d^2
 \end{aligned}$$

$$\begin{aligned}
 n_1 n_2 m_1 m_2 &= (a+b)(c+d)(a+c)(b+d) \\
 &= (ac + ad + bc + bd)(ab + ad + bc + cd) \\
 &= a^2 b c + a^2 c d + a b c^2 + a c^2 d \\
 &\quad + a^2 b d + a^2 d^2 + a b c d + a c d^2 \\
 &\quad + a b^2 c + a b c d + b^2 c^2 + b c^2 d \\
 &\quad + a b^2 d + a b d^2 + b^2 c d + b c d^2
 \end{aligned}$$

정답

$$\begin{aligned}
 \chi^2 &= \frac{n}{n_1 n_2 m_1 m_2} (a^2 d^2 + b^2 c^2 - 2 a b c d) \\
 &= \frac{n (ad - bc)^2}{n_1 n_2 m_1 m_2}
 \end{aligned}$$

24년 - 1

자료 3 5 7 9+ 11 12

$$\hat{S}(0) = 1$$

5

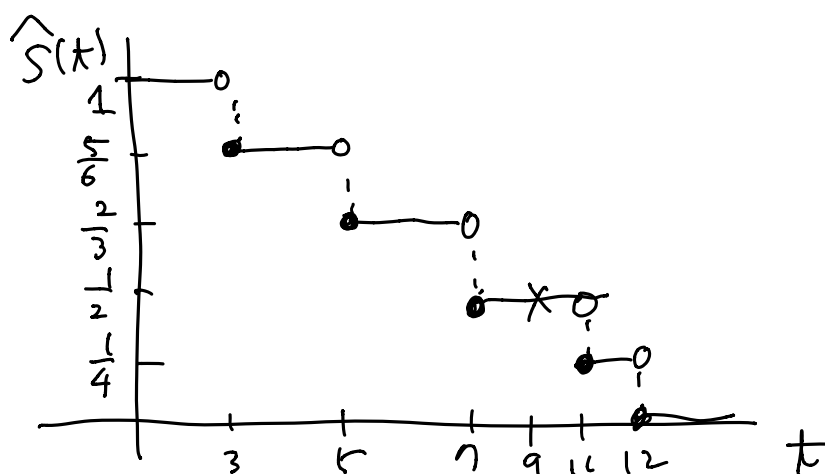
$$\hat{S}(3) = \hat{S}(0) \times \frac{5}{6}$$

$$\hat{S}(5) = \hat{S}(3) \times \frac{4}{5} = \frac{5}{6} \times \frac{4}{5} = \frac{2}{3}$$

$$\hat{S}(7) = \hat{S}(5) \times \frac{3}{4} = \frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$$

$$\hat{S}(11) = \hat{S}(7) \times \frac{1}{2} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

$$\hat{S}(12) = \hat{S}(11) \times \frac{0}{1} = \frac{1}{4} \times 0 = 0$$



● 2번 -2 두 그룹은 정하여 순서대로 놓으면 (모두 11명)

3, 5, 7, 8, 9, 10, 11, 12, 19, 24,

	사망 생존		
group 1	a	b	n_1
group 2	c	d	n_2
	m_1	m_2	n

group 1 은 6명

group 2 는 5명

x	n	m_1	n_1	a	$E_0(A)$	$a - E_0(A)$
3	11	1	6	1	$6/11$	$1 - 6/11$
5	10	1	5	1	$5/10$	$1 - 5/10$

7	9	1	4	1	4/9	1-4/9
8	8	1	3	0	3/8	0-3/8
10	6	1	2	0	2/6	0-2/6
11	5	1	2	1	2/5	1-2/5
12	3	1	1	1	1/3	1-1/3
19	2	1	0	0	0	0-0

$$CMH \chi^2 = \frac{[\sum (a - E_0(A))]^2}{\sum \left[\frac{n_1 n_2}{n-1} \right] \left[\frac{n_1 n_2}{n-1} \right]}$$

$$= 2.59$$

유의수준 $\alpha=0.05$ 이시 2.59 가 $\chi^2(1, 0.95)=3.84$

보다 작으므로 H_0 는 기각할 수 없다,

즉 두 그룹간의 생존률수는 차이가 없다