fishers_odds_ratio4goats

January 31, 2023

[1]:
```
import numpy as np
from scipy.stats import fisher_exact, norm
```

[2]:
```
def calc_odds_ratio(a, b, c, d):
    odds_ratio = (a * d) / (b * c)
    p_value = fisher_exact([[a, b], [c, d]])[1]
    se = np.sqrt(1/a + 1/b + 1/c + 1/d)
    z = np.log(odds_ratio) / se
    confint = np.exp(norm.ppf(0.025) * se), np.exp(norm.ppf(0.975) * se)
    return odds_ratio, p_value, confint
```

[3]:
```
#Age
odds_ratio, p_value, confint = calc_odds_ratio(48, 15, 129, 288)

print("The Fisher's Exact Association for age =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for age =
Odds ratio:  7.144
P-value:  1.077e-11
confint_lower 0.540
confint_upper 1.851
```

[4]:
```
#Sex
odds_ratio, p_value, confint = calc_odds_ratio(10, 53, 111, 306)

print("The Fisher's Exact Association for sex =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for sex =
Odds ratio:  0.520
P-value:  8.583e-02
```

```
confint_lower 0.492
confint_upper 2.034
```

not significant

[5]:
```
#presence of cat
odds_ratio, p_value, confint = calc_odds_ratio(59, 4, 91, 326)

print("The Fisher's Exact Association for Presence of Cat =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for Presence of Cat =
Odds ratio:  52.841
P-value:  2.547e-29
confint_lower 0.354
confint_upper 2.826
```

[6]:
```
#cat in contact with goats
odds_ratio, p_value, confint = calc_odds_ratio(59, 4, 54, 363)

print("The Fisher's Exact Association for Cat in Contact with goats =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for Cat in Contact with goats =
Odds ratio:  99.153
P-value:  8.852e-39
confint_lower 0.349
confint_upper 2.864
```

[7]:
```
#Cat with contact in drinking water
odds_ratio, p_value, confint = calc_odds_ratio(52, 11, 58, 359)

print("The Fisher's Exact Association for Cat with Sheep Contact in Drinking␣
  ↪Water =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Association for Cat with Sheep Contact in Drinking Water =
Odds ratio:  29.260
P-value:  5.622e-28
confint_lower 0.493
confint_upper 2.028
```

[8]:
```
#Presence of rats
odds_ratio, p_value, confint = calc_odds_ratio(60, 3, 291, 126)

print("The Fisher's Exact Associatio for Presence of Rats =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Associatio for Presence of Rats =
Odds ratio:  8.660
P-value:  2.781e-06
confint_lower 0.308
confint_upper 3.249
```

[9]:
```
#House type
odds_ratio, p_value, confint = calc_odds_ratio(54, 9, 330, 87)

print("The Fisher's Exact Associatio for House Type =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Associatio for House Type =
Odds ratio:  1.582
P-value:  3.097e-01
confint_lower 0.475
confint_upper 2.105
```

Not significant

[10]:
```
#Water source
odds_ratio, p_value, confint = calc_odds_ratio(38, 25, 278, 139)

print("The Fisher's Exact Associatio for Water Source =")
print("Odds ratio: ", "{:.3f}".format(odds_ratio))
print("P-value: ", "{:.3e}".format(p_value))
print("confint_lower", "{:.3f}".format(confint[0]))
print("confint_upper", "{:.3f}".format(confint[1]))
```

```
The Fisher's Exact Associatio for Water Source =
Odds ratio:  0.760
P-value:  3.222e-01
confint_lower 0.580
confint_upper 1.723
```

Not significant