fishers_odds_ratio4sheeps

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(47, 24, 78, 331)

print("The Fisher's Exact Associatio 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 Associatio for age =
Odds ratio:  8.310
P-value:  7.212e-15
confint_lower 0.577
confint_upper 1.733
```

[4]:
```
#Sex
odds_ratio, p_value, confint = calc_odds_ratio(29, 42, 108, 301)

print("The Fisher's Exact Associatio 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 Associatio for sex =
Odds ratio:  1.924
P-value:  1.559e-02
```

```
confint_lower 0.593
confint_upper 1.685
```

[5]:
```
#presence of cat
odds_ratio, p_value, confint = calc_odds_ratio(63, 8, 73, 336)

print("The Fisher's Exact Associatio 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 Associatio for Presence of Cat =
Odds ratio:  36.247
P-value:  1.614e-31
confint_lower 0.459
confint_upper 2.177
```

[6]:
```
#cat in contact with Sheep
odds_ratio, p_value, confint = calc_odds_ratio(57, 14, 37, 372)

print("The Fisher's Exact Associatio for Cat in Contact with Sheep =")
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 Cat in Contact with Cattle =
Odds ratio:  40.934
P-value:  2.497e-35
confint_lower 0.509
confint_upper 1.964
```

[7]:
```
#Cat with contact in drinking water
odds_ratio, p_value, confint = calc_odds_ratio(55, 16, 37, 372)

print("The Fisher's Exact Associatio 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 Associatio for Cat with Contact in Drinking Water =
Odds ratio:  34.561
P-value:  5.731e-33
confint_lower 0.521
confint_upper 1.918
```

[8]:
```
#Presence of rats
odds_ratio, p_value, confint = calc_odds_ratio(68, 3, 304, 105)

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:  7.829
P-value:  1.065e-05
confint_lower 0.308
confint_upper 3.246
```

[9]:
```
#House type
odds_ratio, p_value, confint = calc_odds_ratio(64, 7, 309, 100)

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:  2.959
P-value:  5.201e-03
confint_lower 0.444
confint_upper 2.253
```

[10]:
```
#Water source
odds_ratio, p_value, confint = calc_odds_ratio(37, 34, 268, 141)

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:  0.573
P-value:  3.315e-02
confint_lower 0.602
confint_upper 1.662
```