Answer on Question #49951 – Math – Statistics and Probability

Given:

In a study of dialysis researchers found that of the three patients who were currently on dialysis 67% had developed blindness and 33% has their toes amputated. What kind of display might be appropriate for these data ?

Solution:

If we suppose that blind patients and those, who had their toes amputated, are different sets, with no patients who had or did not have both features (blindness and amputated toes), then we can suggest the following reasoning.

$\frac{2}{3}$ of patients have developed blindness

$\frac{1}{3}$ of patients have their toes amputated

It might be displayed in the following form:

$P = \frac{1}{3n}\sum_{i=1}^{3n} a_i$ Possibility of blindness

$R = \frac{1}{3n}\sum_{i=1}^{3n} b_i$ Possibility of toes amputation

where 3n (it is actually 3) is an amount of all patients who were currently on dialysis and

$$a_i = \begin{cases} 1, \_if\_patient\_has\_blindness \\ 0, \_if\_patient\_has\_their\_toes\_amputated \end{cases}$$

$$b_i = \begin{cases} 0, \_if\_patient\_has\_blindness \\ 1, \_if\_patient\_has\_their\_toes\_amputated \end{cases}$$

$$P + R = 1$$

also we know that

$$\sum_{i=1}^{3} a_i \approx 2 \qquad \sum_{i=1}^{3} b_i \approx 1$$

If we suppose that patients can have simultaneously both features (blindness and amputated toes), then provided information is not sufficient, we can research each feature (blindness and amputated toes) only in an individual way.

It might be displayed in the following form:

$P = \frac{1}{3n}\sum_{i=1}^{3n} a_i$ Possibility of blindness

$R = \frac{1}{3n}\sum_{i=1}^{3n} b_i$ Possibility of toes amputation

where 3n (it is actually 3) is an amount of all patients who were currently on dialysis and

$$a_i = \begin{cases} 1, \_if\ \_patient\_has\_blindness \\ 0, \_if\ \_patient\_does\_not\_have\_blindness \end{cases}$$

$$b_i = \begin{cases} 1, \_if\ \_patient\_have\_its\_toes\_amputated \\ 0, \_if\ \_patient\_does\_not\_have\_its\_toes\_amputated \end{cases}$$

$P + R = 1$ is not necessarily true.

More general form of display is the set of all possible triples (k,l,m), where k is the id number of patient, l can take on either 1 (blindness was developed) or 0 (blindness was not developed), m can take on either 1 (toes were amputated) or 0 (toes were not amputated).
Then proceed with contingency table

	Blindness	No blindness
Amputated Toes	Number of triples with $l=1,\ m=1$	Number of triples with $l=0,\ m=1$
Not amputated Toes	Number of triples with $l=1,\ m=0$	Number of triples with $l=0,\ m=0$

In this problem on the whole it cannot be constructed through the lack of information. Assuming patients cannot have or lack simultaneously both features (blindness and amputated toes), then contingency table will be

Number of patients	Blindness	No blindness
Amputated Toes	0	1
Not amputated Toes	2	0