What is the definition of Number Needed to Harm and can you provide an example?

Authored by

stats writer

April 26, 2024

Number Needed to Harm (NNH) is a statistical measure used to determine the number of individuals who need to be exposed to a certain risk factor for one additional person to experience a harmful outcome. In other words, it represents the number of people who would need to be exposed to a particular treatment or intervention for one person to experience a negative effect. For example, if the NNH for a certain medication is 10, it means that for every 10 people who take the medication, one person is likely to experience a harmful side effect. This measure is commonly used in medical research to assess the potential risks of a treatment or intervention.

What is Number Needed to Harm? (Definition & Example)

Number needed to harm (NNH) refers to the average number of patients who need to be exposed to some risk factor to cause harm in an average of one person who would not have been harmed otherwise.

For example, suppose doctors test out a new drug designed to lower blood pressure and find that one in every 250 patients experiences a heart attack as a side effect.

The number needed to harm for this particular drug would be NNH = 250.

The higher the NNH for a given drug or treatment, the lower the risk factor of that drug or treatment.

For example, if drug A has a NNH of 250 and drug B has a NNH of 600, drug B would be preferred because it only

harms one in every 600 patients, on average.

Formula to Calculate Number Needed to Harm

In practice, we use the following formula to calculate NNH:

Number Needed to Harm (NNH) = 1 / (IT - IC)

where:

IT - The incidence rate in the treatment group
IC - The incidence rate in the control group

For example, suppose 5% of patients who use a new blood pressure drug experience a heart attack compared to 3% of patients who simply took a placebo.

We would calculate the number needed to harm as:

NNH = 1 / (IT - IC)
NNH = 1 / (.05 - .03)
NNH = 50

This means that 50 patients, on average, need to be exposed to this drug in order for one of them to experience a heart attack who otherwise would not have

experienced the heart attack.

NNH vs. NNT

A similar metric is known as the number needed to treat (NNT), which refers to the average number of patients that need to be treated for a benefit to occur to one person.

It is calculated as:

where:

IT - The incidence rate in the treatment group
IC - The incidence rate in the control group

An ideal new drug or treatment would have a low NNT and a high NNH because this means that only a few people need to be treated for a benefit to occur while a lot of people need to be treated for something harmful to occur.

Doctors and clinicians often look at both NNH and NNT when deciding whether or not it's prudent to give patients certain drugs. However, the specific scenario also makes a difference.

For example, a drug may have a low NNH (meaning harmful effects occur often) but it may still be used if the alternative is something serious like a heart attack, stroke, or even death.

Caveats of Using NNH

Keep in mind the following caveats of using NNH as a metric:

1. The NNH is not the same for all patients.

Number needed to harm (NNH) only provides us with an average. However, some patients will naturally be at higher risk if they have pre-existing conditions or make poor lifestyle choices.

2. Time frame matters.

The time frame for a given treatment or drug is important. For example, if a treatment is given to a patient over the course of five years then this should be mentioned along with the value for NNH.