Morbidity Measurement

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Outline

1. Measurement of morbidity
2. Importance of morbidity data
3. Specific rates of morbidity
4. Incidence
5. Prevalence

Objectives

- To study morbidity measurements.
- To define and identify uses of each morbidity measurement.

Measurement of morbidity

- The word Morbidity is coming from Latin [*morbidus* “diseased”].
- Morbidity measures are used to calculate the disease rates.

Importance of morbidity data

- Describe the extent and nature of the disease in the community.
- Provides more accurate and clinically relevant information on patient characteristics than can be obtained from mortality data.
- Serve as starting point for etiological studies.

Specific rates for morbidity

- Incidence
  - Attack rate
  - Secondary attack rate
- Prevalence
  - Point
  - Period

Incidence

- Incidence is the number of **new** cases arising in a given period in a specified population.

$$= \frac{Number\ \ of\ \ new\ \ cases\ \ of\ \ specific\ \ disease\ \ during\ \ a\ \ given\ \ time\ \ period}{Population\ \ at\ \ risk\ \ during\ \ that\ \ period} \times 1000$$

- Incidence used mainly in cohort studies ; people followed up for a long period of time.
- Determine usefulness of preventive & therapeutic measures.

Specific types of incidence

- Attack rate (Primary AR)
- Secondary Attack Rate.

Attack rate (AR)

- A type of incidence.
- Expresses the occurrence of a disease among a specific population at risk, observed for a limited period of time (e.g. during an epidemic).
- Usually expressed as a percentage.

$$= \frac{Number\ \ of\ \ people\ \ at\ \ risk\ \ in\ \ whom\ \ a\ \ certain\ \ illness\ \ develops}{Total\ \ number\ \ of\ \ people\ \ at\ \ risk} \times 100$$

Secondary attack rate

- Number of new cases among contacts occurring within the accepted incubation period following exposure to a primary case divided by the total number of exposed contacts.

$$= \frac{\begin{array}{l}\textit{Number of cases who develop the}\\ \textit{disease within the incubation period}\end{array}}{\begin{array}{l}\textit{Number of susceptib le individual s who}\\ \textit{were exposed to the primary cases}\end{array}} \times 100$$

Example

- If there are 500 new cases of an illness in a population of 30,000 in a year, the incidence rate would be:

Incidence

- Incidence is the number of **new** cases arising in a given period in a specified population.

$$= \frac{Number\ \ of\ \ new\ \ cases\ \ of\ \ specific\ \ disease\ \ during\ \ a\ \ given\ \ time\ \ period}{Population\ \ at\ \ risk\ \ during\ \ that\ \ period} \times 1000$$

- Incidence used mainly in cohort studies ; people followed up for a long period of time.
- Determine usefulness of preventive & therapeutic measures.

Example (Cont.)

- = 500/30,000 × 1000
- = 16.6 per 1000 per year.

Example on Attach rate

- An outbreak of Salmonella infection has occurred in October 2004, at a wedding party in Choman sub-district.

- Of the 100 invitees who ate there, 50 felt ill.

Attack rate (AR)

- A type of incidence.
- Expresses the occurrence of a disease among a specific population at risk, observed for a limited period of time (e.g. during an epidemic).
- Usually expressed as a percentage (rate?).

$$= \frac{Number\ \ of\ \ people\ \ at\ \ risk\ \ in\ \ whom\ \ a\ \ certain\ \ illness\ \ develops}{Total\ \ number\ \ of\ \ people\ \ at\ \ risk} \times 100$$

Example on Attach rate (Cont.)

- Attack rate= 50/ 100×100= 50%.

Example on secondary AR

- Seven cases of hepatitis A occurred among 70 children attending a health center. Each infected child came from a different family. The total number of persons in the 7 affected families was 32. One incubation period later, 5 family members of the 7 infected children also developed hepatitis A.

Secondary attack rate

- Number of new cases among contacts occurring within the accepted incubation period following exposure to a primary case divided by the total number of exposed contacts.

$$= \frac{\begin{array}{l}\textit{Number of cases who develop the}\\ \textit{disease within the incubation period}\end{array}}{\begin{array}{l}\textit{Number of susceptib le individual s who}\\ \textit{were exposed to the primary cases}\end{array}} \times 100$$

Example on secondary AR

- AR in health center =7/70 ×100= 10%.
- Secondary AR among family contacts

= 5/ (32-7) × 100 = 5/25 × 100= 20%.

Exercise

Q1/ Consider an outbreak of shigellosis in which 18 persons in 18 different households all became ill. One incubation period later, 17 persons in the same households developed shigellosis. If the 18 households included 86 persons, *calculate the secondary attack rate*.

Answers

Q1/ Secondary attack rate = (17 / (86 - 18)) x 100% = (17 / 68) x 100% = 25%.

Prevalence

- Prevalence refers to ALL current cases (old and new) existing at a given point in time, or over a period of

  time in a given population.

Types of prevalence

✓Point prevalence

✓Period prevalence

Point prevalence

- Defined as the number of all current cases (old and new) of a disease at one point in time in relation to a defined population.
- When the term “prevalence” is used, without any further qualification, it is “point prevalence”.

$$= \frac{\begin{array}{c}Number\ \ of\ \ all\ \ current\ \ cases\ \ (old\ \ \&\ \ new)\ \ of\\ a\ \ specified\ \ \ disease\ \ \ existing\ \ \ at\ \ a\ \ given\ \ \ point\ \ \ in\ \ time\end{array}}{Estimated\ \ \ population\ \ \ at\ \ the\ \ same\ \ \ point\ \ \ in\ \ time} \times 100$$

Period prevalence

- It measures the frequency of all current cases (old and new) existing during a defined period of time (e.g., annual prevalence) expressed in relation to a defined population.

$$= \frac{Number\ \ of\ \ existing\ \ \ cases\ \ (old\ \ \&\ \ new)\ \ of\ \ a\ specified\ \ disease\ \ during\ \ a\ given\ \ period\ \ of\ \ time\ \ interval}{Estimated\ \ \ mid\ \ -\ interval\ \ \ population\ \ \ at\ \ risk} \times 100$$

References

- **Control of communicable diseases manual**, by Heymann DL, American Public Health Association, 19th edition, 2008.
- **Park's textbook of preventive and social medicine**, by Park K, Banarsidas Bhanot Publishers, 21st edition, 2011.