Health Indicators

Prof. Randa & Dr. Ibrahim
Department of Family & Community Medicine

435 Lecture Notes by Sara Alenezy & Ahmed Alyahya

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LEARNING OBJECTIVES

Learning objectives

1. Explain the need to use "indicators" to measure "health" status.

2. State the characteristics of health indicators.

3. List the uses of health indicators.

4. State with examples the types of health indicators.

Performance objectives

1. Compute indicators of mortality.

2. Interpret the result of the indicator.

HEALTH INDICATORS

"Health is a state of complete physical, mental and social well being not merely the absence of diseases or infirmity." – WHO.

Since "health" is a state (not like BP or WBCs level) we cannot measure it directly, therefore, it needs to quantified.

So, how can I measure how healthy a person or a population is?

By using health indicators.

Health indicators are:

- Variables that measure indirectly a status which can not be measured directly.
- They are a reflection of a given situation.
- They are used to compare between areas or population group at a certain time.
- They are used to measure changes over a period of time.
- Health indicators quantify the health of a population.

TYPES OF HEALTH INDICATORS

Will we calculate them all? No, we will calculate the MORBIDITY & MORTALITY only.

1. Morbidity indicators مؤشرات المرض
2. Mortality indicators مؤشرات الوفاة
3. Disability indicators مؤشرات العجز أو الإعاقة
4. Nutrition indicators مؤشرات التغذية
5. Healthcare delivery indicators مؤشرات تقديم الرعاية الصحية
6. Healthcare utilization indicators مؤشرات استخدام الرعاية الصحية
7. Social and mental health indicators مؤشرات الصحة الاجتماعية والنفسية
8. Socioeconomic indicators مؤشرات المستوى الاجتماعي
9. Environmental indicators مؤشرات البيئة
10. Quality of life indicators مؤشرات جودة الحياة

CHARACTERISTICS OF HEALTH INDICATORS

Health indicators should be:

- **Valid:** corresponds to the actual status; Measure what it is supposed to measure.

- **Reliable:** precise and reproducible; Give the same results on repeated measurements by different individuals.

- **Sensitive:** reflect the smallest changes in the health status of the population (no false negatives).

- **Specific:** reflect changes only in the situation concerned (no false positives).

USES OF HEALTH INDICATORS

- Reflect the health status of a given population.

- Reflect changes in the health profile of the same population over time.

- Provide international comparison.

- Delimit areas of health priority.

- Diagnosis of community needs.

- Allow evaluation of health services and specific interventions.

- Chart progress towards specific targets.

- Allow future projection of the health status of the population.

MORBIDITY INDICATORS

- Incidence rate (rate of development of new cases).
- Prevalence rate (rate of people who are already affected).

In chronic diseases like Diabetes, the incidence rate is high because new cases are constantly diagnosed; on the other hand, prevalence rate of Diabetes is even higher because patients are only taken care of and cannot be cured, so the incidences pile up, forming the prevalence. In fatal diseases, the incidence is equal to the prevalence.

- Attendance to outpatient clinics or health centers.
- Admission–readmission–discharge rate.
- Length of hospital stay.
- Spells of sickness or absence from school or work.

DISABILITY INDICATORS

- **Event-type indicators:**
  - Number of days of restricted activities.
  - Number of days confined to bed.
  - Number of days lost from work.

- **Person-type indicators:**
  - Number of people with limited mobility.
  - Number of people confined to bed.
  - Number of people confined to house.
  - Number of people getting around with aids (e.g. wheelchair).

- **Limitation of activities:**
  - Limitation of basic activities (toilet, bathing, shaving… etc).
  - Limitation of major activities (shopping, housework, job… etc).

HEALTHCARE DELIVERY INDICATORS

Assuming that the more healthcare provided, the healthier people would be.

- Doctors, nurses and beds–population ratio.

- Health center or subcenter–population ratio.

- Midwives–female in the fertile age group ratio.

HEALTHCARE UTILIZATION INDICATORS

Since healthcare is provided, people should be encouraged to use it.

- Percentage of children attending for immunization.

- Percentage of children attending for routine check-up.

- Percentage of pregnant female attending for antenatal care.

- Percentage of pregnant female attended by a trained birth attendant.

- Percentage of female attending family planning clinics.

- Bed occupancy rate.

- Bed turnover ratio.

NUTRITION INDICATORS

- **Specific nutritional indicators:**
  - Percentage of the population who have low weight for age, height for age or weight for height.
  - Percentage of infants born with a low birth weight.
  - Percentage of the population who have low HB level.
  - Percentage of children with clinical signs of malnutrition.
  - Percentage of those whose protein and caloric intake below the required.
  - Percentage of those who have 2 meals or fewer per day.
  - Increases in food prices as a percentage increase in minimum wages.
  - Percentage of expenditure (money spending) on food from total income.

- **Mortality indicators:** certain diseases are only fatal in cases of malnutrition.
  - MMR (Maternal Mortality Ratio) – IMR (Infant Mortality Rate) – children <5 years.
  - Morbidity rates for certain diseases as diarrhea (Malnutrition ⇄ Diarrhea).
  - Cause specific mortality rate as from measles and tuberculosis.

SOCIOECONOMIC INDICATORS

- Rate of population growth.
- Per-capita gross national production (GNP).
- Percentage of unemployed.
- Percentage of literacy.
- Average family size.
- Crowding index.
- Dependency ratio.

SOCIAL & MENTAL INDICATORS

Rate of :

- Suicide.
- Homicide.
- Delinquency.
- Alcohol and substance abuse.
- Rape.
- Child abuse.
- Wife abuse.
- Neglected or abandoned youth.

ENVIRONMENTAL INDICATORS

Percentage of the population with:

- Safe water supply inside dwellings.
- Sanitary refuse and sewage disposal.
- Living nearby a source of pollution.

QUALITY OF LIFE INDICATORS

- **Physical quality of life:** Standardized universal scale

Averaging three indicators: Infant mortality, Life expectancy at 1 year of age and Literacy rate; yielding a score on a scale ranging from 0 (worst) to 100 (best).

- **Subjective quality of life:** Depends on how the person feels
  - **Physical:** Pain, fatigue, lack of energy.
  - **Psychological:** Memory, concentration, self esteem.
  - **Level of independence:** Mobility, daily activity, working capacity.
  - **Social relation:** Personal relations, social support.

MORTALITY INDICATORS

We need to know the name of the indicator, how can we calculate it, and when we change the indicator, what changes in our calculations consequently?

- Crude death rate.
- Age specific mortality rate.
  - Infant mortality rate.
  - Perinatal mortality rate.
  - Neonatal mortality rate.
  - Post-neonatal mortality rate.
- Mortality rate of children below 5 years of age.
- Maternal mortality rate and ratio.
- Cause specific mortality rate.
- Proportionate mortality rate.
- Life expectancy.

MORTALITY RATE

Rate = **A** (part of the population or group) / **A+B** (total of the population or group) x Constant

Mortality rate is the number of deaths expressed as per 1000 or per 100 of the total population among which the deaths occurred.

$$Mortality\ rate = \frac{Deaths\ in\ a\ given\ period\ of\ time}{Size\ of\ the\ population\ among\ which\ deaths\ occurred\ in\ the\ same\ period\ of\ time} \times Constant$$

معدل الوفيات = عدد المتوفين (أ) بالنسبة لإجمالي عدد السكان (أ+ب) مضروبًا في الثابت ١٠٠٠ أو ١٠٠

If 10 people died in a population of 400 people, I express it as:

10/400 x 1000 = 0.025 x 1000 = 25

25 what? 25 deaths per 1000 people

CRUDE DEATH RATE (CDR)

Mortality from all causes of death (regardless of the cause) in a given period usually expressed as per 1000 of the estimated mid year population.

$$CDR = \frac{Total\ deaths\ in\ a\ given\ period\ of\ time\ and\ locality}{Estimated\ mid\ year\ population\ in\ the\ same\ year\ and\ locality} \times 1000$$

Mid year population is an adjustment of the size of the population as of 1st of July of the same year.

معدل الوفيات الخام = عدد الوفيات لجميع مسببات الوفاة (أ) بالنسبة لإجمالي عدد السكان وفقًا لإحصائية منتصف العام (أ+ب) مضروبًا في الثابت ١٠٠٠

AGE SPECIFIC MORTALITY RATE

Mortality from all causes of death among a certain age group in a given period and locality usually expressed as per 1000 of the estimated mid year population of the same age group in the same period and locality.

$$Age\ Specific\ Mortality = \frac{Total\ deaths\ among\ a\ certain\ age\ group\ in\ a\ given\ period\ of\ time\ and\ locality}{Estimated\ mid\ year\ population\ of\ the\ same\ age\ group\ in\ the\ same\ year\ and\ locality} \times 1000$$

معدل الوفيات المحدد بالعمر = عدد الوفيات لجميع مسببات الوفاة في فئة عمرية معينة (أ) بالنسبة لإجمالي عدد السكان للفئة العمرية ذاتها وفقًا لإحصائية منتصف العام (أ+ب) مضروبًا في الثابت ١٠٠٠

The difference here in comparison to the CDR is that we are not addressing the deaths according to the whole population, but to that specific age group itself.

INFANT MORTALITY RATE (IMR)

Infant = birth → 1 year of age.

Mortality rate in the first year of life expressed as per 1000 of total live births.

$$IMR = \frac{Deaths\ below\ 1\ year\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 1000$$

Reflects socioeconomic development and health services; the better they get, less deaths occur.
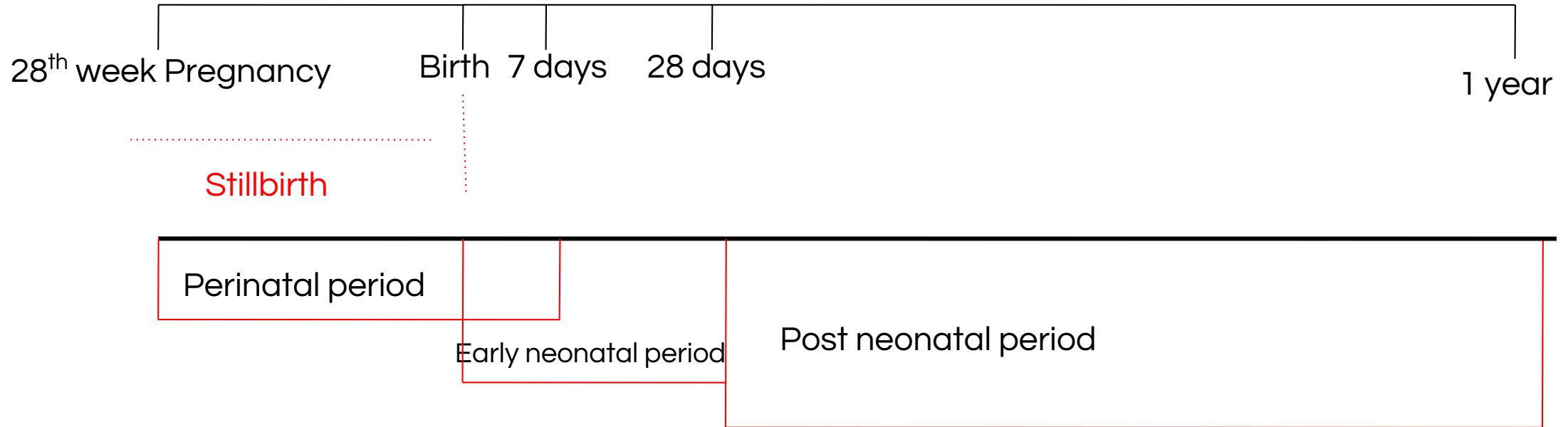
معدل وفيات الأطفال الرضّع = عدد الرضّع المتوفين خلال سنتهم الأولى (أ) بالنسبة لإجمالي عدد ولادات الأطفال أحياءً (أ+ب) مضروبًا في الثابت ١٠٠٠

If 10 infants died in a total of 400 live births, I express it as:

10/400 x 1000 = 0.025 x 1000 = 25

25 what? 25 deaths per 1000 live births

INFANT MORTALITY RATE

28th week Pregnancy   Birth   7 days   28 days   1 year

Stillbirth

Perinatal period

Early neonatal period

Post neonatal period

A stillbirth is a baby born dead after 24 completed weeks of pregnancy. If the baby dies before 24 completed weeks, it's known as a miscarriage or late foetal loss; Because 28 weeks is the age of which a fetus is born and can be survived.

Do not exclude who were born dead after 28 weeks of pregnancy هذا مربط الفرس

And do not be confused between "28 weeks of pregnancy" and "28 days after birth"

PERINATAL MORTALITY RATE

Perinatal = 28 weeks of pregnancy → 7 days of life.

Deaths between 28th week of gestation to less than 7 days of life expressed as per 1000 of total births (live-birth and still-birth).

$$Peri\ natal\ mortality = \frac{Deaths\ from\ 28th\ week\ of\ gestation\ to\ less\ than\ 7\ days\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ births\ (live\ and\ still) in\ the\ same\ year\ and\ locality} \times 1000$$

Reflects maternal health status, quality of maternal care and obstetric services.

معدل وفيات الأطفال الرضّع حول الولادة = عدد وفيات الأطفال الرضّع بعد الأسبوع الـ ٢٨ من الحمل إلى الأسبوع السابع بعد الولادة (أ) بالنسبة لإجمالي عدد ولادات الأطفال أحياء وأموات (أ+ب) مضروبًا في الثابت ١٠٠٠

NEONATAL (EARLY NEONATAL) MORTALITY RATE

Early neonate = birth → 28 days of life.

Mortality rate in the first 28 days of life expressed as per 1000 of total live births only.

$$Neonatal\ mortality = \frac{Deaths\ below\ 28\ days\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 1000$$

Reflects primarily quality of obstetric care and neonatal care as well as maternal nutrition and health status.

معدل وفيات الأطفال الرضّع حديثي الولادة = عدد وفيات الأطفال الرضّع خلال الأيام الـ ٢٨ الأولى بعد الولادة (أ) بالنسبة لإجمالي عدد ولادات الأطفال أحياء (أ+ب) مضروبًا في الثابت ١٠٠٠

UNDER-5 MORTALITY RATE

Deaths below 5 years expressed as per 1000 of the number of children below the age of 5 years.

$$Under-5\ mortality = \frac{Deaths\ below\ 5\ years\ of\ age\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ children\ below\ 5\ years\ of\ age\ in\ the\ same\ year\ and\ locality} \times 1000$$

معدل وفيات الأطفال تحت سن الخامسة = عدد وفيات الأطفال تحت سن الخامسة (أ) بالنسبة لإجمالي عدد الأطفال تحت سن الخامسة (أ+ب) مضروبًا في الثابت ١٠٠٠

MATERNAL MORTALITY RATIO (MMR)

Ratio = **A** (part of the population or group) / **B** (other part of the population or group) x Constant

Deaths due to maternal causes (pregnancy, delivery and puerperium) in a given year and locality expressed as per 100,000 live births in the same year and locality.

$$MMR = \frac{Deaths\ due\ to\ maternal\ causes\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ live\ births\ in\ the\ same\ year\ and\ locality} \times 100\ 000$$

Reflects the status of maternal health and nutritional status, the quality of antenatal, natal and postnatal care as well as family planning services.

نسبة وفيات الأمهات بسبب الحمل أو الولادة = عدد وفيات الأمهات بسبب الحمل أو الولادة (أ) بالنسبة لإجمالي عدد الأطفال المولودين أحياء (ب) مضروبًا في الثابت ١٠٠٠٠٠

CAUSE SPECIFIC DEATH RATE

Deaths from a certain cause (as accidents, cardiovascular diseases) expressed as per 100,000 of the population among which the deaths occurred.

$$\text{Cause specific mortality rate} = \frac{\text{Number of deaths by a certain disease for a select subgroup in a given year}}{\text{Total mortality cause population (or sub-group) in the same period (1 year) (population at risk)}} \times 100,000$$

Reflects the leading causes of mortality.

PROPORTIONATE MORTALITY RATE

Deaths from a certain cause (as accidents, cardiovascular diseases) expressed as percentage of the total deaths in the same year and locality.

$$Proportionate\ mortality\ rate = \frac{Deaths\ from\ a\ certain\ cause\ in\ a\ given\ year\ and\ locality}{Total\ deaths\ from\ all\ causes\ in\ the\ same\ year\ and\ locality} \times 100$$

Reflects the burden of diseases in the community.

CASE FATALITY RATE

Deaths from a certain disease expressed as percentage of the total number of cases of the same disease in the same year and locality.

$$Case\ fatality\ rate = \frac{Deaths\ from\ a\ certain\ disease\ in\ a\ given\ year\ and\ locality}{Total\ number\ of\ cases\ of\ the\ same\ disease\ in\ the\ same\ year\ and\ locality} \times 100$$

Reflects the virulence and pathogenicity of the organism.

LIFE EXPECTANCY

"Number of years expected to be lived by those borne into the population if the current age specific mortality rate persists"

Life expectancy at birth
- Best global indicator of health status.
- Affected by infant mortality.

Life expectancy at 5 years
- Not affected by infant mortality.

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