EPIDEMIOLOGY OF Dental Caries

The criteria for caries diagnosis should be defined before examination.

The tooth is considered carious ***when a sharp explorer catches in a cavity with a detectably soft floor and/or some undermined enamel or a breakdown in the walls of a pit or fissure.***

For numerical evaluation of caries in a group of population, certain indices had been devised.

Indices Used For The Assessment of Dental Caries:

1. Prevalence Index:

It is the simplest index used for dental caries.

It describes whether the disease is ***present or absent***.

This is useful mostly when observing and comparing populations with wide difference in caries experience.

Here, a simple count of persons (units of measurement) with and without signs of caries, may be adequate to establish the relative prevalence.

The prevalence rate=

$$\frac{\text{Number of all cases affected}}{\text{Total n. population}}$$

2. DMFT Index:

Decayed plus Missing plus Filled teeth.

It is the commonest of the current dental caries measurements. Each ***permanent tooth*** is considered individually and if it is decayed (D), missing due to caries (M) or filled (F) it scores one.

The **total number of the affected teeth in an individual gives an individual** dental **caries experience (individual DMFT).**

The average, number of DMF teeth for a group is found by dividing the total number of the affected teeth of the individuals by the number of individuals in the group.

3. DMF S- Index:

Decayed, Missing, Filled-Surfaces Index:

This is a more sensitive, reaching its greatest usefulness where accurate work is to be done involving the use of dental (X-ray) and for measurements during clinical trials of caries preventing agents.

This index counts the number of the affected tooth surfaces (surface counts).

Here the unit of measurement is not the tooth (as in DMF) but the tooth surface.

Certain difficulties, are encountered in the use of surface indices:

One of them is the score to be allocated to extracted teeth, which may have been attacked by one surface only, although its extraction results in the loss of four or five surfaces.

The extracted teeth are given score five (for posterior teeth) or four (for anterior teeth) as advocated by some authors.
Full crowns score 5 while 3/4 crowns score 4 and so on.

4. The dmf Index:

This is an index for the primary dentition,

where (d) denotes decayed deciduous teeth indicated for filling

(m) indicates missing deciduous tooth due to caries,

and (f) indicates filled deciduous teeth.

if it is decayed (d), missing due to caries (m) or filled (f) it scores one.

The **total number of the affected teeth in an individual gives an individual** dental **caries experience (individual dmf).**

5-Slack index

A sensitive classification of the extent of carious lesions was advocated by Slack et aI., (1958) where the size of the lesion is indicated on a scale running from I to 3.

D_1: the probe catches in a pit or fissure but does not penetrate to the dentin

D_2: Obvious carious lesion involving the dentin, but not more than one quarter of the crown.

D_3: Cavitations had proceeded more than one quarter of the crown.

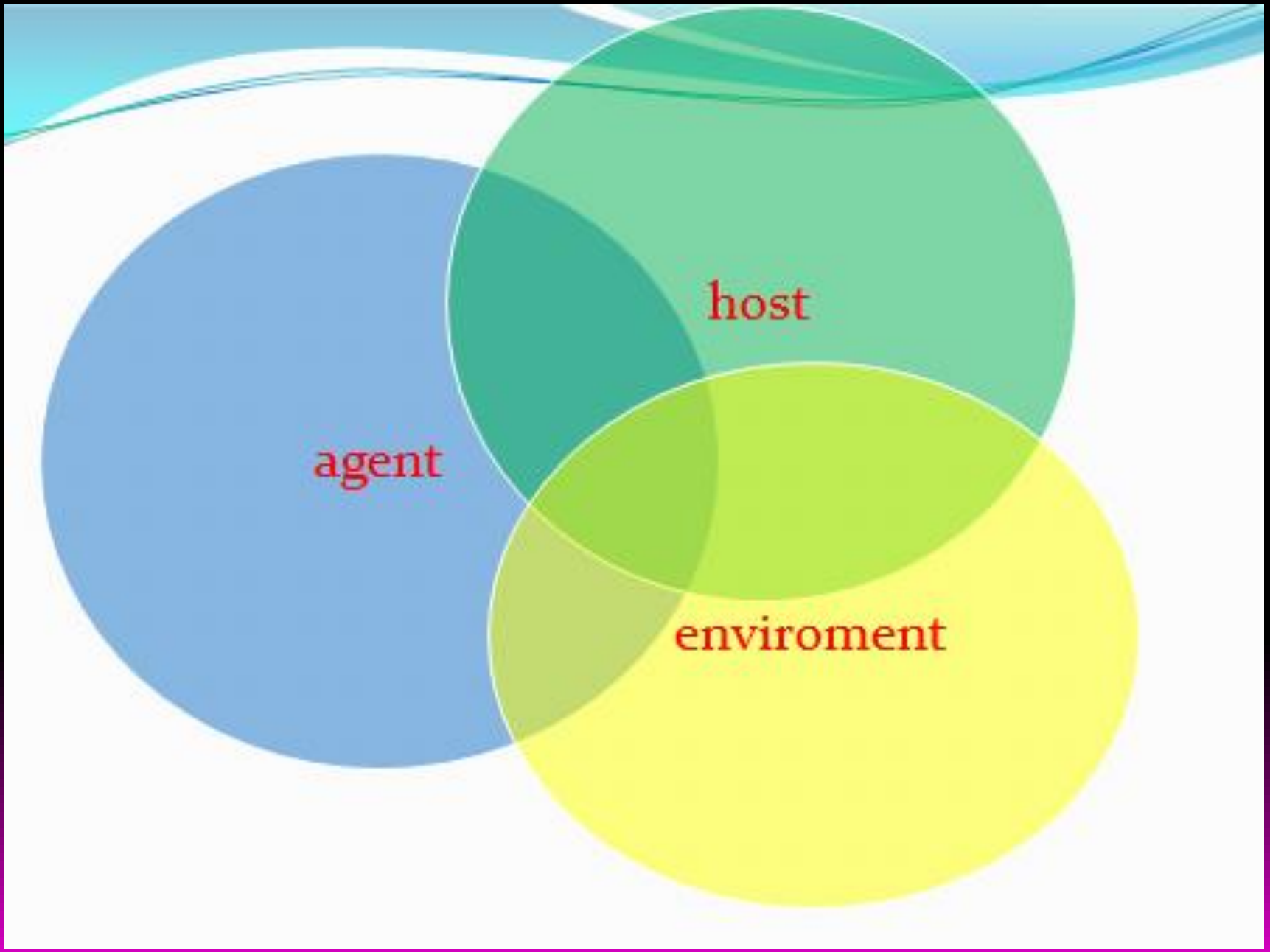
Slack index of an individual equals the total number of the affected teeth scores divided by the total number of the affected teeth.

Factors Affecting The Epidemiology of Dental Caries

There are many factors affecting caries process.

They are divided into three main groups;

the ***host*** (human),
the ***agent (***bacteria),
the ***environment.***


host
agent
enviroment

I- Host factors

1- Race:

Chinese and Negro population have been shown to have lower caries rates than corresponding ***white*** population.

2-Age:

Dental caries was essentially ***a disease of childhood***

The greatest intensity of caries incidence in **permanent teeth** occurs in the decade between ***15-25*** of age.

Pit and fissure caries is the predominant type occurring at this period.

The period between ***25-35*** years showed a pronounced decrease in caries incidence This is because the more susceptible tooth surfaces has already affected by caries.

Another increase in caries incidence occurs at about ***45-55*** years. ----------***proximal caries***

Over 60 years of age, ***acute root caries*** because root surface becomes denuded by gingival recession.

3 . Sex:

In young people, caries has been seen to be ***higher in females***.

An impression has long been held that ***pregnancy*** accelerates dental caries in the females.

4-Inheritance:

Caries varies considerably ***from family to family***, and that Inheritance of a ***characteristic tooth structure or form*** either good or poor is common.

5-Emotional disturbance:

Transitory anxiety states may influence the incidence of dental caries.

A study on DMF among **psychiatric patients** demonstrated a higher caries experience at all Ages among the manic depressive group than in the base line hospital population.

Another study, reported close correlation between **severe mental stress** and dental caries.

6-Nutrition

Nutrition can be considered a host factor since individual selects specific foods from the array available to him.

II. Agent Factors

1. Bacterial factors:

lactobacilli acidophilus and streptococci mutans were proved to be strongly implicated in humans dental caries.

2. Role of carbohydrates:

Freely fermentable carbohydrate, have an essential role in caries process.

The ***rate of clearance*** from the mouth also affects the acids production rate.

III. Environmental Factors

1. Geographic variations:

In the USA, studies of dental disease suggests two striking associations: ***latitude and distance from seacoast***.

This is mainly due to climatological factors including:
"sunshine,
rainfall,
temperature
humidity.

A-Sunshine:

There was an inverse relation between the mean annual sunshine and dental caries due to the increase in the amount of ultraviolet rays increases the formation of ***vit. D*** by mobilizing its precursor from the fat deposition under the skin.

Also in many areas of the world the ***temperature*** is in direct relation with sunshine and as sunshine increases temperature increases and there will be increased demand for water consumption.

The ***increased water intake*** will help wash away food debris from the mouth.

b) Temperature:

Temperature in turn, acts to vary the ***caloric requirements*** and ***water intake*** of human beings.

Since carbohydrate food is a quick and cheap source of caloric energy, so in localities of ***low temperature***, **the carbohydrate consumption specially sweets is high and there is a decrease in water intake and therefore caries incidence increases** and vice versa.

C- Humidity level

It is the ratio of the amount of moisture in the atmosphere.

a direct relation between DMF, and relative humidity.

This is because of ***increased demand of water*** intake in areas with high humidity levels.

D- Rainfall:

Most of the crops utilize in their growth the upper thirty centimeters of the soil, as the rainfall increases, ***minerals leaching*** (specially fluorides) will lead to reduction of **fluoride concentration** in the crops.

Another factor, is that rainfall is accompanied by **heavy clouds** which block sunlight.

2. Fluoride:

Especially in the communal water supplies is greatly decrease the DMF index.

3. Total water hardness:

Usually measured in terms of ***calcium carbonate***.

There is an inverse relation between DMF and the total water hardness.

4. Trace elements:

It has been found that there is marked **increase in dental caries, in areas where *selenium* was high** both in water and food stuffs.

On the other hand, ***molybdenum and vanadium*** **have caries inhibiting influences**.

5.Urbanization

may be accompanied by an increase in dental caries. This may be due to the type of diet in urban areas.

6. Social factors:

Good economic status and social pressure in the direction of good mouth appearance are both strong factors in creating demand of dental treatment