Community

Dental need and demand

Need: It is an important concept in public health. It is used in the planning and management of health services including health improvement, resources allocation and equity.

Need for care is defined as the quantity of dental treatment which should be available over a time period for people to be certified dentally healthy.

There are various definition of need. There are four categories of need:

1-Normative need (defined by the professional)

Is that which the professional defines as need in any given situation

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2-Felt need (Perceived need)
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This reflects the individual own assessment of his or her requirement for health care. It is equated with want.

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3-Expressed need (demand):
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This is felt need is converted in to action by seeking care

Demand: is the expression by a patient or the public of desire to receive health care related to the perceived needs.

4-Coparative need, which is assessed by comparing care received by different people with similar characteristics.

The methods of assessment of treatment need has been through:

1-Clinical examination

2-Measuring patient demand for treatment.

3-Survey system to determine oral health status of the population

Utilization: is the actual attendance by members of the public at dental treatment facilities to receive dental care.

Factors affecting dental demands:

1-Age: Utilization are lowest in children < 5 years and in person >65 years.

2-Gender: female more than male but in some age and education, male= female

3-Education: Utilization increased with increasing the level of education.

4-Socioeconomic status: higher social class more than low social class. This is because higher social class often related to high income and good educational level.

5-Occupation: Persons in professional occupation visit their dentist more than nonskilled manual worker.

6-Residence: Urban area more than rural area.

The larger community the greater the utilization rate for dental services.

Dental manpower:

Manpower: defined as individual with a kind of knowledge, skill and attitude need to achieve predetermined health target and ultimately health status objective.

Dental health manpower planning: has been defined as the process of estimating the number of persons and the kind of knowledge and skills the need to achieve predetermined dental health targets and optimal improvements in dental health of the population.

Dental health manpower planning involves:

1-Analysis and projections of dental health needs and demands for population which obtained from epidemiological surveys and treatment records.

2-Assessment of present dental health manpower availability and its pattern of utilization.

3-Formulation of policy.

4-Estimation of future manpower requirements.

Lec.18

Dental Ethics

Ethics is that branch of philosophy concerned with the study of those concepts that are used to evaluate human activities in particular the concepts of goodness and obligation.

Ethics is made up of micro_ ethics and macro_ethics. Micro_Ethics focuses on individual rights and duties. Macro_ethics guides the conduct of population based researches.

Principles of ethics and code of professional conduct:

1-Patient autonomy (self governance).

2-Nonmaleficience (do no harm).

3-Beneficence (do good).

4-Justice (fairness).

5-Veracity (truthfulness).

1-Patient autonomy (self governance).

Dentist primary duty is to respect patient right to self determination and confidentiality. It is prudent to include the patient in treatment decisions in a meaningful way, consideration should be given to patient needs, desires and abilities are safeguarding privacy.

Code of professional conduct

1-Patient involvement : Inform the patient about treatment plan and any reasonable alterations.

2-Patient records: Safeguard the confidentiality of the patient records. Upon request by another practitioner provide information only if it is beneficial to the patient.

2-Nonmaleficience (do no harm).

Professional have a duty to protect the patient from harm. Dentist primary obligations include keeping knowledge and skills current and to refer to a specialist under appropriate circumstance. Macro-ethical application: Not to harm the subject population. Investigator has a responsibility toward individual subjects and to the population to which they belong.

Code of professional conduct

1-Continuing dental education by the dentist.

2-Consultation and referral: The specialist should return the patient upon completion of their care, to the referring dentist.

3-Specialist who has been referred patient for second opinion by third party regarding a treatment plan has an obligation to do so without any prejudice.

3-Beneficence (Do Good)

Professional have a duty to act for the benefit of others. Dentist primary obligation is to serve to the patient and public at large, provider competent and timely delivery of dental care within the bounds of clinical circumstances. Dentist should use their skill, knowledge and experience for the improvement of dental health of the public .

Code of professional conduct

1-Dentist should evaluate if services is good to the patient.

2-Identify and report cases of abuse and neglect.

3-It is unethical to carry out screening when no treatment is possible or beyond financial reach.

4-Justice (Fairness)

Professional have a duty to be fair in their dealing with patients, colleagues and society. Dentists obligation dealing with people justify and delivering dental care without prejudice.

Code of professional conduct

1-Dentists should not refuse to accept patients based on race, color, caste, gender or nation of origin.

2-Dentists should provide care to patients with AIDS or HIV

3-Dentists are obliged when consulted in an emergency by patients not of record.

4-If such treatment is provided then he/she should return the patient to his/her regular dentist.

5-Veracity (Truthfulness)

Patient doctor relationship is based on trust. Lying shows disrespect to the patient and threatens relationship.

Dentist should not represent the fees being charged for a case in a false/misleading manner. It is considered as unethical for dentist to increase fee to patient just he is covered under dental benefit plan, as also it is to perform unnecessary dental services or procedures.

The removal of amalgam restoration in patients who were non allergic but only for the purpose of removing toxic substances was considered unethical.

Duties of the dentist towards the patient

1-Dentist must be courteous, sympathetic, friendly and helpful

2- Dentist must observe punctuality in appointments.

3-The welfare of patient should be conserved to the utmost of the practitioner ability

4-Dentist should not permit any religion, nationality, race, part polities or social standing to intervene in duties.

Some unethical practices

1-Practice by unregistered persons employed by the dentist

2-Dentist signed under his name and authority issuing any certificate, which is untrue, misleading or improper

3-Dentist advertising either directly or indirectly for purpose of obtaining patients or promoting his own professional advantage.

4-Use of bogus diplomas, styling of clinicetc.

Book: Essential of Preventive and Community Dentistry

BENIGNE EPITHELIAL LESIONS Dr. Afrah Adnan Aldelaimi

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ITEMS COVERED IN THIS LECTURE

- SQUAMOUS PAPILLOMA
- KERATOACANTHOMA
- MELANOTIC MACULES
- SMOKER'S MELANOSIS
- NEVUS
- ACTINIC LENTIGO
- PEUTZ-JEGHERS SYNDROME
- MELASMA
- NICOTINE STOMATITIS

SQUAMOUS PAPILLOMA

•A benign exophytic papillary growth of stratified squamous epithelium. • Causative agent: some reports consider HPV as a causative agent



HPV comprises a large family (more than 100 types) of double-stranded DNA viruses of the papovavirus. The virus is capable of becoming totally integrated with the DNA of the host cell, and at least 24 types are associated with lesions of the head and neck.

Viral subtypes 6 and 11 have been identified in up to 50% of oral papillomas

CLINICAL FEATURES:

- Exophytic papillary lesion (sessile or pedunculated)
- oless than 1 cm diameter
- white (keratinized) or pink (nonkeratinized)
- o solitary lesion
- soft palate, uvula, and ventral and dorsal surfaces of the tongue, gingiva, and buccal mucosa





HISTOPATHOLOGY

- A thick papillary layer of keratinized or nonkeratinized squa. epi.
- a central core of fibrovascular CT
- The papillary projections may be long and fingerlike or short, rounded, and blunt.
- The epithelium generally exhibits a normal maturation pattern.



• It demonstrates basilar hyperplasia and mitotic activity, which can be mistaken for mild epithelial dysplasia. • Koilocytes, virus-altered epithelial clear cells with small dark (pyknotic) nuclei, are sometimes seen high in the prickle cell layer.



 Koilocytes are HPV-altered epithelial cells with perinuclear clear spaces and small, dark nuclei (pyknosis).

TREATMENT:

• The treatment of squamous papilloma consists of simple surgical excision of the base of the lesion and a small area of surrounding normal tissue. Recurrence is uncommon

VERRUCA VULGARIS (COMMON WART)

o is a benign, virusinduced, focal hyperplasia of stratified squamous epithelium. One or more of the associated human papillomavirus (HPV) types 2, 4, 6, and 40 are found in virtually all examples.



• Verruca vulgaris is contagious and can spread to other parts of a person's skin or mucous membranes by way of autoinoculation. It infrequently develops on oral mucosa but is extremely common on the skin.



• the verruca appears as a painless papule or nodule with papillary projections Multiple or clustered lesions are common.

• On occasion, extreme accumulation of compact keratin may result in a hard surface projection several millimeters in height, termed a cutaneous horn or keratin horn



TREATMENT AND PROGNOSIS

- Skin lesion treated by topical salicylic acid, topical lactic acid, or liquid nitrogen cryotherapy.
- Skin lesions that recur or are resistant to standard therapy may be treated by alternative methods, such as intralesional bleomycin, topical or photodynamic therapy.
- Oral lesions are usually surgically excised, or may be destroyed by a laser, cryotherapy, or electrosurgery.
- Recurrence is seen in a small proportion of treated cases.

KERATOACANTHOMA:

- A benign endophytic epi. growth
- well-circumscribed keratin-filled crater on sun-exposed skin.
- Developed 1 to 2 months nodules with a central keratin filled crater on the faces of patients 50 years of age and older.
- The male to female ratio 2:1. Although most lesions occur on hair-bearing skin (cheeks, nose, eyelids, ears), they also occur on the lower lip.





HISTOPATHOLOGY:

- It needs closer observation
- Well-differentiated spinous cells epi. with abundant cytoplasm and minimal nuclear pleomorphism, infrequent mitotic figures, and an absence of abnormal mitotic figures.
- Moderate infiltrate of chronic inflammatory cells in CT.
- TREATMENT : regress spontaneously if left untreated
- Surgical removal before they reach their maximum size of 2.0 to 2.5 cm.





MELANOTIC MACULES:

• Reactive small lesion on lip termed a labial melanotic macule and intraoral lesion an oral melanotic macule.



 Many melanotic macules of the mucosa represent foci of postinflammatory pigmentation.



HISTOPATHOLOGY:

- They are characterized by an increase in melanin granules in the basal cell layer.
- The melanocytes are confined to the basal cell region and are usually within the normal numeric range. Nuclear atypia is absent.



TREATMENT:

 Quickly developed lesion should be excised to establish the actual diagnosis and to rule out the possibility of melanoma



SMOKER'S MELANOSIS:

- Irregular brown macular pigmentation of the oral mucosa resulting from prolonged tobacco smoking.
- Smoking stimulates melanin production and more intense in female use contraceptive pills.
- maxillary and mandibular anterior labial gingiva.



- Histologic features similar to those found in a melanotic macule.
- The most effective treatment for smoker's melanosis is to stop smoking.
- Stop smoking will usually result in elimination of the pigmentation within a few months. If the pigmentation persists after a period of not smoking, a biopsy to assess the lesion is advisable.



Physiological and racial pigmentation

•This is the most common cause of oral pigmentation. **Gingiva and** inner aspect of lips is typically spared. It is commoner in dark skin.



- Fragments of amalgam AMALGAM TATTOO embedded in the oral mucosa.
- It seen as brown or black granules deposit along collagen bundles and around small blood vessels as amalgam granules in the macrophages or giant cells.
- Dense tattoos may be radiopaque.
- Excision is necessary to exclude a melanoma.



•A benign, exophytic, usually pigmented, congenital lesion of skin or mucosa composed of focal collections (nests) of rounded melanocytes (nevus cells) •It classified as intradermal (mucosal),

junctional, or compound.

NEVUS:



INTRADERMAL NEVUS INTRAMUCOSAL NEVUS

Intramucosal

- It is commonly termed a mole. Oral lesion is uncommon
- It appears as an asymptomatic, pigmented, brown to black, slightly elevated or flat macule on the hard palate or gingiva. The lesion grows very slowly and generally measures less than 1 cm in diameter.

• It characterized by clustered of nests, cords or sheets of nevus cells confined to the connective tissue. The morphology of the cells and the amount and distribution of melanin are variable and mitotic figures are usually absent.



If the lesional cells are found at the junction between the epithelium and the connective tissue, it is known as a junctional nevus. If the nevus cells begin to drop off into the underlying connective tissue, the lesion then is called a compound nevus



- Benign dark blue papule or as a flat macule occurs most commonly on the hard palate.
- The cells in the blue nevus are spindled dendritic cells rather than rounded or epithelioid and are confined to the connective tissue rather than being arranged in separated rounded clusters. The blue nevus has no tendency to undergo malignant transformation.

BLUE NEVUS:



CONGENITAL MELANOCYTIC NEVUS

• It is large nevus appears as a brown to black plaque, usually with a rough surface or multiple nodular areas and darker with age.

• A common feature is the presence of hypertrichosis (excess hair) within the lesion, which may become more prominent with age (giant hairy nevus).




• TREATMENT:

• A solitary pigmented lesion of the oral mucosa, particularly on the hard palate, should be excised and submitted for histopathologic examination.

ACTINIC LENTIGO

- Solar lentigo, senile lentigo, age spot, or liver spot.
- It is a benign pigmented multiple macular on sunexposed skin, primarily on the face, exterior surfaces of the forearms, and most commonly on the dorsal surfaces of the hands.





•Sunlight is the contributing factor.

 Age related lesions are uncommon before the 5th decade of life.
 It does not undergo malignant transformation.



bulbous and elongated rete ridges with a marked increase in melanin within the basal keratinocytes.

• No treatment of actinic lentigo is required. esthetic reasons with topical retinoic acid can reduce the color intensity of the lesions. Laser treatment has also been used.



PEUTZ-JEGHERS SYNDROME:

- It is uncommon autosomal dominant disorder characterized by multiple intestinal polyps (intestinal polyposis)
- freckle-like pigmentation of the skin in perioral areas
- Recognition of the clinical characteristic of the oral and skin lesions can lead to early diagnosis of the disorder and evaluation of the GIT



• The pigmented macules typically develop during the first decade of life and can be widespread, affecting the hands and feet and perioral skin as well as the oral mucosa.

 Cutaneous macules usually fade after puberty but the oral macules persist



MELASMA: THE MASK OF PREGNANCY

- It is symmetrical hyperpigmentation of the sunexposed skin of the face and neck.
- increase in melanin within basal keratinocytes. The superficial connective tissue may also display melanin within the phagocytes (melanin incontinence).
- Topical treatment with 3% hydroquinone and retinoind. The pigmentation can spontaneously resolve after cessation of oral contraceptives.





- Excessive thickening of the spinous layer of squamous epithelium, resulting in broadening and elongation of rete ridges.
- It develops in response to chronic irritants, such as ill-fitting dentures, smoking or chewing tobacco, and infections such as chronic candidiasis

ACANTHOSIS:



PSEUDOEPITHELIOMATOUS HYPERPLASIA

- An excessive benign proliferation of squ. Epi. that histologically resembles the proliferation seen in a SCC.
- It is commonly seen in inflammatory papillary hyperplasia (palatal papillomatosis), chronic hyperplastic candidiasis, granular cell tumor, and blastomycosis.



NICOTINE STOMATITIS:

- White lesion combination of hyperkeratosis and acanthosis palate, the buccal mucosa, in chronic pipe smokers
- Dilated salivary gland duct exhibiting squamous metaplasia of the ductal lining. CT exhibits variable degrees of chronic inflammation.
- TREATMENT: it rapidly resolves when the smoking habit stops



Suggestive Reading

Brad W Neville, Douglas D Damm, Carl M. Allen, Jerry E Bonguot. Oral And Maxillofacial Pathology, 4th Edition, Elsevier, 2015



Fibro-osseous lesions of bone

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- k Group of bone lesions that characterized by replacement of normal bone by fibrous tissue containing a newly formed mineralized product.
 k No specific etiology : some are developmental (hamartomatous) lesions or reactive or neoplasms.
 k Clinical, radiograph, and histopathological correlation is
 - beneficial in establishing a specific diagnosis.
- **&** The treatment of these pathoses varies from none to surgical recontouring to complete removal.

k fibro-osseous lesions of the jaws are: Fibrous dysplasia
 Cemento-osseous dysplasia
 Periapical cemento-osseous dysplasia

Fibrous dysplasia

Ossifying fibroma

- **& Developmental genetic mutation**
- k It has 2 type monostotic and polystotic
- **& Age 10 years** ∎
- **&** Treatment : recontour

k Neoplasm with significant growth potential & Charactized by F.C.T stroma intermixed with cementum or bone trabiculae. **k** Normal and juvenail & Age 40-10 **R** Treatment: local excision

Fibrous dysplasia & Ground glass with ill defind margin

Ossifying fibroma

Radiolucent to radioopaque with Blend margin





Histopathology





FIBROUS DYSPLASIA

Monostotic F.D



Polystotic F.D & Jaffe-Lichtenstein syndrome & McCune-Albright syndrome



k polyostotic fibrous dysplasia: Involvement of two or more bones

- Solution State State
- McCune-Albright syndrome: Polyostotic fibrous dysplasia combined with *café au lait* pigmentation and multiple endocrinopathies, such as pituitary adenoma, or hyperthyroidism.



The age of the patients
Sites of involvement
Clinical behavior.
(1) trabecular (2) psammomatoid

Juvenile ossifying fibroma





Mostly occurs in the tooth-bearing areas of the jaws. Based on the clinical and radiographic features, it is separate into three groups:

⊾ focal ⊾ Periapical ⊾ florid.



Cemento-osseous dysplasia









Suggestive Reading

Brad W Neville, Douglas D Damm, Carl M. Allen, Jerry E Bonguot. Oral And Maxillofacial Pathology, 4th Edition, Elsevier, 2015

THANK YOU

Community

Dental Caries:

A progressive irreversible microbial disease affecting the hard parts of the tooth. It is the most prevalent chronic disease affecting the human race. Once it occurs, its manifestations persist throughout life even the lesion is treated. It usually begins soon after the teeth erupted into the oral cavity. So, it is a post eruptive disease. It affects persons both genders, all races, all ages, all socioeconomic groups. 1- Indices used for coronal caries.

A- Permanent teeth. Primary teeth. B-

د محد

2- Indices used for root caries .

*Permanent teeth index: Decayed-Missing-Filled Index (DMF) which was introduced by Klein, Palmer and Knutson in 1938 and modified by WHO:

1--DMF teeth index (DMFT) which measures the prevalence of dental caries/Teeth.

2- DMF surfaces index (DMFS) which measures the severity of dental caries .

The components are:

D component:

Used to describe (Decayed teeth) which include:

1. Carious tooth.

2. Filled tooth with recurrent decay.

- 3. Only the root are left.
- 4. Defect filling with caries.

- 5. Temporary filling.
- 6. Filled tooth surface with other surface decayed .
- M component:

Used to describe (Missing teeth due to caries) other cases should be excluded these are: 1. Tooth that extracted for reasons other than caries should be excluded, which include: a-Orthodontic treatment.

b-Impaction.

- c-Periodontal disease.
- 2. Unerupted teeth.
- 3. Congenitally missing.
- 4. Avalsion teeth due to trauma or accident .

F component:

Used to describe (Filled teeth due to caries). Teeth were considered filled without decay when one or more permanent restorations were present and there was no secondary (recurrent) caries or other area of the tooth with primary caries. A tooth with a crown placed because of previous decay was recorded in this category. Teeth stored for reason other than dental caries should be excluded, which include:

- 1. Trauma (fracture).
- 2. Hypoplasia (cosmatic purposes).
- 3. Bridge abutment (retention).
- 4. Seal a root canal due to trauma.
- 5. Fissure sealant.

Note :

1- A tooth is considered to be erupted when just the cusp tip of the occlusal surface or incisor edge is exposed. The excluded teeth in the DMF index are:

1- Supernumerary teeth.

2- The third molar according to Klein, Palmer and Knutson only .

2--Limitations - DMF index can be invalid in older adults or in children because index can overestimate caries record by cases other than dental caries .

Principle and rules in recoding:

1-DMFT:

- 1- A tooth may have several restorations but it counted as one tooth, F.
- 2- A tooth may have restoration on one surface and caries on the other, it should be counted as decayed D.
- 3- No tooth must be counted more than once, D M F or sound

2-DMFS Each tooth was recorded scored as 4 surfaces for anterior teeth and 5 surfaces for posterior teeth.

 $\hfill\square$ Retained root was recorded as 4 D for anterior teeth, 5 D for posterior teeth.

 $\hfill\square$ Missing tooth was recorded as 4 M for anterior teeth, 5 M for posterior teeth.

 $\hfill\square$ Tooth with crown was recorded as 4 F for anterior teeth, 5 F for posterior teeth .

```
Minimum score =
Maximum score:
Zero 1 - DMFT = 32
                                                    2 - DMFS = 12 *
4 + 20 * 5
          =48 + 100 = 148 or 128
*
        Primary teeth index :
1 - dmft / dmfs
                          Maximum scores: dmft = 20,
                                                               dmfs
= 88
 2- deft / defs, which was introduced by Gruebbel in 1944
  d- decayed tooth.
                                        e- decayed tooth indicated for
 extraction.
                                 f-filled tooth.
 3- dft / dfs
```

In which the missing teeth are ignored, because in children it is difficult to make sure whether the missing tooth was exfoliated or extracted due to caries or due to serial extraction

Mixed dentition:

Each child is given a separate index, one for permanent teeth and another for primary teeth. Information from the dental caries indices can be derived to show the:

Q- How could you differentiate between tooth missing due to caries and due to exfoliation?

1- By age of the patient if it is near to exfoliation time or not.

2- The shape of ridge is concave in carious missing tooth and straight in exfoliated one and permanent successor may be seen.

3- DMF/dmf index is higher in association with carious missing tooth especially adjacent and the contra lateral teeth.

4- Bad oral hygiene mainly associated with carious teeth .

Q- How could you differentiate between tooth missing due to caries and due to orthodontic treatment *?*

- 1- By type of teeth, in ortho. treatment most teeth should be extracted are 4,5/c, d while in carious missing teeth any teeth may be involved.
- 2- Bilateral and /or opposing missing generally associated with ortho. treatment, while in carious missing teeth it is not necessary.
- 3- DMF/dmf index is higher in association with carious missing tooth especially adjacent and the contra lateral teeth with bad oral hygiene mainly associated with carious teeth.
- 4- Crowding or appliance may be seen in ortho. treatment .

*Root Caries Index (RCI), which was introduced by Katz in 1979:

RCI is based on the requirement that gingival recession must occur before root surface lesions begin. Therefore, only teeth with gingival recession are examined.

1. All teeth are examined in both the lower and upper arch.

2. To obtain the RCI, each of the four surfaces the mesial, distal, buccal (labial), and lingual, of a root are examined for a single tooth. 3. When multiple types of root surfaces are exposed, the most severely affected root surface be recorded for that tooth .

The calculation of RCI:

(R-D) is no. of root surfaces with decay.

- (R-F) is no. of root surfaces which have permanent filling.
- (R-N) is the no. of sound root surfaces.

Book: Essential of Preventive and Community Dentistry

Epidemiological Studies

Epidemiology is the scientific method of studying the occurrence of diseases among groups of people and application of this study to control the health problem. Various methods can be used to carry out epidemiological investigation.

Classification of methods:

Observational studies:

1-Descriptive Epidemiological Studies.

They are represent the first phase of an epidemiological investigation. It involves observing the distribution of disease in human and identifying the associated characteristics of that particular.

Procedure steps in descriptive epidemiology:

1-Define the population to be studied. They can be whole sample of population or selected such as age or occupational groups.

2-Define the disease under study.

3-Describing the disease by time, place and person.

4-Measurement of disease. Morbidity of disease is measured by two aspects; incidence(is obtained from longitudinal studies) and prevalence (is obtained from cross sectional studies).

5-Comparing with known indices.

6-Formulation of etiological hypothesis

Measurement of the disease:

Cross sectional studies: these are surveys designed to identify the levels of condition and association risk at the same time. Science it measure the prevalence of disease also these studies called as(prevalence studies), although it is easy and rapid to under taken, but they are not able establish cause and effect, this method of investigation is much used in dentistry in regular survey of oral health.

a-Cross-sectional Studies

- Often used to study conditions that are relatively frequent with long duration of expression (nonfatal, chronic conditions)
- It measures prevalence, not incidence of disease
- Example: community surveys
- Not suitable for studying rare or highly fatal diseases or a disease with short duration of expression

Disadvantages

-Weakest observational design,

- (it measures prevalence, not incidence of disease). Prevalent cases are survivors

-The temporal sequence of exposure and effect may be difficult or impossible to determine

-Usually don't know when disease occurred

b-Longitudinal Studies:

These studies are conducted over a long period of time for calculating the incidence rate of the disease also useful for studying the natural history of the disease and its outcome. These studies are cross sectional studies done for a long duration by repeating periodically.

2-Analytic epidemiological studies:

They are next step of epidemiological study, that test hypothesis about disease causation and prevention. Two type of analytical study designs are commonly used:

a-Case control study

It is the first approach to test and search a causal hypothesis in the past, go back in time. This study involve two population case and control groups. It is a comparison study taking into consideration confounding factors like age, gender, occupation...etc. These studies effectively used in studies of medical serious condition like oral cancer, liver cirrhosis...etc. Many steps are followed in conducting this study:

1-Selection of case and controls. It is the first step to identify a suitable group of case and controls.

2-Matching. A comparison between cases and controls as they differ according to factors like age, social status....etc.

3-Measurement of exposure. The same methods should be used to obtain the information for both cases and controls to over come the bias or systemic error

4-Analysis of collected data.

b-Cohort studies:

This study also known as longitudinal studies, incidence studies and forward looking studies a people who have a higher exposure to the risk factor than normal or control are identified, however cohort mean that a group of people who share a common characteristic or experience within a defined time period E.g, occupation, age, pregnancy, exposure to drug or x-ray.

Usually case control study differ from cohort study as followed:
Case control study	Cohort study	
1-Start with disease	1-Start with people expose to risk	
	factor	
2-Involve few number of subjects	2-Involve large number of subjects	
3-Quick results	3-Delay results	
4-Suitable for study of rare disease	4- Suitable for study of common	
	disease	
5-Yield information about one	5-Yield information about more	
disease	one disease	
6-Relatively inexpensive	6-Expensive	

Experimental Epidemiology:

After a disease has been described and analyzed, various methods of intervening the disease are tried, this is done with experimental epidemiology. This aims to:

1-Provide scientific proof of etiological or risk factor to control of the disease.

2-Provide a method of measuring the effectiveness of health services for prevention, control and treatment.

These studies are classified as:

1-Randomized clinical trails: These are experimental and prospective. RCTs are based on the principle that two groups used are identical in all respects except in the subject of the simplest design, in simplest design subject are randomly divided to two groups (one group receives the test treatment and other placebo (no treatment). They are most useful in the evaluation of new materials.

Ideally to avoid the bias which may occur due to errors from assessment of the outcome, the study should be undertaken blind a-Single blind trail (in which the investigator should not know whether a subject is a member of test or control group).

b-Double blind trail (if the subject and investigator in ignorance of whether he/she is using a test product or placebo).

RCTs are often seen in trail that evaluate dental filling material.

2-Fielf trials:

These studies involve people who are disease free but presumed to be risk, data collection takes place in the field. Since the subject are disease free and the purpose is to prevent the occurrence of disease that may occur with relatively low frequency. Example: using preventive measure like vaccination against disease.

3-Community Trial:

In this study it is not possible to randomly allocated people to test and control groups however in this form of experimental the treatment groups are communities rather than individual. Limitation of such studies is that only a small number of communities can be included and random allocation of communities is not practicable. In this type of study the whole community is taken as the study group. Example fluoridation has be tried out for reducing dental caries. Communities in the neighborhood is taken as the control group for comparison.

Lec.8 Fluoride Mechanism and Effects

What are fluorides?

Fluoride ion comes from the element fluorine. It is negatively charged and will not remain as a free element. Fluoride has a high affinity for calcium. It is, therefore, very compatible with teeth and bone. Fluorine is 17th most abundant element in the earths crust. Never encountered in its free state in nature. Exits only in combination with other elements as a fluoride compound.

Source of Fluoride

1-Ground water: Rain water, sea water and river water

2-Atmosphere: fluoride containing soils and gas

3- Food: certain foods contain more F than others e.g. tea and sea foods.

4-Drugs and fluoride containing dental products. Dentifrices, Fluoride mouth rinse, Professional applied fluorides and Dietary fluoride supplements.

5-Pollution: in vicinity of industries involved in production of aluminum from cryolit and phosphate fertilizers.

Types of Fluoride Used in Dentistry

- A- Water fluoridation (Systemic fluoride)
- B- School Water fluoridation (Systemic fluoride)

- C- Self applied fluorides (Topical fluoride)
- D- Professionally applied fluoride(Topical fluoride)

A-Water Fluoridation

What is Fluoridation?

Fluoridation is the adjustment of the fluoride in drinking water to the optimal level for reducing tooth decay

"Fluoridation is the single most effective public health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults."

For colder climates where the mean annual maximum air temperature is lower than 10 degree celcius fluoride concentration in water as high 1.3 ppm must be considered safe and beneficial

Optimal fluoride concentration & climatic conditions.

In temperate regions - 1ppm.

Temp in degree Celsius	Recommended ppm
≤ 18.3	1.1 - 1.3
18.9 -26.6	0.8 - 1.0
≥ 26.7	0.5 -0.7



Advantage of water Fluoridation 1-Safe 2-Socially acceptable 3-Feasible 4-cost effective

B- School Water fluoridation

It is recommended only if the student are coming from the area which have low or no fluoride content. The recommended concentration for school water fluoridation is 4.5 ppm. Studies have shown approximately 40% reduction in dental caries due to school water fluoridation.

Why concentration of fluoride in school water 4.5 times than community?

1-children spend only a part of their total waking hours in schools.

2-They enter the school at 6 years of age. Thus the incisor are no longer at risk of dental fluorosis.

3-Only part of daily water intake is consumed.

B- Self applied fluorides: (Topical fluoride)

It is benefit in post eruptive phase

- Dentifrices.
- Fluoridated mouth rinse
- Fluoridated gel.

C- Professionally applied fluoride(Topical fluoride)

In the form of solution, gel foam, varnishes, prophylactic paste or pumice. Many types of fluoridated agent used, mainly:

-Sodium fluoride (NaF) -Stannous fluoride (Snf2) -Acidulated phosphate fluoride -Zirconium fluoride -Titanium fluoride -Amine fluoride

Choice depend on: -Current levels of fluoride intake -Caries status -Age of subject in the area

Mechanism of action

Three principal mechanisms by which fluoride is considered:

1- To inhibit dental caries have been identified.

2-It reduces the enamel solubility in acid by pre eruptive incorporation into the hydroxyapatite crystal.

3-It promotes remineralisation and inhibits demineralization of early carious lesions. It inhibits glycolysis, the process by which cariogenic bacteria metabolizes fermentable carbohydrates.

In general, fluoride has many effects in relation to caries reduction(anti-caries effect) these include:

- 1-Decrease solubility of enamel in acid by converting hydroxyapatite into less soluble fluoroapatite.
- 2- Enhance remineralization of enamel in areas that have been demineralized by acid.
- 3-Antibacterial action: Bactericidal in high concentration and bacteriostatic in low concentration. Fluoride affect oral bacteria and dental ecology. It inhibit bacterial adsorption and decrease acid production of plaque bacteria.
- 4- Improve tooth morphology making them more self cleansing.

Metabolism of fluoride

When fluoride is ingested, the absorption occurs mainly in the stomach. Fluoride concentration in the blood reach a peak after about 30 minutes, and returns to the usual level after 11-15 hours. About 99% is associated with calcified tissue (bone and teeth). Fluoride also can be absorbed following inhalation and through the skin. The main route of F excretion is via the kidney.

Dental Fluorosis

Hypomineralization of enamel results from excessive fluoride ingestion during tooth development.

Side effect of fluoride

- 1- Dental fluorosis
- 2- Reversible gastric disturbance
- 3- Skeletal fluorosis
- 4- Death

Concepts of disease transmission

1-Infection: is the multiplication of infections agent (micro-organsim) within the host

2-Invasion: is the process in which micro-organsim enter the host cell.

3-Virulence: is the ability of agent (m.o) to cause disease.

The acquisition means of pathogens

1-Direct contact: skin to skin or skin to mucous membranes

2-Indirect contact : droplet or body screation

3-Air born mechansims : Inhalation of pathogens

4-Vechle borne mechansims : contaminated food, water

5-Vectors: animals or insects

Transmission of infectious diseases

- 1- Transmission of infection from infected patients to dental health care workers.
- 2- Transmission of infection from infected workers to the general public.
- 3- Transmission of infection from infected patients to another.

The common infections condition

- 1-Viral hepatitis : hepatitis B and C
- 2-Herpes virus infection: herpes simplex virus.
- 3-Syphlis

4-Acquired Immune Deficiency Syndrome (AIDS): cause by human immunodeficiency virus (HIV)

5-Tuberculosis: caused by mycobacterium tuberculosis

Control of infectious disease

1-Personal barrier techniques:

a-Hand washing

There is no acceptable way to sterilize human hands. For this reason, all health care providers who come in direct contact with patient must wear disposable gloves when performing intraoral procedures.

The recommended hand washing procedure include

-Scrubbing of all surfaces of the nails, figures, hand and lower arms with soft sterile brush or disposable sponge and antimicrobial preparation.

-All jewelry must be removed. Care should be taken to avoid the over use of stiff bristle brush , which will cause abrasion and laceration to skin an nail area.

-Hand must be washed between the patient before gloving to reduce the skin microbial flora and prevent skin irritation by the waste products of bacterial growth under the gloves.

b-Gloves:

Gloves used for

1-Protect the dental team members from direct contact with patient microbes

2-Protect the patient from contact with microbes on the hands of dental team members.

Gloves should be:

-Change between patients and are not to be washed with detergent at any time.

-Punctured gloves should be removed as soon as possible

c-Masks :

- 1- Prevent spatter from patient mouth
- 2- Reduction in the inhalation of air born particles
- 3- Mask should be changed per hour or between each patient.
- 4- Mask should be properly disposed off after each use and not left hanging around the neck.

d-Eye wear :

-The eyes due to limited vascularity and lower immune abilities are susceptible to macroscopic and microscopic injury.

-Protective eye wear should be worn by all dental personnel involved in treatment in form of glasses to prevent trauma to the eye tissue from flying droplets.

- Dental personnel at risk from the herpes simplex virus and hepatitis B may develop after the initial contamination.

- Protective eye wear should be available to patients as well as the dental personnel. The supine position render the patient susceptible to failing object in the head and neck area.

-All Protective eye wear should be cleansed after every appointment. Eye wear should be washed with soap first, then rinsed with water and surface disinfectant can be used later.

e-Protective clothing:

- Protective clothing is the outer layer or covering of garments that would first be contacted by the contaminating droplets, generating sprays and splatter.

-The garment should be worn only in the dental environment and should be changed at the end of the treatment, also should be changed immediately if soaked or spattered with blood or other contaminants.

2- Immunization:

All dental health care workers should be Immunized by taken vaccine against the most prevalent infectious disease because the are at risk of infection.

3-Medical history of patient :

Complete screening of patient medical history must be taken.

4-Radiographic asepsis:

-For operator : A convenient way to prevent spread of contamination on film packs to use plastic disposable covers on packs before they are placed into patient mouth.

-For patient: using plastic barrier material on the portions of cone and tube head and on the exposure switch will reduce the cross contamination between patients.

5-Use of disposable instrument for patient:

Use of disposable items to prevent patient to patient contamination.

Numerous disposable items are available in dentistry which include: gloves, masks, gowns, surface covers, saliva ejector tip, air syringe tip, impression tray, fluoride gel tray and high speed handpices.

Sterilization of instruments

Instrument processing involves:

1-Cleaning:

Presoaking of contaminated instrument keeps them wet until thorough cleaning can occur. This procedure prevent blood and saliva from drying

on the instrument and facilitate cleaning of instrument which is achieved by:

-Hand scrubbing of contaminated instruments.

-Ultrasonic cleaning.(2-20mint) is needed to clean instrument ultrasonically.

2-Packing:

After cleaning instruments have been rinsed and dried they are to be packaged in functional sets before sterilization(caution must be exercised to ensure that the items are dry before sterilization to prevent corrosion). This packaging protect the instrument from becoming contaminated after sterilization.

3-Sterilization:

Sterilization : It is process of killing all microorganism using physical and chemical procedure.

Disinfection: It is process of killing most, but not all microorganism using physical and chemical procedure.

4-Drying, cooling, storage and distribution of instrument.

Forensic odontology is derived from Latin, meaning forum or where legal matters are discussed. Most forensic dentists are board certified and members of professional organizations, although it is possible to work in the field without special qualifications. Forensic dentistry relies on the detailed knowledge of the teeth and jaws possessed by a dentist. This skill incorporates an education in dental anatomy, radiographs and their interpretation, pathology, dental materials, and developmental anomalies.

Forensic identification plays a major role in man-made or natural disaster. Dental identification of humans occurs for a number of different reasons: 1. The bodies of victims of violent crimes, fires, and motor vehicle accidents, 2. Persons who have been deceased for some time prior to discovery, 3. Those found in water, can be disfigured to such an extent that identification through conventional methods are difficult.

In the case of forensic dentistry, experts (forensic dentists) can use dental records for: I. Identification of found human remains: It was done by using dental records. The principle of dental identification is that postmortem dental remains can be compared with antemortem dental records, including

 \Box written notes, \Box study casts, \Box radiographs, \Box photographs etc, to confirm identity.

Limitation: There are two types of discrepancy, those that can be explained and those that cannot. Explainable discrepancies normally relate to the time elapsed between the antemortem and postmortem records. Examples include teeth extracted or restorations placed were found in postmortem records only. If a discrepancy is unexplainable, for example a tooth is not present on the antemortem record but is present on the postmortem record then an exclusion must be made. If there is no antemortem dental records, a postmortem dental profile will typically provide information on the victim's

1-Age:

 \Box In children: The patterns of tooth eruption, the root length, tooth wear were assessed.

□ In young adults: The third molar development.

 \Box In middle-aged and older adults: Periodontal disease progression, excessive wear, multiple restorations, extractions, bone pathosis and complex restorative work were assessed. Recently, dentine composition and cementum deposition were examined in relation to age determination.

2-Race can be assessed from skull shape and form. Additional characteristics, such as cusps of Carabelli, shovel-shaped incisors and multi-cusped premolars.

3-Gender can be assessed from

 $\hfill\square$ Skull shape and form, (no gender differences regarding teeth morphology).

 \Box Presence or absence of Y-chromatin in teeth.

□ DNA analysis. □ Mandibular canines size

4- Socio-economic status can be assessed through the quality, quantity and presence or absence of dental treatment.

5-Occupation, dietary habits and dental or systemic diseases. The presence of erosion can suggest alcohol or an eating disorder while stains can indicate smoking, tetracycline. Unusual wear patterns may result from pipe stems, cigarette holders.

II. Identification the suspect through the assessment of bite mark injuries in cases of abuse in (child, spousal, elder) and in women during sexual attacks. Bite marks can be found on:

 \Box the victim (by the attacker),

 \Box the attacker (suspect) when a victim attempts to defend himself,

 \Box an object found at the crime scene.

The first published issue based on bite marks, was depend on a piece of cheese found at the crime scene.

Typical presentation of bitemark injuries

Human bitemarks may be found on almost all parts of the human body skin. In defensive circumstances, the arms and hands are often bitten. A representative human bite is described as an elliptical or circular injury that records the specific characteristics of the teeth. Alternatively, it may be composed of two U-shaped arches that are separated at their bases by an open space. The injuries caused by teeth can range from bruises to scrapes and cuts or lacerations.

It is possible to identify specific types of teeth by their class characteristics. For example, incisors produce rectangular injuries and canines produce triangular injuries. Other characteristics include fractures, rotations, attritional wear, congenital malformations, etc. When these are recorded in the injury it may be possible to compare them to identify the specific teeth (person) that caused the injury.

Evidence collection from the bite victim

Dentists should be familiar with the general principles of evidence collection. These are:

1. Documentation

Make a descriptive record of the injury, including the physical appearance, colour, size and orientation of the injury, location on

the body, relative contour and elasticity of the site, and types of injuries.

2. Photographs

Take photographs, both colour and black-and-white films. A reference scale (ruler) should be placed in the same plane as the injury and visible in the photographs to enable subsequent measurements.

3. Saliva swab

a. Saliva will have been deposited on the skin during biting and this should be collected and analyzed.

b. A buccal swab or a sample of whole blood must be collected from the victim at this time to assess the victim's DNA. This will enable analysis of any mixtures that are found in the sample from the bite.

4-Impression

Fabricate an impression of the bitten surface to record any irregularities produced by the teeth.

Evidence collection from the bite suspect

The following evidence are recovered during examination of the bitemark suspect:

1. Clinical examination

The extra and intra-oral structures are examined and are noted on a dental chart. Special attention is focused on the status of the dental health, occlusion and mandibular articulation, tooth mobility, periodontal pocketing, dental restorations, diastemata, fractures, caries, etc., and the function of masticatory muscles.

- 2. Photographs Full facial and profile photographs are produced in addition to frontal and lateral views of the teeth in occlusion.
- 3. Impressions It is necessary to produce extremely accurate study casts of the teeth that record all characteristics of the dentition.

4. Bite sample

A sample of the suspect's bite is recorded in centric occlusion using a wax.

5. Salivary sample Saliva is also taken for DNA testing.

Forensic physical and biological techniques for comparison The most common methods to determine if the suspect's teeth caused the bitemark include techniques to compare:

 \square the suspect's study casts with the actual or photographs of the bitemark,

 \Box the suspect's teeth pattern of dental cast using tracing with photographs of the bitemark,

 \Box the suspect's test bites with the actual bitemark.

The conclusions are often based on the expert's level of personal experience.

Factors that may affect the accuracy of bite mark identification include:

- 1. Time-dependent changes of the bite mark on living bodies,
- 2. Effects of where the bite mark was found,
- 3. Damage on soft tissue,
- 4. Similarities in dentition among individuals,
- 5. Poor in techniques, exa. photography, impressions.

Also dental profiles of the suspect are subject to change by time, for example

- 1. Loss of teeth.
- 2. Teeth attack by dental caries.

So, the suspect's DNA profile obtained from saliva or blood with salivary DNA surrounding the bitemark area proves to be a more reliable form of identification. Finally..... Dentist not only improves health by doing treatment in private clinic or preventive program in a community, but also play a major role in justice achievement.

Community Dentistry

Lec . 1

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Dental public health

public health: is the health of people (Efforts organized by society to protect, enhance and promote the health of the population).

Dental public health: The Science and practice of preventing oral diseases, promoting oral health and improving quality of life through the organized efforts of society.

Dental public health: Is the science & art of preventing & controlling dental diseases and promoting dental health through organized community.

It is that form of dental practice which serves a community as the patient rather than the individual.

Dental Public Health Concerns

- Dental health education and motivation of the public
- Applied dental research(conducting field programs and research activities for dental students, dental professional)
- Administration of programs(promotion oral health programs as school dental health program)
- Prevention & control of dental diseases on a community basis (preventive measures such as water fluoridation)

Factors Affecting Dental Health

Access to Care

- 1- Restriction of dental hygiene services
- 2- Shortage of Medicaid providers
- **3-** Financial Situations
- 4-Transportation

Government Role

- Research
- Disease Prevention
- Disease Control
- Program Planning and Operation
- Funding for the Education of Dental Professionals
- Regulation

Dental public health tools:

- 1- Epidemiology: study distribution and determinant of health related events in population. It is a branch of medical science dealing with epidemic.
- 2- Biostatistics: It is of statistic (the science of compiling, classifying and tabulating numerical data and expressing the results in a mathematical or graphical form. Biostatistics is concerned with mathematical fact and data related to the biological events.
- 3- Social Science : usually include sociology, culture anthropology and psychology.
- 4- Principle of administration: In public health program the dentist with a leadership role needs to know many of principles:
 a-Organization
 b-Management
- 5- Preventive Dentistry: It is procedure employed in the practice of dentistry and community dental health programs to prevent oral disease and abnormalities. Including three levels of prevention:
 - a- Primary prevention: (pre pathogenic stage) prevent the occurrence of the disease(health education, water fluoridation, immunization)
 - b- Secondary Prevention early pathogenic stage) prevent the prognosis and recurrence of disease by diagnosis and treatment of it.
 - c- Tertiary Prevention: (pathogenic stage) restore the function, esthetic

Procedural steps in dental public health

1. Survey

- 2. Analysis
- 3. Programme planning
- 4. Programme operation
- 5. Financing
- 6. Programme appraisal

1. Survey

- based on chief complaint of the population

- surveys are methods for collection of data, analysing and evaluating them in order to determine the amount of disease problems in a community

- parameters included in survey :

- \rightarrow assessment of socioecoomic status of community
- \rightarrow nature of distribution of community
- \rightarrow resources available for elimination of problem
- \rightarrow attitudes of community towards health providers

2. Analysis

- to define characteristics of specific health problems in the community

- electronic data processing medias such as computers are resorted for analyzing data

3. Programme planning

- designed programme should be accepted by the community and the people should show an interest in it.

- it has to be ensured that the community is well informed about the programme and that they participate in all steps involved

4. Programme operation

- a public health team constituting professionals in various disciples

- employed for excecuting the programme

- eg : water fluoridation in a community with higher prevalence of dental caries

5. Financing

- through funds provided by the governments / by local or state authorities

- public health personnel

 \rightarrow identify source for securing funds

 \rightarrow plan for the management of same

6. Programme appraisal

- effectiveness of programme is assessed

- dimensions : efficiency

appropriateness

adequacy

possible side effects

SIMILARITIES BETWEEN PERSONAL AND COMMUNITY HEALTH CARE

PATIENT

- 1. Examination
- 2. Diagnosis
- 3. Treatment planning
- 4. Treatment
- 5. Payment for service
- 6. Evaluation

COMMUNITY

- 1. Survey
- 2. Analysis
- 3. Programme planning
- 4. Programme operation
- 5. Finance
- 6. Approval

DIFFERENCES BETWEEN PRIVATE DENTAL PRACTICE AND PUBLIC HEALTH DENTISTRY

Characteristic	Private Dental Practice	Public Health Dentistry
Target	Individual patient	community or group of individuals
Collection of information	History taking and oral clinical examination	Analysis of available health and morbidity records
Special investigations	Diagnosis	Situational analysis of oral health status and needs and utilization of services
Requirements for success	Patient's consent and co- operation	Community Participation
Service provider	Dentist alone, sometimes with an assistant	Health team professionals and para professionals, community volunteers
Evaluation & Results	Relief of symptoms and restoration of function	Formal programme evaluation
Funding	Generally by the patient	Generally by Government or Local authorities

Community Dentistry

Dental Indices

Index: A numerical value describing the relative status of a population on a graduated scale with definite upper and lower limits, which is designed to permit and facilitate comparison with other populations classified by the same criteria and methods.

Objectives:

1. To define the specific problem under investigation.

2. To discover populations at high and low risk.

3. To increase understanding of the disease process, leading to methods of control and prevention .

Ideal properties of an index:

Ideally, an index should possess the following properties:

1- Clarity

-The examiner should be able to carry out the index rules in his mind.

Simplicity

-The index should be easily to apply, so there is no undue time lost during examination.

Objectivity

-The index criteria should be clear and unambiguous.

2- Validity:

The index should be measure what it is intended to measure. So it should be correspond with clinical stages of the disease, ex. number of missing teeth in adults is not a valid measure of caries activity.

3- Reliability:

The index should measure consistently at different times and under a variety of conditions, by the same person or different persons.

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4- Quantifiability:

The index should be amenable to statistical analysis. So that the status of a group can be expressed by a number that corresponds to a relative position on a scale from zero to the upper limit.

5- Sensitivity:

The index should be able to detect reasonably small shifts, in either direction in the group condition.

6- Acceptability:

The use of the index should not be painful or demeaning to the subject.

Classification of indices:

Which is based upon the:

A- Direction in which their scores can fluctuate:

1. Irreversible index DMF Index that measures conditions will not return to the normal state. Once established cannot decrease in value on subsequent examinations.

2. Reversible index GI Index that measures conditions that can be return to the normal state. Reversible index scores can decrease or increase in value on subsequent examinations.

3. Composite index PDI Index that measures conditions that can be return to the normal state and conditions will not return to the normal state.

B- The extent to which areas of oral cavity are measured:

1. Full mouth index Dean's Fluorosis Index

These indices measure the patient's entire dentition.

2. Simplified index CSI

These index measure only a representative sample of teeth.

C- The entity which they measure:

- 1. Disease index D M F
- 2. Treatment index D M F
- 3. Symptom index PBI

D- The special categories:

1. Simple index CSI

Index that measures the presence or absence of condition.

2. Cumulative index D MF

Index that measures all the evidence of a condition, past and present.

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Biostatistics

Statistic: It is a method of describing, summarizing or displaying a set of data.

Biostatistics: is the branch of statistic responsible for the proper interpretation of scientific data generated in clinical medicine, biology, public health and other health sciences.

Types of data

Depending on the nature of the variable, data is classified into two categories:

1) Qualitative data: when the data is collected on the basis of attributes or qualities like gender, malocclusion, cavity types etc., it is called qualitative data.

2) Quantitative data: when the data is collected through measurement using calipers, like arch length, arch width, fluoride concentration in water supply etc., it is called quantitative data.

Methods of data collection:

(a) Direct personal interview

In this method, there is a face-to-face contact with the persons from whom the information is to be obtained. This method enabled to measure subjective phenomena such as the oral health status, the opinions, beliefs and attitudes and some behavioral characteristics. The advantage of this method is that all information can be collected accurately and any ambiguity can be clarified .

(b) Oral health examination

When information is needed on the oral diseases, this method provides more valid information than health interviews. It is conducted by dentists, technicians, and the investigators .

(c) Questionnaire

In this method, a list of the questions relating to the survey – known as questionnaire-is prepared. This method is easy to adopt when a wide geographic area is to be covered. It is relatively cheap and fast. The questions should be short, easy to understand. There should be no ambiguity while answering the questions. As far as possible, the questions should be close-ended i.e., objectivemultiple choice questions.

Sample

The word sample means the group of individuals who are actually available for the investigation. The actual sample selection can be accomplished in two basic ways:

(1) Purposive selection

Is easy to carry out and does not need the preparation of sampling frame. For instance, in a study on oral cancer in man, 30 representative patients may be picked, examined and assessed for this disease .

(2) Random selection

A sample in which each individual in the population has an equal chance of appearing is a random sample. Random, here, does not mean haphazard, but it indicates the chance of the population unit being selected in the sample. So, it is also called probability sampling.

Sampling designs:

Different sampling designs are available depending on the type and nature of the population and the objectives of the investigation. Some designs commonly used are:

- a) Simple random sampling
- b) Systematic random sampling
- c) Stratified random sampling
- d) Cluster sampling
- e) Multiphase sampling
- f) Pathfinder surveys
- a) Simple random sampling:

This is a sampling technique in which each and every unit in the population has an equal chance of being included in the sample. In this method, the selection of the unit is determined by chance only. To ensure randomness a very popular method is used. To draw a sample of 10 from a population of 100 :

1. First give serial numbers to all the units in the population.

2. The population units are numbered on separate slips of paper of identical size and shape.

3. These slips are then shuffled

4. A blindfold selection of the number of slips is made to constitute the desired sample size.

This method assures randomness and eliminates personal bias.

b) Systematic random sampling:

A systematic sample is formed by selecting one unit at random and then selecting additional units at evenly spaced interval till the sample size has been formed. For example, suppose there are 215 patients in a clinic and it is decided to select a sample of size 20. From the numbers 1 to 10, suppose the number 2 is selected at random. The next unit will be, for example, 10 which is the interval, so the serial numbers of the sample units will be 2, 12, 22, 32, and 42, and so on till 20 numbers. This method can be adopted as long as there is no periodicity of occurrence of any particular event in the population.

Stratified random sampling:

The population to be sampled is subdivided into groups known as strata. Then a simple random sample is then chosen from each stratum. For example, if it is decided to know the prevalence of caries in different age groups, then the age groups form the strata and a random sample is to be chosen from each stratum.

d) Cluster sampling:

This method is used when the population forms natural groups or clusters, such as, villages, children of school etc. Here, first a sample of the clusters is selected and then all the units in each of the selected clusters are surveyed . e) Multiphase sampling:

In this method, a part of the information is collected from the whole sample and a part from the sub-sample. For example, in a school health survey, all the children in the school may be examined. From these, only the ones with tooth fracture may be selected in the second phase. A section needing treatment may be selected in the third phase. Number in the sub-samples in the 3rd and 4th phase (need recall) becomes smaller and smaller.

f) Pathfinder surveys:

Sometimes, there is a need to sample a specified proportion of the population, say 1%, in order to estimate disease prevalence accurately. Sampling methodology to be defined called "pathfinder" methodology. The method used is a stratified cluster sampling technique, which includes the most important population subgroups likely to have differing disease levels and to cover a standard number of subjects in specific index age group in any one location.

Sample size

The sample size has to be decided before selection of the sample. Bigger the sample, higher will be the precision of the estimates of the sample. In fact, it may do the opposite, if the quality of the measurement or data collection is adversely affected by the large size of the study. It is better to ensure that the sample is representative, rather than being very large.

Errors in sampling

There are two types of errors that arise in sampling investigation :

1-The sampling errors which occur due to the sampling process, including:

- (i) Faulty sampling design.
- (ii) Small size of the sample .
- 2- The non-sampling errors arise due to:
- a) Coverage error due to
- \Box non-response of the informant.
- \Box non-cooperation of the informant.
- b) Observational error due to
- \Box interviewers bias
- □ imperfect experimental technique
- $\hfill\square$ interaction of both \hfill .
- c) Processing error due to errors in statistical analysis.

Lec:10 Measure of central tendency

For overall comparison of the distributions, the entire mass of data may be summarized using a single value which is known as the parameter and one such parameter is the measure of central tendency.

The main objective of measure of central tendency is:

- (a) To condense the entire mass of data.
- (b) To facilitate comparison.

The most common measures of central tendency are:

a) Arithmetic mean – mathematical estimate.

b) Median – positional estimate.

c) Mode – based on frequency.

a) Arithmetic mean: It is the simplest measure of central tendency. Which is calculated as follows:

$$\overline{X} - \frac{X_i}{N}$$

Where, Σ , sigma, means the sum of, X_i is the value of each observation in the data, n is the number of observations in the data.

For example: The number of decayed teeth among 10 children aged 5 years are: 2, 7, 3, 11, 4, 6, 5, 9, 0, 1.

So, the mean number of decayed teeth is: 48/10 = 4.8 teeth.

Thus, it is seen that mean is based on all the items in the series. But, this measure is highly influenced by extreme values. For example, if the number of decayed teeth in 5 children are: 2, 3, 1, 2, 1. Then, mean = (2+3+1+2+1)/5= 1.8.

If we change only one value, the mean of decayed teeth increased considerably (2+3+1+2+9)/5 = 3.4. So, in such cases, it is better to use median.

b) Median: The median is the middle value in a distribution such that one half of the units in the distribution have a value smaller than or equal to the median and one half has a value higher than or equal to the median.

To calculate the median, all the observations are arranged in the order of their magnitude and then the middle value of the observations is selected as the median. When the number of observations is odd the value will correspond to a
single value and, when the number of observations is even, the mean of the two middle values may be taken as the median.

For example...1, 2, 3, 3, 4, 6, 7, 8, 8, and 13. The median = (4+6)/2 = 5.

c) Mode: The mode value is that value in a series of observations that occurs with the greatest frequency. For example, the mode of these data (6, 6, 5, 7, 8, 6, 7, 5) would be 6 since it occurs more than any of the others. There can be more than one mode for a series.

Measures of dispersion

In the previous section, we have seen that the measures of central tendency give us a single value that represents the entire data. But this does not adequately describe the data and it is necessary to know how widely the observations are spread on either side of the average. Dispersion is the degree of spread of the variable about a central value. The most common measures of dispersion used in dental science are:

1. Range.

2. Standard deviation.

3. Variance.

1.Range:

It is the simplest method, defined as the difference between the value of the smallest item and the value of the largest item. This measure gives no information about the values that lie between the extreme values. This measure is simple to calculate.

For example: 3, 5, 5, 6, 7, 2, 1, 1, 8 range = 8 - 1 = 7.

2. Standard deviation:

It is the most important and widely used measure of dispersion. It is a summary measure of the differences of each observation from the mean of all the observations. If the differences themselves were added up, the positive would exactly balance the negative and so their sum would be zero. A large

standard deviation indicates a wide dispersion around the mean and it is the heterogeneous group.

Computation of Standard Deviation:

$$SD - \sqrt{\frac{-2d}{N}}$$

Ex, a sample of 4 children

No. of decayed teeth		
$\mathbf{X}_{\mathbf{i}}$	$X_i - X = d$	d^2
2	2-3.5 = -1.5	2.25
4	4-3.5 = 0.5	0.25
0	0-3.5 = -3.5	12.25
8	8-3.5 = 4.5	20.25
$\Sigma X_i = 14$	ļ	$\Sigma d^2 = 35$

Mean X = 14/4 = 3.5

$$SD = \frac{35}{\sqrt{4} - 1})11.66 - 3.41$$

3. Variance

The variance is the measure of the average deviation of scores around the mean. The variance is based on each score in the distribution. It is possible to have zero variance. Variance is simply the square of the standard deviation. Higher the variance greater is the variation in the series of data.

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Lec:11 Presentation of data

There are two main method of presenting data:

a) Tabulation

A most common way of presenting data in the tables is known as frequency distribution table. Frequency is the no. of units belonging to group of the variable. The variable characteristics such as age has a range from lowest to highest, the age for example ranges between 4------12. This range is divided into subgroups called classes (4 - 6, 7 - 9, 10 - 12). The class limits are the lowest and highest values that can be included in the class. The difference between the upper and lower limit of a class is known as class interval.

Age	Gender		
subgroups	Males	Females	Both
4 - 6	16	18	34
7 - 9	15	16	31
10-12	21	14	35

b)Diagrams

By arranging data into tables, we simplify the entire mass of data. But sometimes it is difficult to understand and compare two or more tables. Diagrams and graphs are extremely useful because they are attractive to the

eyes, give a bird's eye view of the entire data, have a lasting impression on the mind of the layman and they facilitate comparison of data.

Types of diagrams:

Depending on the nature of data, any one of the following diagrams may be chosen.

a) Bar Diagram: This diagram is used to represent qualitative data. It represents only one variable. For example, the number of people with dental caries in a particular age group may be shown by a bar diagram. The width of the bar remains the same and only the length varies according to the frequency in each category. The bars can be either vertical or horizontal.





Se...

Fig:1 Prevalenceof dental caries

b) Multiple Bar: This diagram is used to compare qualitative data with respect to a single variable, like sex. This diagram is similar to the bar diagram except that for each category of the variable we have a set of bars of the same width corresponding to the different sections without any gap in between the width and the length corresponds to the frequency.



c) **Proportional Bar Diagram:** This diagram is used to represent qualitative data. When it is desired to compare only the proportion of sub-groups between different major groups of observations, then bars are drawn for each group with the same length, either as 1 or 100%. These are then divided according to the sub-group proportion in each major group.



d) **Pie Diagram:** These are popularly used to show percentage breakdowns for qualitative data. It is so called because the entire graph looks like a pie and its components represent slices cut from a pie. A circle is divided into different

sectors corresponding to the frequencies of the variables in the distribution. The total at the centre of a circle is equal to 360° and it represents the total frequency. However, this diagram cannot be used to represent two or more data sets.



Illustration.5 Grading of malocclusion

e) **Histogram:** This diagram is used to represent quantitative data of continuous type. A histogram is a bar diagram without gap between the bars. It represents a frequency distribution.



f) Line Diagram: This diagram is useful to study changes of values in the variable over time and is the simplest type of diagram. On the X-axis, the time such as hours, days, weeks, months, years are represented and value of any quantity data is represented along the Y-axis.



i) Cartograms or Spot Map: these maps are used to show geographical distribution of frequencies of a characteristic. The coverage of geographic area through dental clinics may be represented through this diagram and dot or point may be used to indicate one such camp for that area.

2.5



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Lec. 15 Environment and Health کد.ے

Environment: can be defined as the sum total of all conditions and influences that effect the development and life of an organism.

It comprises of the:

1-Physical environment: it is applied to non living things and physical factors(e.g. air, water, soil, climate.....etc)

2- Biological environment: it is the universe of living things which surrounds man including man himself.

3- psychological environment: it is includes a complex psychological factors which are defined as those factors affecting personal health, health care and community well-being that stem from psychosocial make up of individual and the function of social groups (e.g. culture, habit, religion, occupation and income).

Pollution:

It is distinct from contamination and implies the presence of offensive but not necessarily infectious in the environment.

The activities under environment health include:

- 1- Control of air pollution, radiation and noise.
- 2- Accident prevention.
- 3- Public recreation.
- 4- Solid waste management.
- 5- Food hygiene and sanitation measures at times of epidemics, disasters, emergencies and migration.

Environment indicators:

A- Air pollution:

It is important physical factors causes mechanical and irritation of the respiratory passage and lungs. Pure air is never found the foreign substance are always present in air at all times and at all place.

Toxic and irritant gases and fumes:

1-carbon monoxide and carbon dioxide

2-Nitrogen dioxide

3-Sulfur dioxide

4-Hydrogen sulfide

5-Amonia

6-Ozone

Sources of air pollution;

1-Industrial

2-Combstion of coal and oil

3-Motor vehicles (more in urban area)

4-Miscellaneous.

Effect of air pollution:

1-The immediate effect: allergy, acute bronchitis.

2- The delayed effect: chronic bronchitis, lung cancer

3- It dose not affect the oro-dental disease, but indirectly it effect the development of joints and nasopharyngeal complex, thereby affecting the oro-dontal structure.

Prevention and control of air pollution

- 1- Dilution and ventilation : (green belts around industrial zones) reduce air pollution
- 2- Prevention of escape substances.
- 3- Converting coal based industrial to electricity based.
- 4- Legislation smoke nuisance act (to improve quality of air and to prevent and control air pollution).
- 5- International action: WHO has establish in international network of many centers and laboratories in various part of the world for monitoring and study of air pollution.

B- Radiation:

-Radiation is part of man environment. It is transmission of energy through space.

-Ionizing radiation is applied to radiation which has the ability to penetrate tissues and deposit its energy within them.

Effect of radiation on oral tissues:

1-Mucositis: secondary infection by candida albican.

2-Taste bud: taste acuity decrease during course of radiation.

3- Salivary glands: reduced salivary flow lead to dry mouth which cause difficulty in swallowing

4-Teeth: tooth bud may be destroyed and lead to severely retarded development of teeth.

5-Bone: bone infection and necrosis may occur following irradiation (osteoradionecrosis).

Protection from radiation:

1-Un necessary x-ray exposure should be avoided especially in children and pregnant women.

2-Lead aprons and thyroid collars will reduce the intensity of scattered x-ray.

3-Film badge should be used by all workers.

4-Safe distance from x-ray machine.

C- Water Pollution:

The main cause of problems health in the underdeveloped or developing countries is lack of safe drinking water. If water contains infective and parasitic agent, poisonous chemical substances it is called polluted or contaminated water.

Hazard of water pollution may be classified in two groups:

1-Biological hazards: characterize by the presence of infective agent like viral, bacteria

2-Chemical hazards: characterize by the presence of chemical substance like cyanides, heavy metal, mineral, organic acid nitrogenous, sulphide and ammonia.

Purification of water:

- 1- Storage: water should not be stored for more than 14 days.
- 2- Filtration: about 99% of Bactria, ova and cyst are removed by this process
- 3- Chlorination: it is done along with filtration, chlorine kills pathogen bacteria but it has no effect on viruses.

D-Noise Pollution

Noise is defined as un wanted sound in the wrong place at the wrong time.

Effect of noise:

- 1- Auditory effect: fatigue and deafness (Temporary or Permanent)
- 2- Non auditory effect:
 - Interference with speech
 - Noise can greatly affect efficiency
 - Annoyance (psychological response)
 - Physical change:
 - 1-incrase blood pressure
 - 2-increase intracranial pressure
 - 3-incease heart rate and breathing
 - 4-increase tension
 - 5-interfer with sleep

Noise control:

- 1- Control of noise at source: by application of noise reducers to machines
- 2- Control of transmission: by covering the room walls with sound absorbing materials.
- 3- Protection of exposed persons: hearing protection is recommended for all workers exposed to noise like use ear plugs or ear muffs
- 4- Legislation and education.

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Community Dentistry

Lec . 2

Epidemiology

- Epidemiology
- Epi = upon
- $\blacksquare Demos = people$
- $\blacksquare Ology = science$
- Epidemiology = the science which deals with what falls upon people.....
- Bridge between biomedical, social and behavioral sciences

Epidemiology: is the study of distribution and determinant of health related state or event in a specified human population and the application of this study to the control of health problem.

- Epidemiology is the study of the determinants, distribution, and frequency of disease.
- Who gets disease and why
- Epidemiologists study sick and well people to determine the crucial difference between those who get disease and those who are spared

Uses of Epidemiology

1-To study the etiology of diseases or conditions, disorders, disabilities, etc.

2-determine the certain causative factors

3-determine the characteristics of the agent or causative factors

4-define the mode of transmission

5- determine contributing factors

6-To aid in the planning and development of health services and programs.

Purpose of Epidemiology

- 1. To investigate nature of health-related problems in the community
- To study natural history and prognosis of health-related problems
 To identify causes and risk factors
- 4. To provide foundation for public policy

Basic Triad of Descriptive Epidemiology

The Three Essential Characteristics of disease we look for in descriptive epidemiology are:

- Person
- Place
- Time

Personal Characteristics (whom)

- Age
- Gender
- Socio-economic status (education, occupation, income)
- Marital status
- Ethnicity/race/genetic profile
- Behavior / habits

Place (where ?)

- Geographically restricted or widespread (outbreak, epidemic, pandemic)? Off-shore (tsunami...)
- Climate effects (temperature, humidity, combined effects..)
- Urban / sub-urban-squatter / rural
- Relation to environmental exposure (water, food supply, etc)
- Multiple clusters or one

Time (when ?)

- Changing or stable?
- Clustered (epidemic) or evenly distributed (endemic)?

Epidemiology measurements:

Morbidity : is the term used to describe the percentage of a population which is suffering from a disease at a given point in time.

The principle measurements of Morbidity used in epidemiology are **incidence** and **prevalence**

Incidence rate : the number of new cases occurring in a defined population during a specific period of time.

An example of incidence:

• The number of new cases of arthritis in Australia in the year 2010

This can be calculated from the following formula:

Incidence = No. of individuals experiencing a new event during a time period/No. of all individual

Example

The 510 children who did not have tuberculosis on 15th April, 1994 were re-examined for the presence or absence of disease after three months, 12 of them had developed the disease. The incidence of tuberculosis during the three months can be calculated as follows: Incidence of tuberculosis = 12=0.0235 or 2.35% Over three months period 510 or 23.5 per thousand.

Uses of Incidence rate:

- 1- To control disease.
- 2- For research in to etiology, pathogenesis and distribution of disease and efficacy of preventive and therapeutic measure.

Prevalence : Number of people in a defined population who have a specified outcome (eg: disease) at a point in time.

Example of prevalence:

Proportion of people with lung cancer in Australia Proportion of people with arthritis in Australia

This can be calculated from the following formula: Point Prevalence (or) Prevalence = Total No. of persons with attribute at a given time/ Total population at risk at the same time

Example

On 15th April, 1994 all the 530 children enrolled in a school were examined for tuberculosis, 20 of them were found to have disease at the time of examination. Prevalence (of tuberculosis in school children on 15th April, 1994)= 20/530 = .038 or 3.8 percent or 38 per thousand.

Uses of prevalence rate:

1-To estimate the magnitude and health/disease problems in community and identify potential high risk population.

2-For administrative and planning purposes.

Mortality: is the number of death per 1000 population per year in given community

Tools Measurement of epidemiology 1-Counts

Refers to the number of cases of a disease or other health phenomenon being studied

i.e. Number of cases of influenza in Astana in January 2012

Ne	w Cases		
Location	of Disease	Year	Population
City A	20	2008	100
City B	100	2008	1000
Annual Rate of Occurrence			
City A:	20 / 100	=	1 / 5
City B:	100 / 1000	=	1/10

2-Proportions:

• Persons included in the numerator are <u>always included</u> in the denominator:

A Proportion: ------A + B

Proportions - Example

А	В	Total(A+B)
Person with hypertension	Without hypertension	Total study population
1400	9650	11050

P = A / (A + B) = (1,400 / 11,050) = 0.127

3-Ratios:

- Like a proportion, is a fraction, BUT <u>without</u> a specified relationship between the numerator and denominator
- Example: Occurrence of Major Depression

Female cases = 240240-----=----Male cases = 120120

4-Rate:

Measure of some particular event (development of disease) in population during a given time period. E.g. death rate is calculated as

```
Death rate = Number of event (death or disease) in specific period x = 1000
population
```

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Epidemiology of Oral diseases

1-Denata caries:

Dental caries is defined as a progressive irreversible microbial disease affecting the hard parts of tooth exposed to the oral environment, resulting in demineralization of the inorganic constituents and dissolution of the organic constituent, thereby leading to a cavity formation.

The relationship between diet and dental caries Bacterial enzymes + fermentable carbohydrates = acid Acid + enamel = dental caries

Current Trends in Caries Incidence

-In developed countries, caries prevalence declined in last decade, causes are multifactorial. Eg: communal water fluoridation.

- In developing countries increase in caries prevalence, cause is increased use of refined carbohydrates.

CARIES SUSCEPTIBILITY OF INDIVIDUAL TEETH

•	Upper and lower first molar	→ 95%
•	Upper and lower second molar	→ 75%
•	Upper second bicuspid	→ 45%
•	Upper first bicuspid	→ 35%
•	Lower second bicuspid	→ 35%
•	Upper central and lateral incisor	→ 30%
•	Upper cuspids and lower first bicuspid	→ 10%
•	Lower central and lateral incisor	→ 3%
•	Lower cuspids	→ 3%
•	Teeth farthest back in the mouth are mo	re frequently carious.
٠	Caries susceptibility of individual tooth	surface

occlusal > mesial > buccal > lingual

Lec. 3

Etiologic factors in dental caries

• Dental caries is a multifactorial disease in which there is an interplay of 3 principle factors.

I. The host (teeth, saliva etc.)

II. Micro flora

III. Substrate (diet)

• In addition the fourth factor, time must be considered.



I. HOST FACTORS

Tooth

- Composition
- Morphologic characteristics
- Position

Composition of tooth

Enamel:-

- Inorganic : 96%
- Organic + water : 4%

Dentin:-

- Organic matter +water :35%
- Inorganic :65%

Cementum:-

- Inorganic : 45-50%
- Organic +water : 50- 55%

Morphological characteristics of the tooth

• Feature predisposed to the development of dental caries is presence of deep narrow occlusal fissure/ buccal and lingual pits

Tooth position

• Which are malaligned, out of position, rotated or otherwise not normally situated, may be difficult to clean and tend to favor the accumulation of food and debris which subsequently lead to dental caries

Saliva

- Composition
- PH
- Quantity
- Viscosity
- Antibacterial factors

Composition of saliva

Inorganic:-

Positive ions:- Ca, Mg, K,

Negative ions:- CO2, Cl, F, PO4, thiocynate

Organic:-

Carbohydrates : glucose

Lipids : cholesterol, lecithin

Nitrogen : non- protein \rightarrow ammonia, nitrites & amino acids

protein \rightarrow globulin, mucin, total protein

Miscellaneous : peroxides

Enzymes : carbohydrases, proteases, oxidases

PH of saliva

- Determined by bicarbonate concentration
- PH increases with flow rate, normal PH 7.8
- Sialin is an argenine peptide described PH rise factor, present in saliva

Quantity of saliva

- Normal quantity 700-800 ml per day
- In case of salivary gland aplasia and xerostomia in which salivary flow may entirely lacking, resulting in rampant dental caries

Viscosity of saliva

Thick, mucinous saliva increases the dental caries

Antibacterial properties of saliva

Lactoperoxidase

- They participate in killing of microorganisms by catalyzing the H2O2 mediated oxidation of a variety of substances in the microbes
- Utilizing thiocynate ions in saliva peroxidation generate highly reactive chemical compound that bond and inactivate general intracellular microbial enzyme system, as well as microbial surface compound.

Lysozyme

• Small, highly positive enzyme that catalyze the degradation of negatively charged peptidoglycan matrix of microbial cell wall

Lactoferin

- Fe binding basic protein found in saliva with mol. wt. near 80,000.
- Tends to bind & link the amount of the free Fe which is essential for microbial growth

IgA

- Immunoglobulin in saliva
- Inhibit adherence and prevent colonization of microbial on tooth and mucosal surfaces
- II. Agent: The most common cariogenic oral flora is two type of bacteria (streptoccus mutans and Lactobacillus) produces an acids that cause the distraction of inorganic components of enamel and dentine.
- III. Diet: The cariogenic bacteria produce and secretes the chemical substances (organic acid) from fermentation of carbohydrate which may cause demineralization of tooth
- IV. Time: once the diet is rich in suitable carbohydrate the caries can be begin within days of a tooth erupting into the mouth (frequency of exposure to cariogenic environment).

Factors affecting caries prevalence

1-Age: dental caries essentially is a disease of childhood, the mean of DMF increase with age because it is accumulative disease.

2-Gender: Its higher in female than male could be explained in children by early eruption of teeth in females.

3-Race: people living in different geographical area having different caries incidence an in Africa and India enjoyed greater freedom caries than Europeans.

4-Hereditary:(genetic factor) dental caries run in the family of the parents suffering from caries, although the environment factors have great influence but also the genetic factors contributes to caries occurrence.

5-Emotional disturbance: anxiety status influence the incidence of dental caries.

6-Socioeconomic factors: prevalence of dental caries in many developing countries are increasing due to the availability of refined sugars, while the caries experience decrease in undeveloped countries.

7-Nutrition: malnourished people are attributed higher prevalence of dental caries.

8-Tobacoo smoking : it may increase the risk of caries formation.

9-Oral hygiene habits: tooth brushing, flossing and uses of fluoride supplement reduce the occurrence of dental caries.

10-Pregnancy and Lactating : neglect their oral hygiene.

11-Use of medications: drugs promote xerostomia.

12-Radiation: increasing caries susceptibility.

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Community Dentistry

Epidemiology of Periodontal Diseases

- Periodontal disease: is an infectious disease process that involves inflammation of the structures of the periodontium.
- Periodontal disease can cause a breakdown of the periodontium resulting in loss of tissue attachment and destruction of the alveolar bone.

Types of Periodontal Diseases

Gingival diseases and periodontitis are the two basic forms of periodontal disease, and each has a variety of forms.

Prevalence of Periodontal Disease

- Periodontal diseases are the leading cause of tooth loss in adults.
- Almost 75% of American adults have some form of periodontal disease, and most are unaware of the condition.
- Almost all adults and many children have calculus on their teeth.
- Fortunately, with the early detection and treatment of periodontal disease, most people can keep their teeth for life.

Causes of Periodontal Diseases

- Dental plaque is the major factor in causing periodontal disease.
 - Dental calculus provides a surface for plaque to attach.
 - Subgingival calculus
 - Supragingival calculus

Signs and Symptoms of Periodontal Disease

- Red, swollen, or tender gingiva
- Bleeding gingiva while brushing or flossing
- Loose or separating teeth
- Pain or pressure when chewing
- Pus around the teeth or gingiva

Lec. 4

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Risk Factors for Periodontal Disease

- Age: the prevalence of Periodontal Disease increase with age.
- **Gender:** the prevalence of Periodontal Disease was higher in male than female, this may be related to poor oral hygiene usually observed among male .
- **Race:** Black people had more sever periodontal disease than white people
- **Socioeconomic status:** Lower socio and education individual have higher prevalence and severity of Periodontal Disease than higher income and educate individual .
- **Poor Oral Hygiene**: The major cause of periodontal disease is a Poor Oral Hygiene
- **Hormonal change:** increase in gingivitis is reported in children as they approach puberty and in women during pregnancy, lactation, menopause
- Genetic factor: These factors are strongly associated with periodontal disease
- **Restoration:** Over hang filling and rough surfaces of filling increase degree of plaque accumulation.
- **Teeth misalignment:** Periodontal Disease is more common misaligned teeth as they difficult to clean
- Infections: HIV/AIDS
- Systemic disease: many systemic disease such as Diabetes
- **Psychological factors:** Stress (behavioral changes such as smoking and poor oral hygiene), distractive oral habit (clenching and bruxism), anxiety and fear of the dentist and lack of knowledge about the disease.

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د محد

Indices used for assessment of oral disease:

2- periodontal disease

Periodontal diseases and their etiological factors:

 \Box Gingivitis: It is an inflammation of gingival tissue mainly caused by dental plaque.

□ **Periodontitis:** It is an inflammation of periodontal ligament which mainly precede by un treated gingivitis.

□ **Dental plaque:** It is soft non mineralized, bacterial deposit formed on the tooth surface.

 \Box Calculus: It is a hard deposit that forms by mineralization of dental plaque.

Indices used for plaque and debris assessment :

*Plaque Index (PII) ... which was introduced by Silness and Loe in 1964 -Used together with GI, and should be preceded the gingival examination.

-Used on all teeth (28, so wisdom teeth are excluded) or selected teeth (6).

-No substitution for any missing tooth.

-Used on all surfaces (4)(M, O, D, L) or selected surfaces(M, O, L).

-This index measures the thickness of plaque on the gingival one third.

-The six index teeth are:

Score Criteria

0 No plaque

1 A film of plaque adhering to the free gingival margin and adjacent area of the tooth, which can not be seen with the naked eye. But only by using disclosing solution or by using probe.

2 Moderate accumulation of deposits within the gingival pocket, on the gingival margin and/ or adjacent tooth surface, which can be seen with the naked eye.

3 Abundance of soft matter within the gingival pocket and/or on the tooth and gingival margin.

Calculation:

 1- Individual:
 2- Population:

 PII = Total scores
 PII = Total scores

 No. of surfaces examined
 No. of subjects examined

Indices used for calculus assessment:

*Calculus Surface Index (CSI) which was introduced by Ennever et al in 1961

1- CSI assesses the presence or absence of supra and/or subgingival calculus by visual or tactile examination, regardless the quantity of calculus.

2-4 or 6 mandibular anterior teeth are examined.

3- Each tooth divided into 4 areas .

Calculation: CSI =Total number of scores 0 - 16 or 0 - 24

Indices used for gingival disease assessment :

*Gingival Index (GI).... which was introduced by Loe and Silness in 1963

 $\hfill\square$ GI could be used in all teeth or selected teeth and in all surfaces or selected surfaces.

 \Box The examination done by blunt probe.

 $\hfill \square$ Partially erupted teeth, retained roots, teeth with periapical lesion and third molars should be excluded .

Score Criteria

- 0 No inflammation.
- 1 Mild inflammation, slight change in color, slight edema, no bleeding on probing.
- 2 Moderate inflammation, moderate glazing, redness, bleeding on probing.

3 Severe inflammation, marked redness and hypertrophy, ulceration, tendency to spontaneous bleeding.

Calculation:

1-Individual

GI = Total scores/No. of surfaces examined

2-Population

GI = Total scores/No. of subjects examined

Indices used for periodontal disease assessment:

Periodontal Disease Index (PDI):

Introduced by Ramfjord in 1959

Composed of three components:

- 1- Gingival and periodontal component
- 2- Plaque component
- 3- Calculus component

All the three components will be scored separately using six Ramfjord selected teeth.

6	14	Ε	A D
4 1	6	D A	E

1- Gingival and periodontal component :

1-The criteria ranged from:

0 123 456

normal gingivitis periodontitis

1--Gingival and periodontal component:

2--All areas (M, D, B, L) is scored as a one unit.

3--Only fully erupted teeth are scored .

4-There is no substitution for excluded teeth.

2-Plaque component:

Scoring criteria:

0 No plaque

1 Plaque present on some but not on all interproximal, buccal, and lingual surfaces of the tooth.

2 Plaque present on all interproximal, buccal, and lingual surfaces, but covering less than one half of these surfaces.

3 Plaque extending over all interproximal, buccal and lingual surfaces, and covering more than one half of these surfaces.

-All areas (B , L , M , D) are scored as one unit.

-Only fully erupted teeth are scored .

-There is no substitution for excluded teeth.

3- Calculus component:

Scoring criteria:

0 Absence of calculus.

1 Supragingival calculus extending only slightly below the free gingival margin (not more than 1 mm.

2 Moderate amount of supragingival and sub gingival calculus or sub gingival calculus alone.

3 An abundance of supra gingival and sub gingival calculus.
Community Periodontal Index of Treatment Needs (CPITN)

introduced by WHO / in 1982 ,1987, 1997

1--The mouth is divided into six parts.

2 -The examination done by special probe (WHO probe).

3- The score is identified by examination of specified index teeth or all teeth.

score	criteria
0	No periodontal disease .
1	Bleeding on probing .
2	Calculus with plaque seen or felt by probing.
3	Pathological pocket $4 - 5 \text{ mm}$.
4	Pathological pocket 6 mm or more .
X	When only 1 tooth or no tooth are present.

Treatment Need

Score	criteria
0	No need for treatment.
1	Personal plaque control (OHI).(1-4).
2	Professional plaque control (scaling and polishing). (2-4).
3	Deep scaling, root planning, surgical procedure. (3-4).

Book: Essential of Preventive and Community Dentistry





Community Periodontal Index of Treatment Needs (CPITN)

Community Periodontal Probe



Book: Essential of Preventive and Community Dentistry

Lec. 13 School Dental Health Program

The maximum time consuming and the most important task in the field of community dentistry is school dental health program. Because of very high prevalence of dental caries in this age group.

Objective of school health program.

1-To evaluate the health status of pupils

2-To educate and motivate the children for correction defect like cleft lip and palate

3-To Identify, educate and motivate the handicapped children.

4-To prevent and control diseases.

5-To provide emergency services.

Phases in School Oral health program

A-Dental Health Instruction:

Dental Health counseling consist of the procedures for helping children and parents understand the nature and significant of conditions revealed by dental inspections and to solve dental health problems.

There are various methods of teaching dental health in school. These are the following:

1-Lecture methods

2-Lecture demonstration methods.

3-Discuusion methods.

4-Questioning methods.

5-Directed study and practice method.

6-Team teaching method.

B- Dental Health Service Program.

It is determining the dental health status of each child in relation to his or her school groups, his or her family and his or her community and providing the dental health services.

These are following:

1-Periodic dental check- up

2-Reports to parents

3-Periodic follow up of program and home care chec up

4-Emergency care

5-Oral prophylaxis

6-Periodical evaluation

C-Dental Health Treatment including preventive procedure.

It includes all those treatment and preventive procedures which are to be carried out after the examination of teeth and formulation of diagnosis *School based preventive programs include

A- Self applied fluorides:

a-school fluoride mouth rinsing program

b- school fluoride tablet program

c-tooth brushing with fluoridated dentifrices.

B-School based Sealant program

The placement procedure for the sealant is rapid and painless. They are highly effective in protecting the occlusal pit and fissure.

C-School water fluoridation.

It is recommended only if the student are coming from the area which have low or no fluoride content. The recommended concentration for school water fluoridation is 4.5 ppm. Studies have shown approximately 40% reduction in dental caries due to school water fluoridation.

Why concentration of fluoride in school water 4.5 times than community?

1-children spend only a part of their total waking hours in schools.

2-They enter the school at 6 years of age. Thus the incisor are no longer at risk of dental fluorosis.

3-Only part of daily water intake is consumed.

D- Topical fluoride application program

Acidulated phosphate fluoride (APF) topical procedure should be applied to children with new smooth surface caries, history of high caries or handicapped conditions.

E- Oral health education

The school can promote good health and prevent oral problems by educating students and parents, it should focus on :

- 1- Prevention of caries through proper oral hygiene.
- 2- Use of fluoride or fluoridate water.
- 3- Good nutrition including restricting cariogenic diet.
- 4- The use of mouth guard in high body contact sports.

Book: Essential of Preventive and Community Dentistry

Primary health care is an essential health care that is a socially appropriate, universally accessible, scientifically sound first level care provided by a suitably trained workforce supported by integrated referral systems and in a way that gives priority to those most in need, maximizes community and individual self-reliance and participation and involves collaboration with other sectors.

The concept of Primary health care involves a concentrated effort to provide the rural population of developing countries with at least the bar minimum of health services.

Element of Primary health care

1-Education concerning prevailing health problems and the methods of preventing and controlling them

- 2-Promotion of food supply and proper nutrition
- 3-Monitoring an adequate supply of safe water and basic sanitation
- 4-Maternal and child health care, including family planning
- 5-Immunization against the major infectious diseases
- 6-Prevention and control of locally endemic diseases
- 7-Appropriate treatment of common diseases and injuries
- 8-Basic laboratory services and provision of essential drugs.
- 9-Training of health guides, health workers and health assistants .

Principles of Primary health care

1-Equitable Distribution.

The first key Principle in Primary health care strategy is equitable distribution of health services. Health services must be shared equally by all people irrespective of their ability to pay all(rich, poor, urban or rural) must be have access to health services.

2- Community participation.

Overall responsibility is of the state. The involvement of individuals, families and community in promotion of their own health and welfare is an essential ingredient of Primary health care.

PHC coverage cannot be achieved without the involvement of community in planning, implantation and maintenance of health services.

3- Intersectoral Coordination

PHC involves in addition to health sector, all related sectors in particular agriculture (e.g food security), food industry, education, housing, public works and communication. To achieve cooperation, planning at country level is required to involve all sectors.

Primary dental health care

dental health may be defined as a state of complete normality and functional efficiency of the teeth and support structures and also of the surround parts of the oral cavity.

The general goals of dental care are:

- 1- Dental health promotion
- 2- Prevention and treatment of dental diseases.

P.D.H.C can be considered under four heading or steps these are:

A-Socially:

The community it self must take the principle role in dental health care activities. It is the responsibility of dental profession to each the people that they should not regard dentistry as simply the provision of services to relieve pain and restore function and appearance, but the must be motivated to use preventive measures themselves from birth to old age to keep their teeth in a healthy mouth.

Each community must primarily be educated about:

1-The benefit of fluoride in reducing dental caries.

2-Various oral hygiene measures of removal dental plaque.

3-Correct food habits for children (restriction of eating sweet not more than 3 times a day and not between snacks).

4-Harmful effects of habits such as smoking.

5-Early recognition of precancerous and cancerous lesion(e.g. ulcer in the mouth not healing for 2-3 weeks, should consult dentist).

6-The importance for regular visits to the dentist for routine examination.

B- Technically:

Oral health teams must be developed which enable both dentist and auxiliaries to guide their community population toward desired level of oral and general health through the development of an appropriate primary dental health system.

Dental school in some countries produce dentists who are also able to render primary oral health care. Dentist or medical doctor with appropriate oral health information should act as leaders of the whole health team.

C- Economically:

Those responsible for dental health care services must develop systems which utilize the resources available to provide level of D.H.C for everyone.

D-Politically:

Primary dental health care cannot developed without the full support of national resources.

Basic dental services are given below these services:

1-Emergency dental care (relief pain).

2-Primary care includes(oral hygiene instruction, use caries preventive as fluoride and fissure sealant).

3-Secondary care (simple restoration, pulp therapy in primary teeth, anterior teeth endodontic).

4-Limited rehabilitation (complex restoration build up, surgical extraction).

5- Rehabilitation (Fixed bridge, molar endodontic).

6-Complex rehabilitation (placing implant, elective oral surgery 3rd molar).

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