Benha University **Date:6-6-2013**

Faculty of Nursing **Time: 2 hours**

Model of Answer of Epidemiology Examination

(Fourth year)

Answer of question no. 1 (25marks)

a- Types Carrier of infectious disease (5 marks)

- ***Types of carriers:*** **4 types:**
  1. *Incubatory carrier:* Cases become infective in the last few days of incubation period (before the onset of disease), e.g. cholera and typhoid, in the last few weeks (viral hepatitis).
  2. *Convalescent carriers:* recovered cases continue to excrete the infective agents during the period of convalescence e.g. typhoid, cholera, diphtheria.
  3. *Contact carriers:* contacts of cases (having high immunity) may be infected and transmit infection within two weeks, e.g. typhoid.
  4. *Healthy carriers:* Contacts to polluted environment such as contaminated food or water (in endemic infectious diseases).

b- Pattern of spread of infectious disease (8 marks)

1. **Sporadic:** Infrequent scattered cases not related to each other.
2. **Endemic:** A disease constantly present in the community due to the presence of its ecological factors (agent, host, environment) that help the maintenance of the disease.
3. **Hyperendemic:** Endemic disease with high incidence and prevalence rates.
4. **Epidemic:** Sudden increase in the number of cases of infectious disease in certain place and time than expected in that place and time.
5. **Pandemic:** Epidemic of particular infectious disease involving some countries of the world e.g. cholera, plague.
6. **Outbreak:** Epidemic occurs in a confined group or closed community e.g. school, camp, hospital.

Spread of infectious disease in animals:

1. Epizootic: Epidemic spread of infectious disease among animals.
2. Enzootic: endemic spread of infectious disease among animals.

c- Control of Contacts of Infectious Disease (5 marks)

1- Enlistment : name , age, sex, address, past history of vaccination.
2- Investigation of contacts: for case finding or carrier state.
3- Specific protection either by immunization or chemoprohylaxis :
4- Surveillance : contacts observed daily for maximum I.P.
5- Segregation where contacts are excluded from work for maximum I.P to prevent spread of infection to others.
6- Isolation of contacts of cholera, pneumonic anthrax and pneumonic plague for maximum I.P.
7- Health education and release after clinically and laboratory free.

d- Prevention of Measles(5 marks)

Prevention: by immunization only

a- Active immunization: by measles vaccine (live-attenuated vaccine).

1- Children: compulsory in Egypt to all infants 9-12 months of age.
2- Susceptible children of any age.
3- Adults: if not vaccinated or infected by measles before but not during pregnancy.
4- During measles epidemics.

e- Modes of transmission of Hepatitis B disease (5 marks)

- <u>Mode of transmission:</u>

- **Exposure to infected blood:**
- Parenteral route (contaminated syringes).
- Professional exposure.
- Traditional procedures and faulty habits (circumcision, tattooing & scarification).
- Attendants of dental clinics.
- Blood transfusion.
- Organ transplantation and renal dialysis.

- **Sexual transmission:** either heterosexual or homosexual.

- **Vertical transmission (Congenital infection):** from HBs Ag +ve pregnant to foetus.

Answer of question no. 2 (25marks)

a- Types of Vaccines(5 marks)

- ***Live vaccine:*** Small pox vaccine prepared from cowpox virus
- ***Live attenuated vaccines:***

- More potent than killed vaccines.
- Given for only one dose except for polio (sabin).
- Should not be given to preganant women or persons with immunodeficiency disease.
- Examples: Measles, mumps, rubella (or MMR), sabin (OPV), BCG (T.B), yellow fever vaccine, otten vaccine of plague.

- ***Killed or in activated vaccines:***

- Killed by heat or chemicals .
- Require primary series of 2-3 doses and some time booster dose.
- Given usually by intramuscular or subcutaneous injection .
- Examples : Pertussis vaccine, salk of polio, TAB of typhoid.

- ***Polysaccharide (capsular) vaccine:*** Examples :

- Meningiococcal vaccine of meningitis.
- Pneumococcal vaccine.
- Haemophilus influenza type b vaccine.
- Typhoid vaccine.

- ***Surface antigen vaccines:***

e.g. vaccine for viral hepatitis B manufactured by genetic engineering in the yeast cells.

b- Preventive Measures for Diabetes(5 marks)

1- **Nutrition education**:

⇒To avoid excess carbohydrate and fats which leads to obesity, through:

- Adequate feeding for children and avoiding over weight.
- Avoid cow's milk during infancy and encourage breast feed.
- Regular checking of weight, to screen and management of over weight and obesity.

2- **Prevention and control of viral infections**:

⇒To prevent the viral infections that may be complicated with pancriatitis, through:

- Specific immunization and seroprophylaxis when needed, (MMR vaccine during childhood) to prevent mumps and rubella.
- Environmental sanitation.

3- **Avoid the diabetogenic drugs abuse**: These preparations must be used under medical supervision.

4- **Premarital examination and counseling**:

- For early case finding and guidance of diabetics:
  The public must be aware of the risk of inherited susceptibility, when both parents are diabetic

c- Precautions against exposure to infected blood (5 marks)

- Use of disposable syringes & needles.
- Sterilization of surgical and dental instruments.
- Professional protection e.g. gloves.
- Blood Igs should be virus-free & sterilized by UVR.
- Precautions with blood donors.
- Donors selection after blood testing for Hbs Ag.
  Exclusion of drug-dependant donor and those have had hepatitis

d- Disadvantages of Chemoprophylaxis(5 marks)

- **Disadvantages:**
  - **Temporary protection as it is effective only during the use of the drug.**
  - **Highly expensive in relation to value and protection (cost benefit).**
  - **Cannot be applied on large-scale as a mass preventive measure but it is given only on limited scale to at risk groups.**
  - **Drug toxicity & resistance if prolonged use.**
  - **Drug allergy as in case of penicillin.**
  - **Suppress the immune response as it kills the antigen and normal intestinal flora.**

e- Naturally Acquired Immunity (5 marks)

1- Active natural acquired immunity :

a- Subclinical infection

b- Clinical infection.

2- Passive natural acquired immunity :

a- Transplacental materno- foetal immunity : (in the last weeks of pregnancy).

b- Colostrum & breast milk which contain:

- **High contents of antibodies (IgA).**
- **Lysozyme & macrophages**.

Answer of question no. 3 (30marks)

a- Nosocomial infection (Reservoir – Prevention) (15 marks)

Reservoir of Nosocomial infection

- **Within hospital or center**

- The patient: may infect himself (autoinfection) or the others.
- Hospital personnel: a case (mild or inapparent) or carrier or third-person (not reservoir) through contaminated hands, clothing.
- Insanitary hospital, center or unit environment (Unknown reservoir).

- **Outside –reservoirs:**

- Visitors: case (mild or inapparent) or carrier.
- insanitary surrounding environment: indirectly carried by vehicles and vectors of (Unknown reservoir).

Preventive measures for Hospital cross infection

- **Sanitation of environment including:**
  - Incineration of particular form of hospital refuse
  - Disinfection of air of operating theaters, premature units and some laboratories and hospital wards by ultraviolet radiation.
  - Sanitary surrounding area all around hospital or medical center.
- **Medical care providers:**
  - Proper healthy behavior and clean habits.
  - Free of infection: pre-employment and periodic examination.
  - When infectious case is suspected: segregated until proving to be free of infection.
- **Sterilization and asepsis:** strictly followed throughout all processes.
- **Chemoprophylaxis:** valuable under certain circumstances of unsatisfactory fulfillment of asepsis and unavoidable infection.
- **Administrative requirements:** asepsis, supervision of personnel and control of hospital visits.
- **Early case finding:** regular health appraisal and supervision of hospitalized cases allow early screening and diagnosis of those who acquired infection to by properly managed.

b- Mode of Transmission of Infectious Diseases (15 marks)

1- <u>Droplet (Air – borne) infection</u>:

- ***Direct droplet:*** from the source to susceptible by direct contact.
  e.g. during coughing, sneezing, showting, loud speeking, kissing.

- ***Indirect:*** method: through :
  - Air borne droplet nuclei or dust.
  - Contaminated articles & fomites.
  - Milk: through invasion of the upper respiratory mucosa by the organism in milk e.g. in case of diphtheria.
- ***Example of droplet infections:***
- Bacterial: T.B., meningitis, diphtheria, pertussis, pneumonia.
- Viral: measles, mumps, rubella, chicken pox, influenza.
- ***Predisposing factors of droplet infection:***
  - Overcrowding - Bad ventilation -Bad health habits

2- <u>Food – borne infection</u>:

- ***Direct fecal: oral transmission:*** through contaminated hands and fingers by human or animal excreta (hand to mouth).
- ***Indirect:*** (ingestion of contaminated food) through:
- Vehicle transmission: contaminated water, ice, raw vegetables and fruits, milk, meat, eggs, fish
- Vector transmission: mechanical transmission of organisms by hours flies and cockroaches.
- Uses of human fertilization → contamination of food (vegetables).
- Contaminated dust.
- ***Examples of food bone infections: -***
- *Bacterial:* cholera, typhoid, food poisoning, brucellosis.
- *Viral:* poliomyelitis, viral hepatitis
- *Parasitic:* Ascariasis, amoebiasis, hydatid disease
- ***Predisposing factors:***
  - Poor environmental sanitation e.g. food sanitation, water sanitation, spread of insects.
  - Lack of supervision of food places and food handless.
  - Bad health habits and lack of personal hygiene

3- <u>Contact infection</u>:

- Organisms invad intact skin or mucus membrane e.g. in Bilharziasis, syphilis, anchylostomiasis, staph & strept. Infection.
- Organisms invad injured skin or mucus membrane e.g. in wound infection, tetanus, gas gangrene, rabies.

4- <u>Arthropod borne infection (vector – borne diseases)</u>

Arthropods or insects transmit infection by:

- *Mechanical* ***transmission:*** the insect has no role in multiplication or development of the organism.
- *Biological* ***transmission:*** the insect plays important role in multiplication and development inside the body of the vector to become infective.

<u>Occasional mode of transmission:</u>

2. <u>Injection (parental) infection:</u>

- <u>Blood transmitted</u> injection: through blood transfusion or contaminated syringes or needles e.g. hepatitis B & C, AIDS, syphilis, CMV.
- <u>Pyogenic infections:</u> By contaminated syringes & needles e.g. staph injection

3. ***<u>Vertical transmission:</u>*** from mother to fetus or infant.

- Inutero-infection: either before formation of placenta or transplacental e.g. hepatitis B & C, AIDS, syphilis, CMV.
- Peri-natal infection: during labor through birth canal e.g. ophthalmia neonatorum, herpes simplex.
- Through lactation (breast feedings) → e.g. HBV, HCV, AIDS, CMV.

GOOD LUCK

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