SUBJECT- SCIENCE

CLASS - IX

CHAPTER -13

WHY DO WE FALL ILL ?

MODULE 3/3

PRINCIPLES OF TREATMENT

The treatment of infectious diseases consists of two steps. They are to reduce the effects of the disease (symptoms) and to kill the microbes which caused the disease.

- **i) To reduce the effects of the disease :- This can be done by taking medicines to bring down the effects of the disease like fever, pain or loose motions etc. and by taking bed rest to conserve our energy.**
- **ii) To kill the microbes :- This can be done by taking suitable antibiotics and drugs which kills the microbes and the disease is cured.**

Antibiotics –

They are chemical substances produced by living organism such as bacteria and fungi,etc., which can kill or stop the growth of some pathogenic microrganisms.

Ex- Penicillin, Tetracycline, Streptomycin, etc.

Vaccine –

It is suspension of disease-producing microbes which does not cause disease but on entering, body initiates immune system to produce antibodies against particular disease and killing microbes.

How do we kill microbes? - Antibiotics

- **Microbes can be classified into different categories- viruses, bacteria, fungi or protozoa. Each of these groups of organisms will have some essential biochemical life process which is peculiar to that group and not shared with the other groups. These processes may be pathways for the synthesis of new substances or respiration.**

- **These pathways will not be used by us either. For example, our cells may make new substances by a mechanism different from that used by bacteria. We have to find a drug that blocks the bacterial synthesis pathway without affecting our own.**

This is what is achieved by the antibiotics that we are all familiar with. Similarly, there are drugs that kill protozoa such as the malarial parasite.

- **One reason why making anti-viral medicines is harder than making anti- bacterial medicines is that viruses have few biochemical mechanisms of their own. They enter our cells and use our machinery for their life processes**

PRINCIPLES OF PREVENTION

There are two ways of prevention of infectious diseases. They are general ways and specific ways.

- **i) General ways of prevention :-** Public hygiene is most important for prevention of infectious diseases. Proper and sufficient food for every one will make people healthy to resist infection.

- Air borne diseases can be prevented by living in conditions that are not crowded. Water borne diseases can be prevented by providing safe drinking water. Vector borne diseases can be prevented by providing clean environment.

- **ii) Specific ways of prevention :-** The specific ways to prevent infectious disease is immunisation by taking vaccines. Vaccines provide immunity from infectious diseases like tetanus, diphtheria, whooping cough, measles, polio etc. Our body has an immune system which fights microbial infection. When this system first sees an infectious microbe, it kills the microbe and remembers it. So if the microbe enters the body the next time, it responds more vigorously. Vaccines mimic the infectious microbe and strengthens our immune system and protects the body from infectious diseases.

NEED OF PREVENTION OF DISEASE

- 1) once someone has a disease, their body functions are damaged and may never recover completely.
- 2) Treatment will take time, which means that someone suffering from a disease is likely to be bedridden for some time even if we can give proper treatment.
- 3) The person suffering from an infectious disease can serve as the source from where the infection may spread to other people. This leads to the multiplication of the above difficulties. It is because of such reasons that prevention of diseases is better than their cure.

IMMUNISATION

Immunization gives a very good level of protection against many serious diseases.

It uses your body's natural defence mechanism, the immune response, to build resistance to specific infection.

- **There are three reasons why we immunise children.**
- **First, immunisation prevents children from becoming ill with unpleasant and serious infectious diseases, which have a risk of complications and long-term side effects.**
- **Second, we immunise to try and help protect all children in the population. The more people who are immunised, the less of the infectious disease there is around so the less chance there is of anyone catching it. When levels of immunisation against an infectious disease are really, really high - then something happens called 'herd immunity' where the risk of the disease occurring is so low that even those who cannot be immunised are unlikely to be affected.**
- **Third, we immunise to try and wipe out as many infectious diseases as we can everywhere in the world.**

Principle of Immunisation.

- when the immune system first sees an infectious microbe, it responds against it and then remembers it specifically.
- So the next time that particular microbe, or its close relatives enter the body, the immune system responds with even greater vigour.
- This eliminates the infection even more quickly than the first time around.
- This is the basis of the principle of immunisation.

Immunisation by vaccine

- ***Traditional Indian and Chinese medicinal systems sometimes deliberately rubbed the skin crusts from smallpox victims into the skin of healthy people.***
- ***They thus hoped to induce a mild form of smallpox that would create resistance against the disease.***
- ***Famously, two centuries ago, an English physician named Edward Jenner, realised that milkmaids who had cowpox did not catch smallpox even during epidemics .***
- ***Cowpox is a very mild disease. Jenner tried deliberately giving cowpox to people , and found that they were now resistant to smallpox.***
- ***This was because the smallpox virus is closely related to the cowpox virus. 'Cow' is 'vacca' in Latin, and cowpox is 'vaccinia'. From these roots, the word 'vaccination' has come into our usage***

Providing vaccines at right time.

There are vaccines against tetanus, diphtheria, whooping cough, measles, polio and many others. These form the public health programme of childhood immunisation for preventing infectious diseases.

National Immunization Schedule

For Infants	Vaccine & Dose	Route
At Birth	BCG 0.1ml + OPV 2drops(0 dose)	Intradermal
6 weeks	BCG 0.1ml [if not at birth]	Intradermal
	DPT-1 0.5ml + OPV-1 2drops	I/M + Oral
10 weeks	DPT-2 + OPV-2	I/M + Oral
14 weeks	DPT-3 + OPV-3	I/M + Oral
9-12 months	Measles 0.5ml + Vit. A 2ml	Deep S/C + Oral
At 18 months	DPT + OPV[Boosters-1]	I/M + Oral
At 24, 30, 36 months	Vitamin A 2ml	Oral
At 5-6 years	DT[Booster-2]	I/M
At 10 and 16 years	Tetanus Toxoid	I/M
For Pregnant Women	**Vaccine & Dose**	**Route**
Early in Pregnancy	TT-1 or Booster	I/M
One month after TT-1	TT-2	I/M

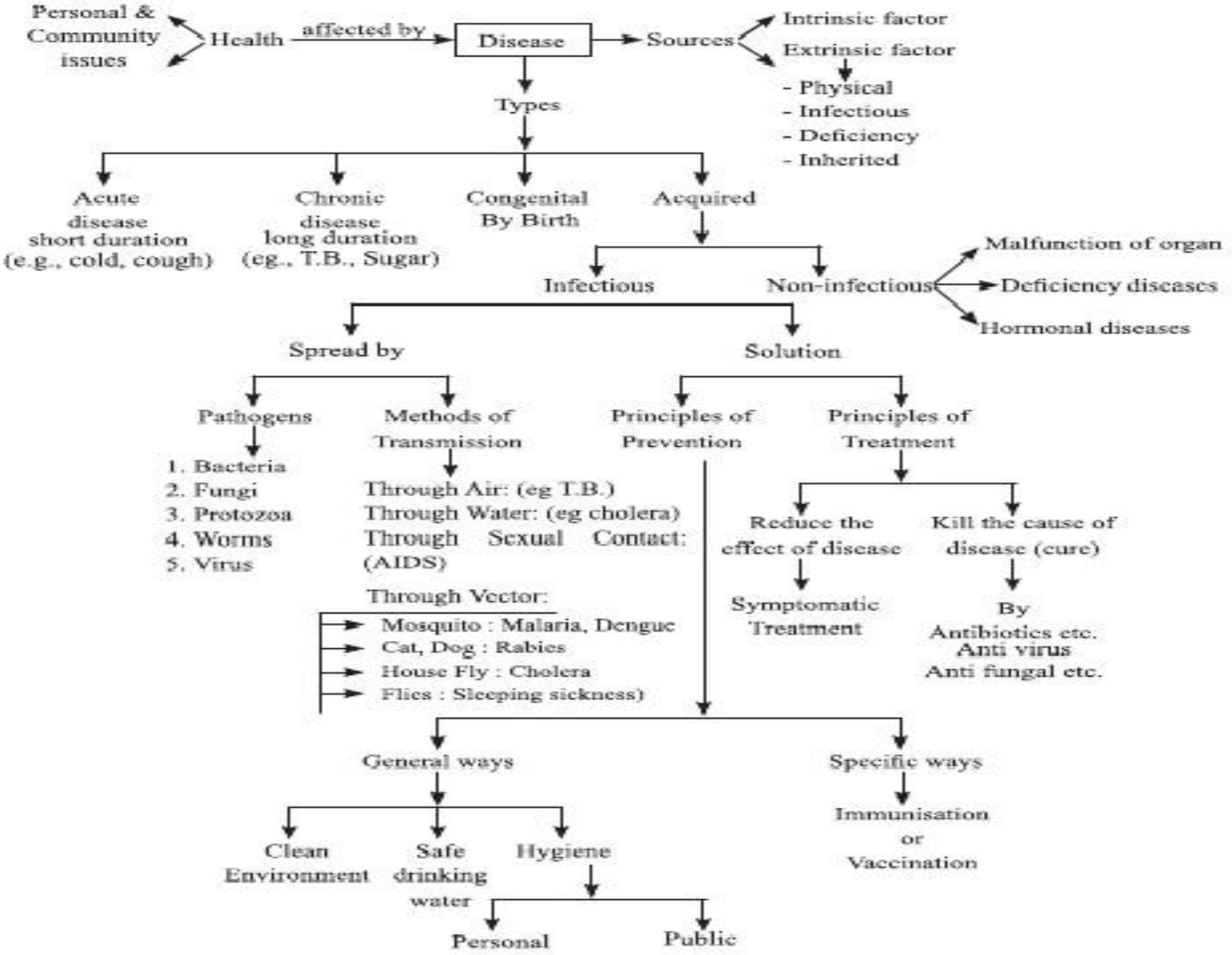
S.N	Vaccine	Age of administration	Dose	Route of administration	Protect against
1.	BCG (Bacillus Calmette Guerin)	At birth	1	Intradermal	Tuberculosis
2.	Pentavalent Vaccine (Diphtheria, Pertussis, Tetanus, Hepatitis B and Hemophilus influenza B)	6, 10 and 14 weeks	3	Intramuscular	Diphtheria, pertussis,Tetanus, Hepatitis B and Haemophilus Influenza B
3.	OPV (Oral Polio Vaccine)	6, 10 and 14 weeks	3	Oral	Polio
4.	PCV (Pneumococcal Conjugate Vaccine)	6, 10 weeks and 9 months	3	Intramuscular	Pneumococcal diseases (Meninges, ear and chest infections)
5.	Rotavirus vaccine	6, 10 weeks	2	Oral	Rota virus diarrhea
5.	fIPV (Fractional Injectable polio vaccine)	6, 14 weeks	2	Intramuscular	Polio
6.	MR (Measles – Rubella)	9 and 15 months	2	Subcutaneous	Measles and Rubella
7.	JE (Japanese Encephalitis)	12 months	1	Subcutaneous	Japanese Encephalitis

Disease	Causative Organism	Mode of Transmission	Control	Prevention
Malaria	Plasmodium	Bite of female Anopheles	Quinine	Breaking contact between female Anopheles and man, eliminating Anopheles
Diarrhea	Protozoan, bacteria, viruses	Contaminated food and water	ORS or salt-sugar solution	Proper sanitation, personal hygiene
Cholera	Vibrio cholerae	Contaminated food and water	Antibiotics, ORS or salt-sugar solution	Proper sanitation, vaccination
Typhoid	Salmonella typhi	Contaminated food and water	Use of antibiotics	Proper sewage system, using chlorinated or boiled water
Tuberculosis	Mycobacterium tuberculosis	Cough/sneeze droplets, contaminated milk	Use of antibiotics	Awareness to maintain cleanliness in public places and BCG vaccine for children
Hepatitis	Hepatitis viruses (A-G)	Contaminated food and water for some forms, through body fluids for others	Rest, antiviral injection, food rich in carbohydrates	Good sanitation, safe drinking water, use tested blood, disposables needles and syringes
Rabies	Rabies virus	Bite of infected animal	No cure after the diseases develops	Wash the wound antirabies serum, course of vaccine shots, pets should be vaccinated,
AIDS	Human immunodeficiency virus (HIV)	Infected blood, semen, breast milk, mother to fetus	No cure yet, a combination of drugs slows down progress of the diseases	Screening of blood and donors, use of disposable needles and syringes, not sharing blades and razors, safe sex practices.
Influenza	Myxovirus	Cough/sneeze droplets	No cure, bed rest, aspirin and fluids provide relief	Keeping away from infected person

REDUCING YOUR RISK OF VIRAL DISEASES

- Avoiding contact of your hands with your eyes, nose and mouth, which can transmit a virus into the body.
- Avoiding contact with a person who has a viral disease.
- Covering your mouth and nose with your elbow (not your hand) or a tissue when sneezing or coughing.
- Eating a well-balanced diet that includes sufficient amounts of fruits and vegetables.
- Vaccination as recommended by your health care provider for viral diseases, such as chickenpox, shingles, influenza, HPV, hepatitis B, hepatitis A, measles, and mumps.
- Washing your hands with soap and water for at least 20 seconds after contact with a person who has a viral disease, before eating, or after using the restroom or touching body fluids, surfaces, or foods that are potentially contaminated with viruses.

CONCEPT MAP


Personal & Community issues
Health
affected by
Disease
Sources
Intrinsic factor
Extrinsic factor
- Physical
- Infectious
- Deficiency
- Inherited
Types
Acute disease short duration (e.g., cold, cough)
Chronic disease long duration (eg., T.B., Sugar)
Congenital By Birth
Acquired
Infectious
Non-infectious
Malfunction of organ
Deficiency diseases
Hormonal diseases
Spread by
Solution
Pathogens
Methods of Transmission
1. Bacteria
2. Fungi
3. Protozoa
4. Worms
5. Virus
Through Air: (eg T.B.)
Through Water: (eg cholera)
Through Sexual Contact: (AIDS)
Through Vector:
Mosquito : Malaria, Dengue
Cat, Dog : Rabies
House Fly : Cholera
Flies : Sleeping sickness)
Principles of Prevention
Principles of Treatment
Reduce the effect of disease
Kill the cause of disease (cure)
Symptomatic Treatment
By Antibiotics etc. Anti virus Anti fungal etc.
General ways
Specific ways
Clean Environment
Safe drinking water
Hygiene
Personal
Public
Immunisation or Vaccination

QUESTIONS

- 1. What precautions can you take in your school to reduce the incidence of infectious diseases?
- 2. What is immunisation?
- 3. What is antigen?
- 4. What are antibodies?
- 5. Why is it not necessary to give Hepatitis A vaccine to children in some cases?
- 6. What are the basic principles involved in medical treatment for diseases?
- 7. Describe the principle behind vaccination.
- 8. Name some diseases for which vaccines are available.
- 9. Who were awarded Nobel prize for discovery of treatment of peptic ulcer?
- 10. List some general principles of prevention of disease.

THANK YOU