UNIT 4 COMMUNICABLE DISEASES
3 – ZOONOTIC DISEASES

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4.0 INTRODUCTION

In this unit, we will be discussing about reproductive tract/sexually transmitted infections (RTI/STIs) including Human Immunodeficiency Virus/ Acquired Immunodeficiency Diseases (HIV/AIDS), soil transmitted heminthic infections, and rabies.

Reproductive tract infections (RTIs) including sexually transmitted infections (STIs) present a huge burden of disease and adversely impacts the reproductive health of people. Community based surveys have shown that about 6% of adult Indian population suffers from sexually transmitted infections and reproductive tract infections. The prevalence of these infections is considerably higher among high risk groups ranging from 20–30%.

It has been observed that in the community, 4% – 9% men and 23% – 43% women were having symptoms of STI/RTI. STI clinic based data indicates STI/RTI among men has been reported to be as follows: Syphilis (13% – 57%), Chlamydia (20% – 30%), (Chancroid: 10% – 35%), and Gonorrhoea (8% – 26%).

The common parasitic intestinal worms, also known as soil transmitted helminths in India are round worms [Ascaris Lumbricoides (AL)], hookworms [Ankylostoma duodenale (AD)] and [Necator americanus (NA)] and the whipworms [Trichuris
trichuria (TTrichuris)”. World Health Organization (WHO) estimates more than 1.5 billion people or 24% of the world’s population are infected with soil transmitted helminths. Asia alone accounts for 70% of this burden where population prevalence is 21% higher in rural population as compared to urban population. The prevalence of roundworm (AL), Hookworm (AD) and whipworm (TT) has been reported to be ranging between 0.4 and 71.8%, 0.14 and 42.0% and 0.3 and 29.3% in various regions of India respectively.

Rabies is an important zoonotic infection in which man is dead end of the infection and hence does not play any role in its spread to new hosts. In most of the developing countries, dogs are the principal reservoirs of rabies. It has terrified man since old times since the disease is invariably fatal, painful and horrible because the sick person has thirst and fear of water (hydrophobia). Till date, no treatment has succeeded in curing hydrophobia and in spite of great strides in the prevention of rabies, it is still a global problem.

4.1 OBJECTIVES

After completion of this unit, you will be able to:

- enumerate RTI/STI;
- describe the magnitude of STI/RTI including HIV/AIDS, rabies, soil transmitted helminths;
- identify risk factors, symptoms and signs of STI/RTI including HIV/AIDS, rabies, soil transmitted helminths;
- enumerate treatment measures, prevention and control of STI/RTI including HIV/AIDS, rabies, soil transmitted helminths; and
- describe the steps for patient referral.

4.2 HIV/AIDS/RTI INFECTIONS

These infections causes huge suffering for both men and women around the world, but their effects are far more dangerous among women than men. Many a times RTI are not diagnosed and not treated. When left untreated, they lead to complications such as infertility; ectopic pregnancy and cervical cancer. Pelvic inflammatory disease arising from STI/RTI poses a major public health problem and adversely affects the reproductive health of poor and untreated women. Due to the emergence of HIV/AIDS problem and identification of STI as a co-factor for its causation, each untreated infection also increases the chances of further spread in the community.

4.2.1 Reproductive Tract Infections / Sexually Transmitted Infections (RTI/STIs)

Reproductive tract infection is a broad term that includes sexually transmitted infections as well as other infections of the reproductive tract that are not transmitted through sexual route. In women, this includes infections of the outer and inner genitals (vagina, cervix, uterus, fallopian tubes, or ovaries). In men too, RTI involve the outer and inner genitals (penis, testes and prostate).

**RTI in women also include:**

- Fungal and bacterial infections (candida and bacterial vaginosis)
- Postpartum and post abortion infections
- Infections following procedures (e.g. IUCD insertion)
They are transmitted mainly due to unsafe deliveries, abortions and procedures.

**Sexually transmitted infections (STI)**

STI are infections caused by microbes such as bacteria, viruses, or protozoa that are passed from one person to another mostly through sexual contact.

### 4.2.2 HIV and AIDS

HIV stands for Human Immunodeficiency Virus, a virus transmitted from an infected person through unprotected sexual intercourse, or by exchange of infected body fluids such as blood, or from an infected mother to her infant. AIDS stands for Acquired Immunodeficiency Syndrome. AIDS is the stage of HIV infection that develops some years after a person is infected with HIV. Since HIV is a STI and is transmitted through the same routes that transmit other STIs, whenever there is risk of STI, there is concomitant risk of HIV infection as well.

**Note:** In India, majority of HIV is sexually transmitted (86%), HIV and AIDS are always included when we discuss STIs.

### 4.2.3 Risk Factors and Routes of Transmission of RTI/STIs

- Poor general health
- Poor genital hygiene
- Poor menstrual hygiene
- Unhygienic practices by service providers during delivery, abortion, and IUCD insertion in women
- Unsafe blood transfusions
- Unprotected sex
- Multiple partners
- Sex with partner having sore on the genital region
- Urethral discharge or infected vaginal discharge
- Previous STI infection(s) in the past
- Women have a greater risk of RTI than men due to physiological, social, cultural, and economic factors. Because women are biologically more susceptible than men; more likely to suffer from complications; limited in their ability to protect themselves from high-risk sex or to negotiate condom use; more likely to suffer from asymptomatic infections, remain untreated and, less likely to seek treatment, even for symptomatic infections.
- Adolescent girls and boys who are sexually active and practicing unsafe sex
- Female and male sex workers and their clients
- Men and women whose jobs force them to be away from their families or regular sexual partners are away for long periods of time.
- Men having sex with men including transgenders
- Street children, prison inmates, etc.

**STI/RTI and its links to HIV/AIDS**

The STI/RTIs are identified as co-factor for the causation of HIV infection. So STI treatment and prevention can be an important tool in limiting the spread of HIV infection since:
• A person with STI has a much higher risk of acquiring HIV from an infected partner.

• A person infected with both HIV and another STI has a much higher risk of transmitting HIV to an uninfected partner. Both ulcerative and non-ulcerative STI increase the risk of HIV transmission per exposure. However, an ulcerative lesion increases the risk more than a non-ulcerative STI.

**Different sites of occurrence of STI/RTI in males**

**Penis**- Glans penis, Scrotum, Urethra, Epididymis, Testes

**Other sites**- Seminal vesicles, vas deferens, Prostate gland, pharynx, Ano-rectal regions

**Types of STI/RTI**

Most common **STI/RTI** are Bacterial Vaginosia and Vaginal fungal infection (candida).

There are over 20 STIs. But 11 most common are Syphilis, Gonorrhoea, Chlamydia, Trichomoniasis, Chancroid, Herpes simplex virus (HSV), Genital and cervical warts or human papilloma virus (HPV), Human immunodeficiency virus (HIV), Hepatitis B (HBV), Genital Scabies and Pubic lice.

<table>
<thead>
<tr>
<th>Diseases or Syndromes</th>
<th>Infectious Agent/s</th>
<th>Type of Infectious Agent/s</th>
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<tbody>
<tr>
<td>Syphilis</td>
<td>Treponema pallidum</td>
<td>Bacteria</td>
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<tr>
<td>Herpes</td>
<td>Herpes simplex virus</td>
<td>Virus</td>
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<td>Chancroid</td>
<td>Haemophilus ducreyi</td>
<td>Bacteria</td>
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<td>Chlamydial infection</td>
<td>Chlamydia trachomatis</td>
<td>Bacteria</td>
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<td>Gonorrhoea</td>
<td>Neisseria gonorrhoea</td>
<td>Bacteria</td>
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<td>Trichomonas infection</td>
<td>Trichomonas vaginalis</td>
<td>Protozoa</td>
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<tr>
<td>Yeast infection</td>
<td>Candida albicans</td>
<td>Fungus</td>
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<td>Bacterial Vaginosis (BV)</td>
<td>Mixed infection by Gardnerella vaginalis, Mycoplasma hominis, Vaginal anaerobes</td>
<td>Bacteria</td>
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<tr>
<td>Pelvic Inflammatory Disease (PID)</td>
<td>Mixed infection by Neisseria gonorrhoea, Chlamydia trachomatis, and/or vaginal anaerobic bacteria infection</td>
<td>Bacterial/ Protozoal</td>
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<tr>
<td>Hepatitis B</td>
<td>Hepatitis B virus</td>
<td>Virus</td>
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<tr>
<td>AIDS</td>
<td>Human Immunodeficiency Virus (HIV)</td>
<td>Virus</td>
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<tr>
<td>Genital and anal warts</td>
<td>Human Papilloma Virus (HPV)</td>
<td>Virus</td>
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<tr>
<td>Genital Scabies</td>
<td>Sarcoptes scabiei</td>
<td>Metazoa</td>
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<tr>
<td>Pubic lice</td>
<td>Phthirius pubis</td>
<td>Metazoa</td>
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</tbody>
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4.2.4 Symptoms and Signs of STI/RTIs

Let us now read signs and symptom of STI/RTIs.

**Both men and women:** Genital ulcers (sores), Burning sensation while passing urine, Swelling in the groin, and Itching in the genital region.

**For women:** Unusual vaginal discharge with or without bleeding, Pain in lower abdomen, lower backache, and Pain/bleeding during sexual intercourse.

**For men:** Discharge from the penis, Scrotal swelling and/or swollen and painful testicles.

**Major complications of STI/RTI in men, women and newborn babies:**

- **Complications in men** include, Phimosis, paraphimosis and urethral stricture, Inflammation of testes, Infertility, Carcinoma of the penis.

- **Complications in women:** Pelvic Inflammatory Disease (PID), Chronic pelvic pain, Infertility, adverse outcomes of pregnancy-Ectopic pregnancy, early labour and delivery, Low birth weight due to premature delivery or intra-uterine growth retardation, Stillbirths, Spontaneous abortions, Cervical cancer.

- **Complications in newborn babies** include (1) Perinatal and Neonatal infections: Congenital syphilis, Gonorrhoea – Opthalmia neonatorum, Chlamydia – eye and lung infections, HIV, Herpes simplex viruses 1 & 2 (HSV1 & HSV2), Hepatitis - B virus, (2) Prematurity and (3) Low Birth weight.

**Future implications:**

STIs are a major public health problem because of the potentially serious complications of untreated STI and the relationship between STI and increased HIV transmission. In women of childbearing age, STIs are second only to maternal factors as causes of disease and death. By far, the greatest burden of STI is borne by women and adolescents.

4.2.5 Prevention and Control of STI/RTI

**Primary Prevention**

- Creating awareness and imparting knowledge about safer sex
- Advising on practicing safe sex
- Correct and consistent use of Condom
- Having single partner
- Avoiding multiple partners
- Maintaining sexual hygiene, removing stigma and bias in the community and the health care provider for improving the treatment seeking behaviour, improving access to safe delivery and safe abortion services, screening of every pregnant woman for syphilis.

**Secondary Prevention**

Early diagnosis and prompt treatment by trained health care worker, correct and adequate treatment, treatment of both the partners simultaneously, strengthening the referral system, providing accessible and affordable STI/RTI services in locality.

**Tertiary Prevention**

Prevention of late complications, complications of infertility and children.
The syndromic case management approach to STI/RTI and its advantages

Syndromic management: The patient is diagnosed and treated based on groups of symptoms or syndromes, rather than for specific STI/RTI. All possible STI/RTI that can cause those symptoms are treated at the same time.

Advantages

The patient is diagnosed and treated in one visit. Treatment is highly effective for selected STI/RTI syndromes and relatively inexpensive since it avoids use of laboratory. There is no need for patient to return for lab results. It avoids the wrong treatment since all possible STI/RTIs causing signs and symptoms are treated at once. It can be used by health care providers at all levels.

Whenever any case suggestive of STI/RTI comes to doctor, how does health professional manage a case of STI/RTI?

- By taking a history and doing a physical examination
- S/he arrives at a diagnosis of STI/RTI
- S/he treats STI/RTI case by providing medicines/drugs and information on how to take them
- S/he tries to prevent another STI/RTI by educating the patient about disease and transmission
- Promotes and provides condoms
- S/he ensures the patient cured by offering partner treatment and asks them to follow up. If patient is not responding s/he asks them to follow up and refers to higher center
- Referring patients who are having clinical history suggests symptoms of STI/RTI, or clients who are having risk of STI/RTI but they are not having any symptoms suggestive of STI/RTI or screening asymptomatic clients
- In client education, counselling, condom promotion, for treatment compliance and follow up
- Partner management by motivating them for treatment and follow up and creating awareness in community Men and women are unaware of the consequences of STI/RTI problem. They are shy and do not come out with their problem especially adolescent and youth. It is difficult to elicit the sexual health related information from them. They believe in privacy and confidentiality.

Check Your Progress 1

i) What are reproductive tract infections (RTI)?

ii) List the routes of transmission of STI/RTI.

iii) List the risk factors of RTI/STI/HIV/AIDS.
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4.3 SOIL TRANSMITTED HELMINTHS

Let us now read the parasitic intestinal worms also known as soil transmitted helminths. In India they are mostly round worms (Ascaris lumbricoides), Hookworms (Ankylostoma duodenale and Necator americanus) and the whipworms (Trichuris trichuria).

World Health Organisation (WHO) estimates more than 1.5 billion people or 24% of the world’s population are infected with soil transmitted helminths. Asia alone accounts for 70% of this burden where national population prevalence is 21% being higher in rural population as compared that in urban population the prevalence of Round worm, Hook worm and whipworm has been reported to be ranging between 0.4 and 71.8%, 0.14 and 42.0% and 0.3 and 29.3% in various regions of India respectively.

People of all age groups and both sexes suffer from soil transmitted helminths. However children and adolescents are the most sufferers having overall prevalence rate ranging between 7.6 and 78.3%. WHO estimates that approximately 241 million children between the ages of 1 and 14 year are at risk of soil transmitted helminths. In India which represent 68% of children in this age group and approximately 28% of all children at risk of soil transmitted helminthes globally.

4.3.1 Effect of Soil Transmitted Helminths Infections

- Worm infestation affects human body in several ways e.g. Worms feed on host tissue including blood which leads to a loss of iron and protein and thus often contribute to anaemia.
- Worms can increase the mal absorption of nutrients.
- Worms can decrease vitamin-A availability in Intestine. Round worm specially when increase in large number they may cause loss of appetite reduce nutrition intake and physical fitness and sometimes may block intestinal passage. Some worms can cause diarrhoea and dysentery.
- The worms have negative effects on physical and mental development of children. Children often remain under weight and have and stunted growth due to anaemia caused by decrease in nutrition intake due following worm infestations. Children with heavy worm infestation become too sick or two tired to concentrate at school or even to attend school. Subsequently these children have poor educational and lower lifetime income outputs. Women with worms have poor pregnancy outcomes. Worms also increase child mortality.

4.3.2 Mode of Spread of Intestinal Worms and Risk Factors for Transmission of Helminths

Soil transmitted worms are transmitted by eggs present in human faeces which contaminated soil in areas with poor sanitation e.g. Through open field defecation. Adult worms live in human intestine for food and survival where they produce thousands of eggs each day. When infected people defecate in outdoors (fields) these eggs come...
out with faeces and contaminate soil. Transmission occurs when (i) eggs that are attached to vegetables are ingested without being carefully washed; peeled or cooked, (ii) eggs are ingested through contaminated water e.g. Pond water (iii) eggs are ingested through soil if children play in contaminated soil and put their hand in mouth without washing (iv) However the larvae directly enter through skin who do not put on footwear.

Risk factors responsible for transmission

People those who are:

- illiterate
- socioeconomically backward classes
- open field defecation
- work with bare feet in fields
- poor personal hygiene
- unhygienic feeding habits and
- unsafe drinking water.

4.3.3 Symptoms and Signs, Diagnosis and Treatment of Worm Infestations

People with mild infection usually have no symptoms. When worm infestation become heavy, the symptoms and signs start becoming prominent which include diarrhoea abdominal pain, weakness easy fatigue and loss of appetite may times patient or child may complain of passing worms in the faeces.

Diagnosis of worm infestations

Presence of worms in the intestine is confirmed either by seeing live/dead worm in the faeces or by identifying the ova and cyst of worms present in the samples of faeces (stool) with the help of microscope in the laboratory of the hospital.

Treatment of worm infestations

In the community, Albendazole has been considered safe de-worming drug presently being made available by the Government of India for treatment of persons with worm infestation under National De-worming Programme. For children between ages of 2 and 19 years 1 tablet (400 mg) and half tablet for children of age 1–2 years is recommended. For younger children should be broken into half and crushed and then administered with water under supervision of health worker. All adults are administered one full tablet each.

Note: Sick child should not be given tablet. Every child should first chew the tablet then swallow. Do not allow the child to take tablet at home.

Who should be given treatment

WHO recommends prevention and control of soil transmitted worms related morbidity through periodic treatment of at risk populations living in endemic countries like India particularly pre school and school age children and women of child bearing age (including pregnant women in second and third trimester and breastfeeding women).

The de-worming treatment is to be given without previous individual diagnosis to all at risk people in endemic areas once a year where prevalence of worm infection is over 20% and twice a year when prevalence is more than 50% for this celebration of National De-worming Day (NDD) has also been recommended.

In India NDD is been observed on 10th Feb. every year since 2015.
Side effects of De-worming treatment

The De-worming treatment has very few side effects. There may be some mild side effects like dizziness, nausea, headache and vomiting and abdominal pain all likely due to worms being passed. However these side effects disappear after some time and hospitalisation is not required.

Severe side effects are fatal, life threatening, disabling or incapacitating e.g. Choking hazard/asphyxia. The patient needs to be taken immediately to the nearest health facility for quick treatment. While doing so health worker should stop de-worming of others and stay calm, should call helpline no. try to arrange vehicle /ambulance. He / She should inform attendance of the patient / child about condition and need of emergency treatment. Soil transmitted infections can be eliminated from country as observed in several countries e.g. US, South Korea.

Note: Albendazole tablet can be administered with IFA tablet & Vitamin-A

4.3.4 De-worming and Prevention

The spread of soil transmitted infections can be prevented by taking precautions such as using sanitary toilet and not defecating in open field, washing hands particularly before eating and after using toilet, wearing slippers and shoes, drinking safe and clean water, keeping nails short and clean, eating properly cooked food and storing it safely, washing fruits and vegetables in safe and clean water.

Advantages of de-worming

- Child grows faster and remain healthier
- He/she becomes more resistant to infections
- He/she learns better and remain more active in school
- He/she attends school more regularly
- Anaemia decreases and nutrition improve, and better pregnancy outcome for pregnant women.

Calculation of albendazole tablets (400 mg) for one de-worming round:

You can calculate the demand for albendazole tablets (400 mg) required for one de-worming round using the formula given below:

\[
1 \times \text{No. of children (1–19 years in the area)} + 10\% \text{ of total requirement as buffer (for wastage and spoilage)}
\]
4) Explain Symptoms and signs of worm infestation.

5) Describe prevention and control of worm infestations.

6) List the side effects of De-worming treatment.

7) List the advantages of de-worming.

8) Calculate the requirement of albendazole tablets (400 mg) for one de-worming round in your area.

4.3.5 **Food Borne Helminths**

Food borne helminths commonly includes the following:

a) Taenia Solium – Found in pork
b) Taenia Saginata – Found in cattle

**Mode of transmission**

Eggs or segments pass out with faeces to the ground. They live here for months or years till ingested by cattle or pigs while grazing. When ingested in raw or uncooked meat this form infects humans. The embryo released after ingestion gets transformed into cysticercus.

**Signs and Symptoms:**

Visible in passage of stools
Vague abdominal pain
Distension of abdomen
Nausea
Anorexia
Weight loss

**For Pork Tabeworm**

- All the above
- Cysticercosis of brain may present with seizures, increased intracranial pressure, hydrocephalus, chronic meningitis

Treatment - Praziquantel single oral dose of 5–10 mg/kg body weight is preferred.
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4.4 RABIES

Rabies is an acute viral disease, which causes encephalomyelitis in virtually all the warm-blooded animals including man. The causative agent is RNA virus which is bullet shaped, round at one end and flat at the other. It is found in domestic and wild animals. It is transmitted to other animals and to humans through close contacts with their saliva (i.e. bites, scratches, licks on broken skin and mucous membranes). It is present in the saliva of the dogs for 2–3 days before the appearance of clinical features. It remains in the saliva till the animal dies. Death usually occurs within one week of onset of clinical manifestations.

4.4.1 Susceptibility to Physical and Chemical Agents

(Characteristics of Rabies Virus)

The rabies virus is highly resistant against cold, dryness and decay. In cadavers, it remains infectious for weeks. This virus is highly thermo labile with a half-life of approximately 4 hours at 40°C and 35 seconds at 60°C. Serum proteins and other chelating agents diminish thermal inactivation. In brain tissue at room temperature it can survive up to 1–2 weeks.

It is also susceptible to the action of oxidising agents, most organic solvents, surface acting agents, and quaternary ammonium compounds. Proteolytic enzymes, ultraviolet rays and X-rays rapidly inactivate rabies virus. Soaps and detergents are effective against rabies virus because of their lipid eliminating property, which destroys the outer covering of the virus.

4.4.2 Epidemiology - Rabies in World and in India

Rabies virus is predominantly the nervous system and kills the host in short period after it has entered the nervous system. Before death, from the brain virus reaches salivary glands and is excreted in saliva. The saliva gains entry into another host through a pre existing breach in skin when mere licking or contamination is adequate or the bite of the rabid animal creates a mechanical breach of skin through which the rabies virus gains entry. Virus may be present in the saliva for many days before clinical signs appear and it may be steadily or intermittently secreted until just before death. Report of pre clinical periods of virus secretion in saliva range from 3 days in cats, 14 days in dogs. Infection has been documented in personnel receiving corneal grafts and organs from rabies cases.

4.4.3 Pathogenesis

On entering into human body, rabies virus multiplies at local site of inoculation prior to its spread towards brain via the nerves. Within the brain, virus spreads from infected to contagious cells. There may be regional differences in the intensity with which areas of brain become infected. The main areas affected are usually the cerebellum, hypothalamus, hippocampus and scattered neurons in the reticular formation. The movement of the virus is extremely slow which results into a long incubation period. This fact helps in initiating immune prophylaxis even after the causative agent has invaded the body.

Incubation period

The average incubation period is between 30–90 days. Factors which may influence the length of the incubation period include the site of bite, the amount of virus in saliva of the biting animal, the virus strain, and the age and immune status of the victim. It is shorter in case the bite is closer to brain and massive dose of virus has
been inoculated. Incubation period as short as 10 days and as long as 2 years have been reported.

### 4.4.4 Clinical Features in Man and in Animals

Let us now read about the clinical features in man and animals.

The first symptom to appear may be pain and tingling in the affected limb, especially around the site of bite. **Hydrophobia** is the best known symptom of this disease and is pathognomonic for rabies. Hydrophobia is usually the only neurologic abnormality found in patient presenting with furious rabies. It is due to a violent jerky contraction of the diaphragm and accessory muscles of inspiration that is triggered by the patient’s attempts to swallow liquid and by a variety of other stimuli such as strong current of air, loud noise and bright light. Hydrophobia is usually not associated with pain in neck or throat. It is also not a conditioned reflex caused by aspiration of liquid into trachea.

Before the appearance of hydrophobia rabies needs to be differentiated from other clinical conditions. Initially patient may have symptoms such as:

- Lockjaw
- Encephalitis
- Hysteria

Later patient develops

- **Paralytic phase** which includes Acute polyneuritis
- Differential diagnosis
- Delirium, tremors
- Rabies post vaccination encephalomyelitis

**Rabies in animals**

**a) Clinical features in dogs**

After an incubation period of around 3 months (range 10 days to 6 months), Dog may manifest one or more of the following clinical features given below:

- change in behaviour of dog, change in bark tone, change in feeding habits,
- animals may go off feed and eat abnormal objects,
- may develop fever, vomiting, excessive salivation, paralysis of lower jaw, anxiety, restlessness, convulsions,
- paralysis leading to death with in 5–7 days of onset of disease,
- There is no hydrophobia in animals.

**b) Clinical features in cats and cattle**

Rabid cats show extreme aggressiveness, great sensitivity to touch/voice, profuse salivation and may attempt to attack dog or man. In cattle, rabies is manifested as abnormal movements of posterior extremity, foamy yellow froth from mouth and decrease in yield of milk. Milk of rabid cattle has been shown to have viable rabies virus and its ingestion in raw form may require post exposure treatment in those individuals who have ulcers or abrasions in mouth or pharynx. Otherwise the gastric juice destroys the rabies virus. **Pasteurisation and cooking also kill the virus.**
4.4.5 Treatment of Rabies in Humans

Because of long incubation period, which is typical of most cases of human rabies, it is possible to institute prophylactic post exposure treatment. This must be started at the earliest to ensure that the individual will be immunised before the rabies virus reaches the Central Nervous System.

a) Decision to treat

In rabies endemic country like India, where every animal bite is potentially suspected as a rabid animal bite the treatment should be started immediately. To bring out uniformity globally, the WHO recommended classification of animal bite for post-exposure treatment should be followed which is made available in the anti-rabies Clinic or hospital.

b) Treatment of animals

Although unvaccinated animals are more likely to transmit rabies, vaccinated animals can also do so if the vaccination of the biting animal was ineffective for any reason. The risk of dog being infected with rabies is greatly reduced when it appears healthy and there is confirmed history of vaccination with minimum of two immunisations with potent rabies vaccine in last two years. The treatment should be started immediately after the bite. The treatment may be discontinued if animal involved (dog or cat) remains healthy throughout an observation period of 10 days. The observation period is valid for dogs and cats only. Bite by all wild animals should be treated as category III exposure. It should be noted that bites by rats, mice, squirrel, hare and rabbits seldom require treatment. Bat rabies has not been conclusively proved in India and hence exposure does not warrant treatment. It is re-emphasised that the treatment should be started as early as possible after exposure, but it should not be denied to person reporting late for treatment.

c) Management of wound

Since the rabies virus enters the human body through a bite or scratch, it is imperative to remove as much saliva, and thereby the virus, from the wound. It is possible by an efficient wound toilet that should not involve additional trauma. Since the rabies virus can persist and even multiply at the site of bite for a long time, wound toilet must be performed even if the patient reports late.

This can be done by prompt and gentle thorough washing with soap or detergent and flushing the wound with running water for 10 minutes. If soap and detergent are not immediately available wash with running water for atleast 10 minutes. Avoid direct touching of wounds with bare hands. Considering the importance of this step the anti rabies clinics should have wound washing facilities.

Remember:

The application of soil, chillies, oil etc. is unnecessary and damaging. If they have been applied on the wound, enough gentle washing with soap or detergent to remove the extraneous material especially oil should be done followed by flushing with copious amount of water for 10 minutes immediately. Immediate washing of the wound is a priority.

The maximum benefit of the wound washing is obtained when fresh wound is cleaned immediately. Suturing of wound should be avoided as far as possible. If unavoidable, minimum loose sutures should be applied after adequate local treatment along with proper infiltration of anti rabies serum.
• Cauterisation of wound is no longer recommended as it leaves very bad scar, and does not confer any additional advantage over washing the wound with water and soap.

• Inj. tetanus toxoid should be given to the unimmunised individual.

• To prevent sepsis in the wound, a suitable course of an antibiotic may be recommended.

d) **Application of antiseptic**

After thorough washing and drying the wound, any one of the available chemical agents should be applied: (in appropriate recommended dilution), Povidone (in appropriate chlorhexidine recommended dilution), Povidone iodine, alcohol etc. For further treatment and necessary immunisation patient should be brought to the Anti-Rabies Clinic of the nearest hospital.

e) **Management of animal bite exposure to pregnant women and lactating mothers**

Pregnancy and lactation are no contraindications for rabies vaccination. Post-exposure prophylaxis against rabies takes preference over any other consideration since it is a life saving procedure. Moreover, rabies vaccine does not have any adverse effect on fetus, mother-to-be and the course of pregnancy. Hence complete post-exposure treatment should be given depending on the category of the exposure.

f) **Pre-exposure prophylaxis**

Pre-exposure prophylaxis may be offered to high risk group like laboratory staff handling the virus and infected material, clinicians and para-medicals attending to hydrophobia cases, veterinarians, animal handlers and catchers, wildlife wardens, quarantine officers and travellers from rabies free areas to rabies endemic areas.

### 4.4.6 Prevention and Control of Rabies

Rabies is primarily a disease of animals and control measures have to be directed towards the natural reservoir of the disease. Wild animals act as important and frequent reservoirs of disease in developed countries whereas developing countries still have canine rabies as their major problem. For control of Rabies, notable progress has been made in the direction of developing suitable vaccines and appropriate delivery systems. Any strategy for control of rabies in developing countries shall have following four components: (i) Epidemiological surveillance (ii) Dog population management (iii) Mass vaccination and (iv) Community participation. The community health nursing workers have to play crucial role in spreading awareness about the disease and its prevention and control along with mobilising of people for early treatment and vaccination.

### Check Your Progress 3

1) What is Rabies?

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2) How much rabies virus is susceptibility to physical and chemical agents?

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<th>Question</th>
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<td>3) What is the prevalence of Rabies?</td>
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<td>4) What does Rabies cause in human body?</td>
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<td>5) What is the incubation period of Rabies?</td>
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<td>6) What are the clinical features of Rabies in man and animals?</td>
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<td>7) How a case of animal/dog bite should be treated?</td>
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<td>8) When should the case of animal bite/dog bite be brought to dog bite clinic for further treatment and vaccination?</td>
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<td>9) What should be done in case of pregnant woman bitten by animal/dog?</td>
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<td>10) How can Rabies be prevented and controlled in the community?</td>
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4.5 LET US SUM UP

In this unit you have learnt about RTI/STI and HIV/AIDS, routes of transmission, factors, symptoms and prevention and control. The complications of STI/RTI in men, women and newborn basis along with future implications are also covered. It is important to create awareness and impart knowledge about safer sex.

In second section of the unit, you have come to know about the prevalence of the worm infestation in the women and children, the common soil transmitted helminthes (worms), their mode of transmission, effects on human health, signs and symptoms, diagnosis and treatment and the measures to prevent and control of soil transmitted helminths in the community.

In the end session of the unit, you have come to know about the rabies, its prevalence in the country and world, the incubation period and signs and symptoms, treatment and vaccination, management of animal/dog bite, and prevention and control of Rabies in the community.

4.6 MODEL ANSWERS

Check Your Progress 1

1) Reproductive tract infections (RTI) Reproductive tract infection is a broad term that includes sexually transmitted infections as well as other infections of the reproductive tract that are not transmitted through sexual intercourse.

2) Route of transmission of STIs are:
   - Poor general health
   - Poor genital hygiene
   - Poor menstrual hygiene
   - Unhygienic practices by service providers during delivery, abortion and IUCD insertion in women
   - Unsafe blood transfusions
   - Unprotected sex
   - Multiple Partners
   - Sex with Partner having sore on the genital region
   - urethral discharge or infected vaginal discharge
   - Previous STI infection(s) in the past year

3) Risk groups are:
   - Women have a greater risk of RTI than men due to physiological, social, cultural and economic factors;
   - Biologically more susceptible than men;
   - More likely to suffer from complications;
   - Limited in their ability to protect themselves from high-risk sex or to negotiate condom use;
   - More likely to suffer from asymptomatic infections and remain untreated and, less likely to seek treatment, even for symptomatic infections
4) (1) Adolescent girls and boys who are sexually active and practicing unsafe sex. (2) Female and male sex workers and their clients. (3) Men and women whose jobs force them to be away from their families or regular Sexual Partners are away for long periods of time. (4) Men having sex with men including transgenders. (5) Street children, prison inmates, etc.

5) **Primary prevention for RTI/STIs.**

- Creating awareness and imparting knowledge about safer sex
- Advising on practicing safe sex
- Correct and consistent use of Condom
- Having single partner
- Avoiding multiple Partners
- Maintaining sexual hygiene, Removing stigma and bias in the community and the health care provider for improving the treatment seeking behaviour, Improving access to safe delivery and safe abortion services, Screening of each and every pregnant woman for syphilis

**4.7 REFERENCES**

1) Training of Nursing Personnel to deliver STІ/RTI Services: Facilitators Guide, department of AIDS control, NACO, Ministry of Health And Family welfare Government of India.


3) Zoonotic Diseases of Public Health Importance-Rabies (Year 2005) , Zoonotic Diseases Division, National Institute for Control of Diseases(DGHS), 22,Shamnath Marg, Delhi-54.