



HEALTH UPDATE

ALLOPATHY AYURVEDA HOMOEOPATHY NATURE CURE UNANI

January 1998

Vol. 2. Issue No. 5

Rupees 30

Advisory Board

1. **Mr. J. Edgar Hoover**
 2. **Director**
 3. **Federal Bureau of Investigation**
 4. **Washington, D. C.**
 5. **Dear Sir:**
 6. **I am writing you to inform you that**
 7. **the following information was received**
 8. **from the New York Office on**
 9. **October 10, 1964:**
 10. **On October 9, 1964, the New York**
 11. **Office received information from**
 12. **the New York City Police Department**
 13. **that a person known as**
 14. **James Earl Ray, who is known**
 15. **as a fugitive, had been seen**
 16. **in New York City on October 8, 1964.**
 17. **The New York City Police Department**
 18. **is currently searching for this person.**
 19. **The New York Office is currently**
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Technical Advisor

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Anxiety

 **ALLOPATHY**

Anxiety is not a disease but a symptom. Most people have anxiety at some time or the other in their life. Usually, it is a normal reaction to a stressful situation and is therefore short-lived. Anxiety can adversely affect your work if it occurs often. It is important to remember that anxiety can exist alone or in combination with other symptoms of several emotional disorders. It is the most common feature of majority of psychiatric illnesses.

How common is anxiety?

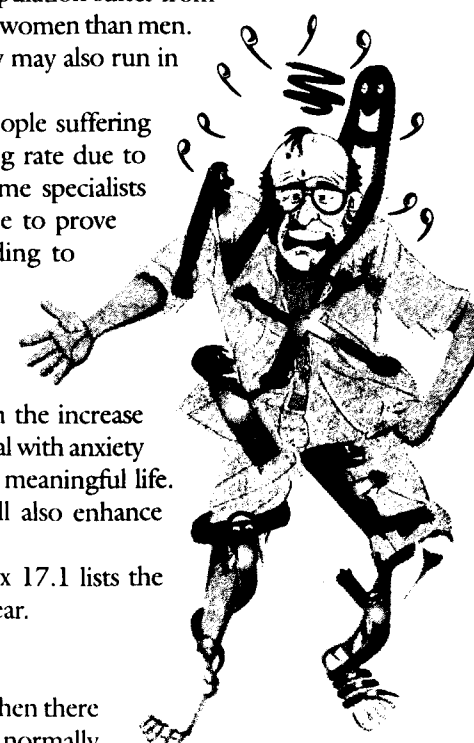
Anxiety is one of the most under-reported conditions largely due to ignorance. It is difficult to estimate the number of people suffering from anxiety because most people suffering from anxiety do not consult a doctor. This is mainly because many people believe that only “mentally sick” people need to consult with a psychiatrist. In the United States, an estimated five percent of the total population suffer from anxiety. Anxiety is more common among women than men. Some studies have indicated that anxiety may also run in families.

It is believed that the number of people suffering from anxiety is increasing at an alarming rate due to pressures of modern life. However, some specialists feel that there is no conclusive evidence to prove that anxiety is on the increase. According to them, increased awareness and the desire to live life fully have resulted in more number of people seeking help for anxiety.

Irrespective of whether anxiety is on the increase or not, it is important that you learn to deal with anxiety in order to lead a more productive and meaningful life. Controlling and preventing anxiety will also enhance your coping skills in case of adversity. Anxiety is often confused with fear. Box 17.1 lists the main differences between anxiety and fear.

What are the effects of anxiety?

Anxiety affects everyone, especially when there is excessive mental or emotional stress. It normally leads to two outcomes: (a) intense panic and therefore inability to function normally or adapt



Why should I go to a psychiatrist?
I am not mentally sick.

to the situations or (b) an ability to anticipate the danger and take appropriate preventive measures against it. The first reaction is called "traumatic anxiety" and the second reaction is called "signal anxiety".

What are the causes of anxiety?

All the memories suppressed during the infancy and childhood can have an impact on the adult life and result in anxiety. It is usually the result of an exaggerated response to an emotional stress. Emotional ups and downs are a part of everyone's life. However, some people are more adversely affected by emotional stress than others.

Anxiety often develops over a long period of time and is largely dependent on the entire life's experiences. Specific events or situations can precipitate anxiety attacks but only after a basic pattern of an anxious response to life's experiences is established. There are four main factors that influence development of the pattern of anxious response:

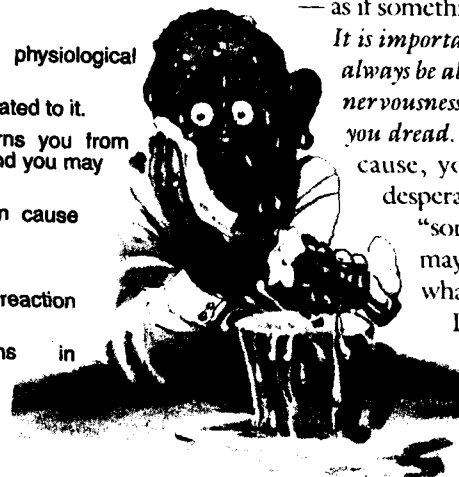
- **Surroundings:** The environment or surroundings in which you live influence the way you think about yourself and others. It could be due to your experiences with family, friends, colleagues, etc. Anxiety is common if you are insecure about your surroundings.
- **Suppressed emotions:** Anxiety can occur if you are unable to find an outlet for your feelings in personal relationships. This is especially true if you suppress anger or frustration for a very long time.
- **Physical causes:** The mind and body are constantly interacting with each other and any change in this interaction may cause anxiety. This is commonly seen in conditions such as pregnancy, adolescence and recovering from an illness. During these conditions, mood changes are common, and they may lead to anxiety.
- **Hereditary:** Although some emotional disorders may run in families, it is not an important cause of anxiety.

What are the types of anxiety?

Conditions that cause anxiety are broadly divided into three categories: (a) anxiety states, (b) phobic disorders and (c) post-traumatic stress disorders. The category of anxiety states includes three specific disorders: (i) panic disorders,

Box 17.1 Anxiety and fear

- Anxiety is the result of psychological and physiological processes in the body.
- Anxiety is not the same as fear although it is related to it.
- Anxiety is the response to danger that warns you from "within" — as an instinct — that there is danger and you may lose control of the situation.
- Fear is the reaction to real danger that can cause harm.
- Fear is usually short-lived. Anxiety lasts longer.
- It is normally difficult to assess whether your reaction is due to anxiety or fear.
- Anxiety and fear coexist in almost all situations in varying proportions.
- It is more important to find out the causes of your symptoms than to decide if it is fear or anxiety.



(ii) generalized anxiety disorder and (iii) obsessive compulsive disorder. *This issue includes a brief description of panic disorders, generalized anxiety disorder and phobic disorders. Obsessive compulsive disorder and post-traumatic disorder will be included in upcoming issues of the Health Update. Stress, one of the important factors contributing to anxiety, and its management will also be discussed in upcoming issues of the Health Update.*

Anxiety states

Anxiety may either be *acute* (of short duration) or *chronic* (of longer duration). It is common for a person with panic disorder to have symptoms of generalized anxiety disorder. Anxiety without panic attacks is called generalized anxiety disorder. Both panic disorders and generalised disorders have similar causes, signs and symptoms.

What are panic disorders?

Recurrent attacks of anxiety or panic along with nervousness are called panic disorders. They are often associated with a feeling of approaching doom. Panic disorders may either begin slowly with a general feeling of tension and nervous discomfort or occur suddenly with an attack of acute anxiety. Although panic disorders are more common in young adults, they may also be present in adolescents.

Panic disorders are usually not related to other mental illnesses and often appear to occur without any *precipitating factors*. Precipitating factors are those factors that hasten the onset of signs and symptoms of a disease. You may not be able to recollect or identify precipitating factors of panic attacks, especially if you have suppressed emotions, which a mental health specialist can help you identify.

What are the symptoms of panic disorders?

Common symptoms of panic disorders include a feeling of panic, *palpitations* (thumping sensation and awareness of the heart beats), pain in the chest, difficulty in, or rapid breathing and a feeling of dizziness or weakness. Most people describe panic as a strange, weird or ghostly feeling — as if something very bad is going to happen.

It is important to remember that you may not always be able to identify the cause of fear and nervousness or the consequences of the event you dread. If you are unable to identify the cause, you are likely to become more desperate and feel that you should do "something" to protect yourself. It may however be difficult to define what this "something" is.

Detailed below are the main symptoms of panic disorders.

- **Chest pain:** Chest pain due to anxiety is often confused with chest pain due to heart attack or angina. There are four major

Box 17.2. Diagnostic criteria for panic disorders

➤ At least three panic attacks within three weeks. These attacks should not be in situations that are related to excessive physical exertion or life-threatening situations.

➤ Fear and apprehension is present in each panic attack along with at least four of the following symptoms:

- Difficulty in breathing ● Awareness of, or forceful heartbeats
- Chest pain or discomfort ● Choking or suffocating sensation
- Giddiness or unsteady feelings ● Tingling in the hands and feet ● Feeling of unreality ● Hot and cold flashes ● Sweating

- Faintness ● Trembling or shaking ● Fear of dying, going crazy or mad or doing something uncontrollable during the panic attack

➤ At least one attack would have been followed by at least one month of one or more of the following:

- Continuous concern about having another attack(s)
- Significant worry about the likely outcome or consequences of the panic attacks, such as having a heart attack or going crazy
- A major change in behaviour related to the attacks.
- No associated physical problems or other mental illnesses such as major depression
- Not associated with fear of being in crowds



differences between chest pain due to heart problems and anxiety. The chest pain due to anxiety:

1. Lasts only for a few seconds at a time but may repeat every few minutes or hours;
 2. Is not related to exercise or physical exertion;
 3. Can occur even at rest; and
 4. Does not go away when you stop the physical activity you may be doing when the chest pain starts.
- **Difficulty in breathing:** During an attack of panic, you may begin to breathe more rapidly and more deeply because of the fear that you are inhaling less air. You may also have a strong urge to go out and inhale more air. If the rapid and deep breathing continues for a long time, there may be loss of large amount of carbon dioxide. This imbalance in carbon dioxide in the body is likely to produce additional symptoms such as numbness or tingling in the toes, feet or face, light-headedness and giddiness.

- **Other symptoms:** Some people with anxiety may complain of sensation of heat on the face, sweating, goose pimples and trembling. In addition, there may be pain or hollow butterfly like fluttering feeling in the stomach. During a panic attack, you may be unable to act or think intelligently and as a result feel as if your mind is clouded or confused.

Criteria for diagnosis of panic disorders are described in Box 17.2.

The frequency of panic attacks varies from person to person. Some people may have only a few attacks during the entire life while others may have attacks every few days, weeks or months. Sometimes the panic attacks may stop

suddenly without any apparent reason. The severity and duration of symptoms varies with each attack.

What is generalised anxiety disorder?

Generalised anxiety disorder is a condition where there is chronic and exaggerated worry or tension, often without any provocative factors. Most people with this condition live with fear of disaster and worry about most aspects of life such as health, money, family, work, etc. There may be periodic or recurrent acute attacks of panic with more severe symptoms.

Just as in panic disorder, it may not be easy for you to identify the exact cause of generalised anxiety. Even if you do, it is likely that you may not be aware of how and why these troubles cause the symptoms.

What are the signs and symptoms of generalised anxiety disorder?

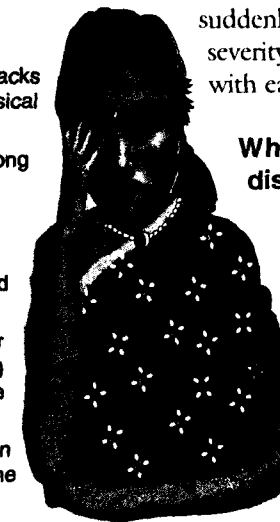
There are several symptoms of chronic anxiety. Of these, the most common are:

- **General irritability:** Nervousness, irritability, tense and panicky feeling. A chronic worry that an unknown calamity will soon strike leads to sleeplessness and easy tiredness during the day.
- **Headache:** Muscle tension, especially in the head, neck and back, may lead to headache or a dull and throbbing discomfort. The pain may be present either at the back, top or front of the head.
- **Tremors:** Shakiness and trembling of the whole body, especially in the arms and hands.
- **Increased activity of the autonomic system:** Involuntary functions of the body such as breathing, digestion, heart beats, etc. are called "autonomic functions" as they function independently without outside influence. Anxiety can increase the activity of the autonomic system and therefore lead to increased sweating (especially on the palms of the hand), and flushing of the face. Sometimes there may either be increased dryness or watering in the mouth.

Increased autonomic activity also leads to disturbances in the digestive system. "Butterflies in the stomach" is a very common feeling. Other symptoms include burning sensation in the chest or stomach, fullness in the stomach, which often accompanied by belching, bowel disturbances (especially loose bowels) and increased frequency of passing the urine.

Box 17.3 lists the diagnostic criteria for generalised anxiety disorder.

It is important to remember that the progress recovery of generalised anxiety disorder varies from person to person. Some people may recover with short-term treatment, while



Box 17.3. Diagnostic criteria for generalised anxiety disorder

● Severe and continuous anxiety that has at least three of the following four categories of symptoms:

➤ **Nervous tension:** Trembling, shakiness, tension, pain in the muscles, tiredness, inability to relax, twitching of the eyebrows, frowning, strained face, restlessness and restless movements.

➤ **General symptoms:** Sweating, increased heart rate and palpitations, cold and clammy hands, dry mouth, dizziness, tingling in the hands and feet, increased frequency of passing urine, indigestion, diarrhoea, discomfort in the middle of the stomach, lump in the throat and rapid breathing.

➤ **Apprehensive expectations:** Anxiety, worry, fear, absent-mindedness and anticipation of harm.

➤ **Attention:** Increased attentiveness that results in distraction, difficulty in concentration, lack of sleep, irritability, impatience and feeling fidgety.

● Continuous anxious mood for more at least one month

● No other associated mental disorders such as depression, etc.

● Age eighteen years or above



others may continue to have symptoms and inability to lead a normal life with varying degrees of severity. Chronic anxiety in young adults often tends to become less severe with age, especially if there is success and stability in professional and personal lives.

How are anxiety states diagnosed?

As mentioned earlier, anxiety can also be one of the major symptoms of other psychiatric illnesses. Your doctor will ask several questions to rule out associated disorders.

It is difficult to diagnose anxiety states by physical examination alone. This is because anxiety is normally not associated with abnormalities in any organs or parts of the body. Also, as mentioned earlier, heart rate may be higher and breathing more rapid without any evidence of heart diseases. Thus, the description of your symptoms, especially those related to mental disturbances and/or conflicts, play a critical role in diagnosis of anxiety states. *It is important that you describe all your symptoms, confusions in the mind, doubts, etc. to the doctor very clearly and without any hesitation.* Unless you are frank with your doctor, he/she may not be able to make a correct diagnosis.

Your doctor is likely to recommend a few laboratory tests to rule out conditions such as heart diseases, over-activity of the thyroid gland, disease of the middle ear, etc.

What is the treatment for anxiety states?

Treatment of anxiety states involves four main approaches. These include (a) psychotherapy, (b) relaxation therapy, (c) meditation and (d) medicines.

● **Psychotherapy:** This term is used for a large number of methods for treating mental and emotional disorders by psychological techniques rather than through medicines or

physical treatment. There are two main types of psychotherapy for management of anxiety states. These include *insight psychotherapy* and *supportive psychotherapy*.

Insight psychotherapy involves determination of the strength of the inner self that affects (a) the stability of your relationships with family, friends and working environment, (b) motivation for treatment and (c) ability to bear difficulties in life. Your doctor will first assess your capacity to "explore" within your mind in order to find out if you are likely to respond to this treatment or not.

If your problem is related to specific and limited situations, you may be free from inner conflicts with short-term therapy and after your doctor has helped to uncover the underlying problems. Freedom from inner conflicts will relieve the symptoms of anxiety. If the underlying causes are related to neurotic difficulties, psychoanalysis or other similar forms of long-term treatment may be necessary.

Supportive psychotherapy involves discussing your difficulties with your doctor. He/she is likely to reassure you about unrealistic fears and encourage you to face situations and/or circumstances that lead to anxiety. Although supportive psychotherapy will not cure anxiety, it will help you understand the situations that lead to anxiety and change them in order to reduce stress.

● **Relaxation therapy:** Relaxation techniques can be helpful if you are eager to accept suggestions from your doctor and implement them. He/she may teach you specific relaxation techniques. It is important that you practise these techniques under your doctor's guidance initially so that both of you are confident that you are able to practise correct relaxation techniques. *It is important to remember that a daily routine of these relaxation techniques is necessary for controlling anxiety.* You should also practice them whenever you feel the inner tension rising or when faced with situations that normally lead to anxiety.

● **Meditation:** Transcendental meditation or other simple forms of meditation that are not related to religious rituals or practices are likely to relieve symptoms of anxiety. Several research studies world-wide have indicated that meditation helps maintain an optimum level of the involuntary functions of the body (such as heart rate, respiration, digestion, etc.).

● **Medicines:** Your doctor may prescribe mild *tranquilizers* and *antidepressants* to reduce the symptoms of anxiety. Tranquilizers are medicines that calm agitated or anxious people without affecting the consciousness. Antidepressants are medicines that relieve depression by restoring the balance of chemical substances in the nervous system. Detailed below are some of the common medicines used for management of anxiety states.

Benzodiazepines: There are several medicines in this group of tranquilizers. *Diazepam* is one of the common

medicines in this group. It is a long-acting medicine, is rapidly absorbed in the stomach and begins to act within fifteen to twenty minutes. However, the maximum effect is observed only one to two hours after taking the medicine. Absorption of diazepam injection is very slow and erratic. It is therefore usually not given.

Lorazepam, another medicine in this group, is absorbed slowly and gives maximum effect after two hours. Unlike diazepam injection, lorazepam injection is absorbed rapidly.

Common side effects of benzodiazepines include tiredness and drowsiness, especially in the initial stages. *It is therefore important that you avoid driving vehicles or working near a dangerous machine after taking these medicines.*

Benzodiazepines are addictive, especially if taken continuously for more than three months. They are also not recommended during pregnancy and breast-feeding as it may adversely affect the unborn baby and the infant respectively. Box 17.4 details the symptoms and principles of withdrawal of benzodiazepines.

Alprazolam: In recent times, this medicine has been used very extensively for management of anxiety and some other mental illnesses. Although its impact on anxiety is similar to those of benzodiazepines, alprazolam results in less severe side effects, especially drowsiness. This is also an addictive medicine.

Bupirone: This is one of the newer medicines for management of anxiety. Although its effect on anxiety is similar to that of diazepam, bupirone does not result in addiction or withdrawal symptoms. Its action is slower and the maximum effect is normally observed after three to four weeks. Bupirone is therefore recommended for chronic anxiety.

Several research studies are resulting in rapid changes in the understanding and applications of the medicines used for treatment of anxiety. It is therefore advisable that you avoid self-medication and take medicines as per your doctor's prescription only.

It is important to remember that although medicines can relieve symptoms temporarily, they cannot cure anxiety. You should therefore consult with a mental health specialist to resolve the conflicts and problems that cause anxiety. Irrespective of how long it takes you to overcome the root cause of the anxiety, you should continue efforts to develop an ability to deal with stress and conflicts more effectively.

Phobic Disorders

Phobic disorders are conditions where you have irrational fears of a specific object, activity or situation. This fear results in a strong urge to avoid them. The irrational fears are called *phobias* and conditions with phobias are called phobic

disorders. Phobias have three main features:

1. The fear is disproportionate to the circumstances.
2. You cannot deal with the fear by reasoning or control it with will power.
3. You are aware that your fears are not justified and yet you stay away from the feared object, activity or situation.

Many people have simple phobias such as fear of animals, high places or closed rooms. You can easily manage these fears by avoiding them. However, some phobias are extreme and serious. They result in anxiety and often lead to panic. Several million people worldwide are estimated to have severe phobias and panic attacks as a result of them.

What are the types of phobias?

There are three main types of phobic disorders. These include *simple phobia* (fear of objects), *social phobia* (fear of functions) and *agoraphobia* (fear of situations).

Phobias usually do not adversely affect the life in adulthood. This is because the fear is often specific and avoiding the cause of fear may not be critical for professional and personal development. The term "phobic disorder" is used when the phobias result in significant symptoms and disability of varying degrees.

Agoraphobia and simple phobia are more common among women. Agoraphobia and social phobia may be present in several members of a family.

What are the symptoms of simple phobia?

An irrational fear of objects is called simple phobia. It normally occurs during infancy and early childhood, which are the early stages of growth and development. Simple phobia may persist till adult life and may appear again after a period of no symptoms. Simple phobia has three essential and one associated features. Essential features include:

Box 17.4. Withdrawal of benzodiazepines**Symptoms:**

- Anxiety
- Irritability or depression
- Nausea
- Numbness or tingling sensation in the limbs
- Pain and weakness in muscles
- Difficulty in sleeping
- Confusion
- Fits or seizures

Principles of withdrawal:

- Dose of medicine to be reduced gradually.
- The dose to be reduced by 10-25% of daily dose once in two weeks
- Dose to be reduced only if symptoms are absent.
- If symptoms recur with reduced dose, relaxation techniques to be practiced and/or alternative medicines to be used.
- Short acting medicine to be replaced temporarily with long-acting medicine



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Box 17.5. Diagnostic criteria for simple phobia

- Continuous, irrational fear of, or a forceful desire to avoid an object or situation such as animals, heights, closed rooms, receiving injections, seeing blood, etc.
- Exposure to the phobic situations or objects often results in panic attacks. Children may express anxiety due to simple phobia as crying, tantrums, clinging, etc.
- Recognition, especially by the adults, that the fear is either excessive or unreasonable. This recognition often causes excessive distress.
- The strong desire to avoid phobic situations or objects interferes with normal personal and/or professional life.
- Duration of symptoms for more than six months in adults.
- No other associated mental disorders such as obsessive compulsive disorder, post-traumatic stress disorder, other phobias, depression, etc.

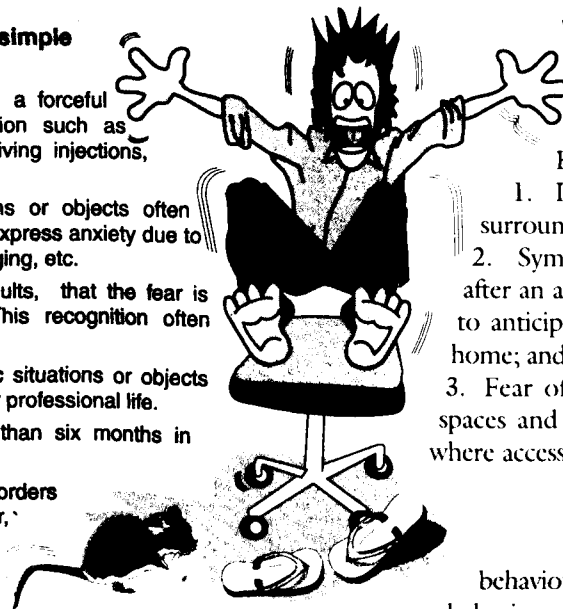
- Fear of a specific object or situation that is not related to situations or functions;
- Tendency to avoid situations that you feel can lead to anxiety; and
- Sudden exposure to the object you fear may produce a panic attack.

A likely associated feature is the tendency to seek detailed information on a situation that you fear before you actually face the situation. Box 17.5 details the diagnostic criteria for simple phobia.

What is agoraphobia?

Fear of being in a situation where you may either be helpless or humiliated, especially during an attack of panic, is called agoraphobia. People with agoraphobia are scared of being away from help or a secure place such as home. They have two types of fears: fear of some specific situations and fear of fear itself. This means that you will anticipate a panic attack. This anticipation or fear of panic attacks leads to more and more such situations. As the frequency of these fears increase, you are likely to behave in a way that proves that your fears were correct. At this stage, you may become scared to go out of the house alone, travel or be in a situation from where you cannot get away quickly. Thus, agoraphobia is a vicious cycle that increases the intensity of the fear itself.

Agoraphobia is estimated to be ten times more common among women than men. This is perhaps because the way most women are brought up, they tend to become insecure and dependent. A large proportion of women are over-protected during their childhood, are "taught" not to assert themselves. They are also not often provided with opportunities to exhibit their skills, special talents, etc. or develop confidence.



What are the symptoms of agoraphobia?

- Agoraphobia has three essential and two associated features. Essential features include:
1. Irrational fear of leaving familiar surroundings of the home;
 2. Symptoms of anxiety usually appear after an acute attack of panic, which leads to anticipation of helplessness away from home; and
 3. Fear of being in crowded and closed spaces and tunnels, or any other situation where access to help is limited.

Associated features include (a) pleading, demanding, manipulative or child like behaviour and (b) a tendency for obsessive behaviour.

Box 17.6 details the diagnostic criteria for agoraphobia.

What are the signs and symptoms of social phobia?

Fear of behaving in a manner that can invite ridicule from others is called social phobia. It occurs less frequently than simple phobia or agoraphobia. Social phobia has three essential and three associated features. Essential features include:

1. Fear of situations in which you may be exposed to scrutiny or critical observations by others.
2. Excessive anxiety of being criticized or ridiculed when forced to be in situations where others can "inspect" you.
3. Anxiety is mainly due to fear of behaving in a shameful manner in front of others.

Associated features include:

1. Awareness that others may recognise signs of anxiety when you are forced to be in situations where they can "inspect" you.
2. Anxiety may adversely affect your behaviour and/or performance, thus increasing the intensity of anxiety.
3. Occasionally you may have generalised anxiety without any apparent cause.

Box 17.6. Diagnostic criteria for agoraphobia

- Significant fear of being alone in public places from where escape or help may not be easily available. These include crowds, tunnels, bridges and public transportation.
- A strong desire to avoid situations described above.
- Gradual restriction to normal activities till the desire to avoid situations described in (1) begins to adversely affect the life.
- Symptoms are not due to normal side effects of medicines or any other abnormal health condition.
- No other associated mental illnesses.



Box 17.7 Diagnostic criteria for social phobia

- A persistent, irrational fear of being exposed to situations where (a) others may scrutinize you and (b) you may behave in a shameful manner.
- A strong desire to avoid situations described above.

- Distressed feeling because you recognize that your fear is either unreasonable or excessive.
- No other associated mental illness.



Box 17.7 details the diagnostic criteria for social phobia.

What is the treatment for phobic disorders?

There are four main approaches to management of phobic disorders. These include: (a) psychotherapy, (b) behaviour therapy, (c) medicines and (d) supportive therapy.

- **Psychotherapy:** In this approach, your doctor will help you identify the root cause of your phobias and analyse them for you. It is important to remember that the psychological techniques for management of phobic disorders are effective only if you are receptive to these methods of treatment. If you are not, even after identifying and analysing your inner conflicts, you may continue to have symptoms of phobias.

- **Behaviour therapy:** In recent times, this approach, which involves techniques that influence and change your behaviour, has been demonstrated to be very effective. One of these techniques involves desensitizing you from the phobias. Your doctor will expose you, one after another, to the images of a predetermined list of situations, objects or conditions that cause phobias. He/she will first begin

with a cause that is likely to cause least symptoms and combine this image with one that is associated with pleasant sensations. If these pleasant sensations are strong, they can suppress the anxiety. Your doctor may also prescribe tranquilizers for a short duration and teach you simple methods of muscle relaxation that you can practice whenever you are exposed to phobic situations. Once you are "desensitized" to this phobia, the doctor will repeat the exercise with successive phobic images, moving gradually from those that cause least symptoms to those that cause severe symptoms. Another successful

behavioural technique is intensive exposure to either the cause of phobia or its image as long as you are able to tolerate the fear until a time when there is no more fear.

Behavioral therapy is more effective for social and simple phobia rather than for agoraphobia. It is however important to remember that the results of this approach vary from person to person.

- **Medicines:** Your doctor may prescribe an antidepressant, especially if you have agoraphobia. Just as for anxiety states, several medicines are recommended *temporarily* for management of phobias in order to relieve symptoms. Once anxiety subsides, it is easier to resolve inner conflicts.

- **Supportive therapy:** Supportive behaviour from the doctor, family and friends can reduce the symptoms and make other approaches of treatment more effective. It is important to remember that the more you avoid what you fear, more intense is your fear likely to be. Supportive therapy can help you develop confidence to deal with the fears over a period of time.

Irrespective of the cause of anxiety, you can control the symptoms by adopting a positive attitude towards life and developing a regular routine of exercises and relaxation techniques such as meditation.

AYURVEDA

It is amazing that the man lives a life of worry, anxiety and discontentment in the midst of prosperity. This is a contradiction and therefore Ayurveda aims at happy state of life. It lays emphasis on the need to overcome this duality of life. It lays emphasis on the need to overcome this duality of life. It lays emphasis on the need to overcome this duality of life. It lays emphasis on the need to overcome this duality of life.

Ayurveda has recognized the individuality of the psyche and body and their inseparable and dependent relationship in the living body. The ancient physicians of Ayurveda have attributed abnormal conditions related to mental functions as *Manovikaras*. The classification of *Manovikaras* as per the classical literature is as listed in Box 17.8.

What are the symptoms of anxiety?

The term *Chittodvega* has special reference to *Manovikaras* and can be equated with anxiety. It is commonly observed in people who have instability of the mind, fear, tremor, palpitation, short temper, indecisiveness, pressure in the chest, fainting or sinking, pricking pain in the chest and excessive perspiration. According to Charaka, the famous physician of ancient times, these symptoms are due to contamination of *vata*. There is imbalance of two mental doshas (*rajas* and *tamas*) and abnormalities *vata* and/or *pitta*. The clinical signs and symptoms described in the ancient Ayurvedic literature are as listed in Box 17.9.

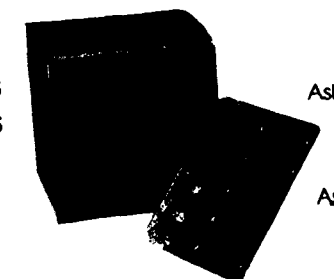
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Box 17.8. Categories of abnormal mental functions as per Ayurveda

● Impairment of general mental functions such as:

➤ Abnormalities in the perceptions and control of involuntary functions of the body in the absence of any abnormality of the organs (*Indriya Vighraha*)

➤ Mental control (*Manonigraha*)

➤ Guess (*Daba*)

➤ Thought and different aspects of the mind (*Vichara*)

➤ Decision (*Buddhi*)

➤ Memory (*Smriti*)

➤ Orientation and responsiveness (*Sanjajana*)

➤ Desire (*Bhakti*)

➤ Habit and temperament (*Shula*)

➤ Psychomotor activity (*Chetas*)

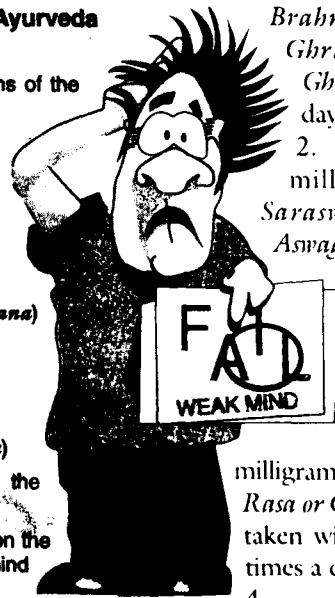
➤ Conduct, separately or in combination (*Achara*)

● Weak mind (the presence of *Alpasatva*) in the origin of the illness.

● Involvement of the three doshas of the body on the two doshas of the mind or two doshas of the mind alone

● Classical identification of the disease either as mental disorder (*Manasvikara*) or disorders of the mind and body (*Ubbayasmakvikara*)

● Contamination of *manovaha stotas*



Brahmi Ghrita, Kalyanak Ghrita or Pachagavya Ghrita to be taken twice a day with milk.

2. Twenty to thirty millilitres of either *Saraswatarista* or *Asvagandharista* to be taken after meals twice a day with equal proportion of water.

3. One hundred twenty five to two hundred and fifty milligrams of either *Smriti Sagar Rasa* or *Cahurmukha Rasa* to be taken with honey two or three times a day.

4. Three to five grams of *Saraswata Churna* thrice a day with milk.

5. One hundred twenty five to two hundred and fifty milligrams of *Manasmitra Vataka* to be taken with

water or milk thrice a day.

6. Five millilitres of *Ksheerbala Tail* to be taken orally with milk three times a day.

7. *Dhanvantari Tail* or *Asanvilvadi Tail* is recommended for causing profuse sweating, and therefore removal of toxins from the body.

8. Tonics recommended for anxiety include any one of the following medicines: *Kusumanda rasayana*, *Chayavanprash*, *Brahmi rasayana*, *Asvagandhavaleha* or *Shatavari Leha*. Depending on the totality of your symptoms, ten grams of any one of these medicines is recommended once a day with milk.

What is the treatment for anxiety?

Ayurveda recommends a combination of medicines for internal administration and external applications. These medicines are in addition to counseling or treatment of the psyche and behaviour. The treatment processes commonly recommended for management of anxiety include purgatives, enema, nasal instillation, streaming of medicated buttermilk, milk, oil or decoctions on the forehead and application of medicated wet cakes on the head.

Listed below are the compound medicines commonly used for management of anxiety.

1. Five grams of any one of the three medicines including

HOMOEOPATHY

Homoeopathy defines anxiety as the result of an insecure mind reacting to circumstances that are apparently adverse to a person but are not openly threatening. The sense of fear is more internal than external. However, it is sufficiently strong to lead to attacks of apprehension.

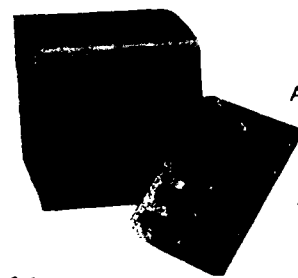
Everyone reacts with anxiety at some time or the other and this is quite in harmony with normal life. Some people, however, begin to have anxiety as a routine than as an exception and therefore adversely affect their life. It is then necessary to consult a doctor who can help overcome the anxiety.

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Box 17.9. Clinical signs and symptoms of anxiety as per Ayurvedic literature

- Fear
- Swiftness or lack of reaction
- Tremor or fine shivering of the hands
- Palpitations or awareness of the heart beats
- Irritability or short temper
- Excessive sweat
- Increased thirst
- Dryness of the mouth



- Dryness of the throat
- Constricting feeling in the chest
- Fickle mindedness or restlessness
- Fatigue
- Expansion by pulling of the muscles of the face and neck
- Poor memory
- Negative thinking
- Body ache

to you and in a strength and dose that is most effective. It is therefore important that you talk to the doctor very frankly and share all your troubles and problems. The doctor will of course keep your conversations with him/her confidential. Detailed below are the questions that your doctor is likely to ask you.

● **Precipitating factors:** You should describe the immediate circumstances that occur just before an anxiety attack. These could be emotional shock such as loss of a close friend or family member, poor examination results, setbacks in business or other professions, financial loss, etc. These situations make you vulnerable and you may not be able to cope with even minor ups and downs of life.

● **Past history:** Any emotional setback in the past (such as those described above) can also weaken your resistance to deal with adverse circumstances. This weakness may result in your over-reacting to even minor situations in life. You should also describe if there were specific cases of fright, grief or suppressed emotions in your childhood. This is because these childhood experiences can weaken your personality and you may therefore not be able to deal with the pressures of life and succumb to anxiety.

● **Physical ailments:** Any long-term illness can weaken your natural defence mechanism. You are therefore likely to be physically and emotionally weak.

● **Family background:** Children of parents who are prone to anxiety attacks are more likely to adopt the same type of behaviour. These children therefore develop anxious personality as they grow up. Similarly, when one of the parents is too dominating or aggressive, the child becomes timid. Such children are more likely to be adversely affected by the pressures of living.

Lack of parental love, loss of a loved one at a young age, neglect due to various circumstances and constraints, etc. lead to lack of confidence in a person. Such people are also prone to become apprehensive and anxious.

● **Circumstances at school, college or place of work:** An

emotionally insecure or timid person normally finds it difficult to deal with challenging situations such as examinations, interviews, submission of project reports, etc. either at school, college or place of work. Such people find it also difficult to cope with these situations and develop anxiety or panic attacks. Sometimes teachers and/or colleagues may harass the weak people, thus reducing whatever little confidence they have.

● **Basic nature:** Your basic nature is very important. Some people are basically weak and react with anxiety even to minor situations whereas some others are emotionally strong and remain cool even in the most difficult circumstances. All of us are equipped with "fight or flight" reaction and react according to whichever feature is more dominant.

● **Presenting symptoms:** Your symptoms at the time of visiting the doctor are also very important. You should make notes of any changes in your normal behaviour, unnatural fears, phobias, panic reactions, etc. and describe them to the doctor. You should also describe changes in your general habits such as likes and dislikes, food habits, sensitivity to weather, etc. Finally, you should describe physical symptoms, such as diarrhoea, constipation, acidity, skin problems, hair fall, etc. Your doctor will collectively evaluate all your symptoms before prescribing appropriate medicines in the dose and strength that are likely to relieve symptoms rapidly and without any side effects.

What is the treatment for anxiety?

Detailed below are some of the medicines that are more commonly used to manage anxiety.

● **Arsenic album:** This is one of the most important medicines used in the management of anxiety. Symptoms that respond well to this medicine are anxiety over small, trivial situations, associate fear or death or disease, intense mental restlessness and general physical weakness. In addition, there may be dryness of the mouth and you may need to sip water very frequently.

● **Aconite:** This medicine is effective for severe fear and anxiety resulting from past experience of fright or shock.

● **Argentum nitricum and Gelsimium:** Both these medicines are useful in cases of anxiety in anticipation of meetings, interviews, exams, etc. Some people develop loose motions in anticipation of such situations.

● **Kali phos:** This medicine is commonly used for treating insomnia due to anxiety. It is usually prescribed in a biochemic form, which is as tablets in low potencies.

● **Natrum mur and Ignatia:** Both these medicines are very effective in managing anxiety when there is history of grief. It is especially effective for people who are usually reserved and do not express their sorrow. They are more likely to brood over situations and become anxious.

● **Aurum met:** This medicine is very effective for people

who have anxiety with depression, to the extent that they become suicidal.

- **Staphysagria:** It is effective if anxiety and depression is the result of suppressed emotions or indignation over unmerited insults.

- **Tranquil:** This is a biochemic compound that is effective in treating anxiety without any apparent cause.

The present day life-style predisposes to immense stress and there is hardly a person who can claim to be free of anxiety in some form or the other. Homoeopathic medicines such as Tranquil are very effective in controlling the adverse effects of these stresses.

What are the advantages of Homoeopathy?

Homoeopathic medicines used for management of anxiety have three main advantages:

1. **No side effects:** Homoeopathic medicines are not sedatives and therefore do not cause side effects such as

drowsiness, dullness of mind, etc. They act by enhancing your potential to fight anxiety and become emotionally stronger.

2. **Treatment of physical ailments:** Homoeopathic medicines also cure physical effects of anxiety such as hair fall, acidity, skin diseases, headaches, etc. This is of course in addition to their main action of removing the root cause of anxiety — emotional disturbances.

3. **Sense of well being:** Homoeopathic medicines give an almost immediate sense of well being and are not addictive. With these medicines you can improve the quality of your life, feel active and fresh and not at the same time not become dependant on medicines.

In addition to prescribing medicines, your Homoeopath will also act as a counselor. He/she will counsel you and your family by making you aware of the reasons behind the behavioural changes and help you to come to term with your natural potential.

NATURE CURE

Causes of anxiety, its types and signs and symptoms of each of these types as per Nature Cure are the same as those detailed in the section on Allopathy.

According to Nature Cure, the blood vessels and nerves of an anxious person become numb and hard. As a result, there is obstruction in the free flow of blood and nerve currents. Thus, the inflow of the vital forces of the body is

either reduced or shut down. Reduced flow of vital forces lowers the natural resistance to poisons in the body and other disease causing agents. In extreme conditions when anxiety and associated fear is very intense, the obstruction to the flow of vital forces can lead to death.

What is the treatment for anxiety?

Nature Cure recommends relaxation techniques, supportive behaviour and reassurance from friends and family, exercises and diet for management of anxiety. In case of severe or long-standing anxiety, counseling and other forms of treatment from a mental health specialist may be necessary. It is also important to live in a congenial atmosphere with fresh air, sunshine, calm and quiet place for relaxation and exercises and eat natural food. Above all, there is a need to develop self-control that will enable you to remain calm in moments of stress and tension.

Self-control: The only sure method to control anxiety is to relax. Try to analyse the conditions or situations that cause anxiety and identify options or solutions. Adopt any one option or solution that you believe is most suited to you. Try to develop a positive attitude.

Support: Support from family and friends may provide

Box 17.10. Water and mud treatments for anxiety

- **Neutral bath:** Lie down in a bathtub filled with water slightly cooler than the body temperature (about 92-95°F) for thirty minutes to an hour. Neutral bath reduces the irritation of the nerves of the skin and therefore results in a calm and relaxed feeling.

- **Full-wet-sheet pack:** Wrap the body with a wet cloth dipped in cold water and wrap it with a blanket. Keeping the full-wet-sheet pack for thirty to forty-five minutes relaxes the body and mind.

- **Cold water:** Allow a stream of cold water to fall on the entire body for two to three minutes. Cold water shower results in relaxation by soothing the nerve endings of the skin.

- **Hot and cold application:** Pouring hot water or doing hot fomentation of the backbone for five to ten minutes followed by pouring cold water or doing cold fomentation of the backbone for fifteen to twenty seconds results in relaxation.

- **Cold spinal bath:** Lie down in a special tub partially filled with cold water in such a way that only the backbone comes in contact with the water. In addition to relaxation, cold spinal bath for thirty to forty-five minutes everyday also strengthens the nervous system.

- **Foot-bath:** Alternate hot and cold foot bath is also an effective method for relaxation. Pour hot water on the feet for three minutes followed by cold water for thirty seconds. Instead of pouring water, you can also immerse the feet in hot and cold water alternately for the same time duration.

- **Warm bath:** A warm bath just before you go to bed will help you relax and sleep well.

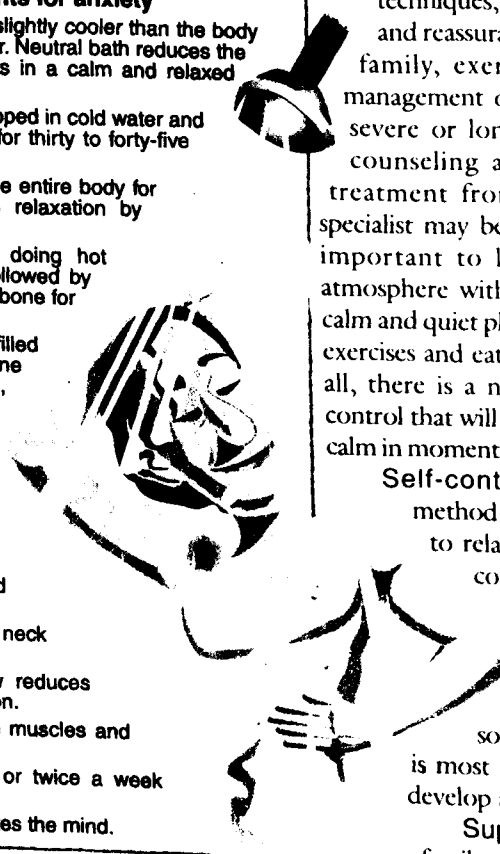
- **Cold pack:** A cold pack to the back of head and neck provides good relaxation.

- **Walking:** Walking bare foot on the snow or dew reduces congestion of the brain and therefore results in relaxation.

- **Massage:** A whole body massage relaxes the tense muscles and nerves of the body.

- **Mud bath:** Application of mud on the body once or twice a week relaxes the mind.

- **Blue light:** Using blue light in the bedroom also relaxes the mind.



temporary relief but it cannot prevent or cure anxiety. Seek their help to identify solutions and implement them. Their support will also help you to take up activities that interest you and help you direct your mind in gainful ways.

Physical measures: Treatment options with air, water, mud and exercises, especially yoga, are very effective for development of positive attitude and for relaxation.

- **Exercises:** Exercise improves blood circulation, especially to the skin, clears the blood channels and maintains normal conditions of the nerves. It also reduces congestion to the brain and other organs of the body.

- **Deep breathing** is one of the most effective methods of relaxation. You can do it either while sitting or lying down, with both the nostrils or alternate nostrils. You should learn the correct method of deep breathing from a qualified person. If the technique is not correct, you may not have any benefits. You can practice deep breathing in the morning on empty stomach, just before going to sleep and whenever you feel exhausted, stressed or anxious during the day.

- **Water and mud treatments** are also very effective for relaxation and soothing irritated nerves. Box 17.10 lists the treatment options.

Sleep: Sleeping for six to eight hours in the night will restore the energy you have spent during the day. Regular practice of meditation, *shavasana* (a type of yoga) and deep

breathing will help you sleep better. *It is important to remember that you should sleep about two to three hours after dinner so that the food is digested.*

Music: Several research studies have persuasively indicated that listening to soft music can relax the mind and hasten recovery during illness.

Diet: Just as for all health problems, Nature Cure lays special emphasis on diet. It is desirable to avoid adulterated and processed foods as they increase the production of "poisons" in the body. These poisons contaminate the blood and therefore irritate and reduce efficiency of various organs of the body. Natural foods are preferable.

Anxiety often leads to indigestion. This is because of (a) improper chewing of the food and (b) reduced production of the digestive juices by irritated organs of the digestive system. Irrespective of the food intake, you will feel sick most of the times because of indigestion.

Avoid excess intake of starch, protein and fat such as oil, *ghee*, butter, etc. as they adversely affect normal chemical processes in the body. Eat foods that are rich in potassium, calcium, magnesium and iron. You should also avoid irritants such as condiments and spices, chilies, pickles, etc.

Your Nature Cure doctor may recommend fasting or a juice diet for a few days in order to remove "poisons" from the body.



UNANI

Anxiety is known as "Izterab" in the Unani system of medicine. It is defined as a "melancholic" disorder that is caused by excessive secretion of *sauda* (melancholic humour). This excessive secretion adversely affects the faculty that controls the nervous system, called *Quwat Nafsania*. There are three main factors that adversely affect the five latent faculties of the brain, called *Quwa khams Batina*. These include: (a) excessive secretion of black bile or melancholic humour, (b) transformation of abnormally digested *safravi* (Choleric) or *Balghami* (Phlegmatic) humours into abnormal melancholic humour and (c) transformation in the normal quality of the melancholic humour.

What are the signs and symptoms of anxiety?

In the early stage of the disorder, you may feel discomfort with fear and mild depression. If the condition lasts for a long time, symptoms such as pain in the muscles, headache, shivering of the hands, palpitation, diarrhoea, sweating, breathlessness or difficulty in breathing, dizziness, unstable walk, a sensation of swinging or hanging in the space, walking on the sky, flying in the air, etc. may be present.

What are the principles of treatment of anxiety?

There are four main Unani principles for treatment of anxiety. These include:

1. Correction of factors that result in excessive production of melancholic humour or change its normal quality through diet, exercises, mental work, habits, etc.
2. Reduction of the load or stress on the faculty controlling the nervous system by sedating it with *Mukhadirat*

Ten helpful hints to cope with anxiety

1. Forget about past problems and situations and concentrate on the present.
2. Learn to differentiate between real and irrational fears and chase out the irrational fears from your mind.
3. Be confident and confront your fears.
4. Think positively and act courageously. Have faith in yourself.
5. Concentrate on your interests first. Remember that no one else will protect your interests as well as you.
6. Develop new habits in dealing with stress. You can do this with discipline and practice.
7. Learn how to say no. It takes courage to stand up for your convictions and principles.
8. Take a balanced diet and do regular exercises to maintain health because physical and emotional health are inter-linked.
9. Learn how to make decisions that suite you most and stick with them.
10. In case your doctor recommends medicines, take them to get temporary relief. Try to discuss the causes of your anxiety with your doctor.



(sedatives).

3. Taking coctives and purgatives for black bile or melancholic humour.

4. Strengthening the faculty that controls the nervous system by giving *Muqawwi at Asab Wa Dimagh* or tonics of the nervous system.

What is the treatment for anxiety?

Detailed below are the commonly used single and compound medicines for treatment of anxiety including their method of use:

- Oil of lettuce seeds or bottle-gourd seeds to be applied on the head.
- One or two tablets of *Dawul Shifa* to be taken twice or thrice a day with *Arq-e-shirneez*.
- One to two tablets of *Hab Jawahar Mohra* to be twice or thrice a day.
- Make a fine powder of three grams each of *Stoechados* (*Ustukhudus*) and coriander along with five grains of black pepper. This medicine is recommended with water early in the morning on empty stomach. You need to rest in the bed for half to one hour after taking this medicine.
- Make a fine powder of ten grams each of flowers of Babool, coriander and seeds of bottle gourd. This

preparation is recommended three grams of the powder with water twice a day.

- Boil six grams each of *jatamansi*, Cinnamon and dry ginger in one hundred and twenty millilitres of water. Strain the liquid and add saccharine. This preparation is recommended in the morning on empty stomach.
- Make a fine powder separately of five hundred milligrams of camphor and two grams of ammonium chloride. Mix the two powders well and store in a clean and airtight glass bottle and use it as an inhaler.
- Make a fine powder of equal proportions of opium, myrrh and cinnamon. Add some water to make a paste. This paste is applied on the cloth and placed on one or both sides of the head just above the cheekbones.
- Seven grams of either *Itrifal Ustukhudus* or *Itrifal Kkishmeezi* is recommended at bedtime.
- Ten grams of *Itrifal Zamani* is recommended at bedtime.
- Six grams of *Khamira Gaazaban Amberi* is recommended in the morning before breakfast.
- *Qurs Musallae* is rubbed in water and the paste applied on the forehead.
- Three grams of *Barshasha* is recommended whenever you have any pain associated with anxiety.

DEFINITIONS

Antidepressants are medicines that relieve depression by restoring the balance of chemical substances in the nervous system.

Autonomic functions are those that function independently without outside influence

Panic is a sudden overpowering fright accompanied by a strong desire or attempts to secure safety.

Physiological means related to the process of normal functions of

the body.

Precipitating factors are those factors that hasten the onset of signs and symptoms of a disease.

Psychological means related to the behaviour, functions and processes of the mind.

Tranquilizers are medicines that calm agitated or anxious people without affecting the consciousness.

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In the next issue: Indigestion

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Indigestion

ALLOPATHY

Indigestion is a term used to describe a variety of uncomfortable sensations situated mainly in the upper abdomen. These sensations are often related to the intake of food. The discomfort may be experienced as pain, pressure, burning sensation, bloating, excessive gas, belching (passing gas through the mouth), nausea or fullness after eating a small amount of food. Sometimes there may only be a vague feeling that the digestion has not proceeded "properly".

What is the digestive system?

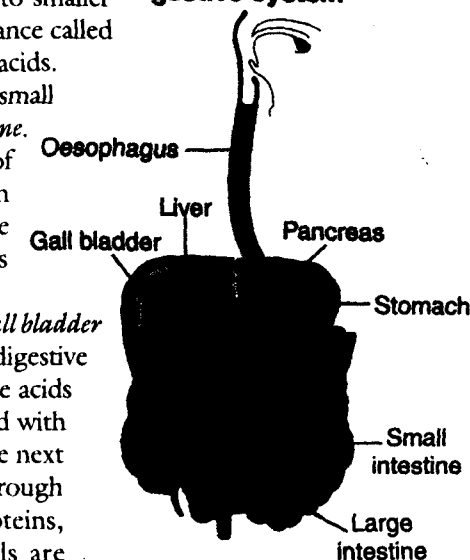
Digestive system consists of the digestive tract through which the food passes and the organs that secrete digestive juices. These include the food-pipe, also called *oesophagus*, stomach, the first part of the small intestine called *duodenum*, large intestine (colon), *gall bladder*, *pancreas* and *liver*.

When the food first enters the digestive tract through the mouth, the first stage of breaking down of food is through chewing. The digestion begins here by the addition of saliva to the food. After you swallow the food, it passes through the *oesophagus* (food pipe) and enters the stomach. There is a muscle valve at the junction of the oesophagus and the stomach that normally prevent the food from entering back into the oesophagus. The acids and enzymes secreted by the stomach wall break down the food into smaller parts. The stomach has a lining of slimy substance called *mucous* in order to protect itself from its own acids.

After the food has been broken down into small parts, it becomes a semi-liquid mass called *chyme*. The chyme is pushed out into the first part of the small intestine called the *duodenum* through a pumping action of the stomach muscles. The pumping action of the digestive tract that pushes the food forward is called *peristalsis*.

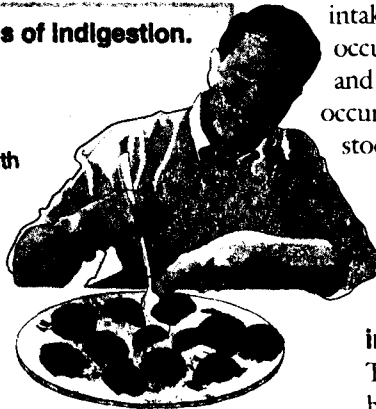
One tube each from the *pancreas* and the *gall bladder* open into the duodenum. These tubes carry digestive enzymes and also chemicals that neutralize the acids and enzymes from the stomach that are mixed with the chyme. The chyme is then pushed into the next part of the small intestines called *jejunum* through peristalsis. The digested carbohydrates, proteins, water, water-soluble vitamins and minerals are absorbed into the blood in the jejunum. The remaining

Figure 18.1. The digestive system



Box 18.1. Common causes of indigestion.

- Irregular timings for meals
- Excessive intake of food or drinks
- Emotional or psychological stress
- Drinking large volume of liquids with meals
- Lying down immediately after eating
- Drinking excessive coffee, tea, cola drinks and alcohol
- Smoking
- Exercising within two hours of eating



food then passes into the last part of the small intestine called *ileum*. This is where the fat, fat-soluble vitamins and *bile salts* are absorbed. The food that has not been digested passes into the large intestine along with the remaining liquids. Most of the water is absorbed in the large intestine and the waste matters are thickened to form stools. The stools finally pass out of the body through the opening, anus, by a series of peristaltic movements.

The normal digestive system is illustrated in Figure 18.1.

What are the causes of indigestion?

Diseases of the various organs digestion can cause indigestion. Your doctor can detect these diseases by asking you several questions and confirm them through appropriate tests. Sometimes even after a detailed review of your problem, it may be difficult to identify a clear disease process that can satisfactorily explain your symptoms. When a clear disease process cannot be identified, indigestion is called "*non-ulcer dyspepsia*" or "*flatulent dyspepsia*".

Box 18.1 details the common causes of indigestion without abnormality in any organ of the digestive system.

What are the symptoms of indigestion?

The symptoms of indigestion depend upon the organ involved. The common symptoms of indigestion without abnormality in the organs of digestive system are detailed in Box 18.2. There are several mechanisms that cause the discomfort of indigestion. These mechanisms are related to the part of the digestive system involved and the specific disease process. For example, inflammation of the inner lining of the food-pipe, stomach and duodenum leads to pain and its exact site can be located. Tension in the wall of any part of the intestine can lead to a feeling of distention, bloating, flatulence (increased gas in the bowels) or pain. This pain is often like cramps. The tension in the wall of the intestine may be due to excessive gas or stool (constipation). These symptoms may also be present if the muscles of the intestines contract even with normal amount of gas. This contraction will lead to tension of the wall of the intestine.

Your doctor will be able to detect the cause of indigestion by asking you questions about the location or pain or discomfort, its timing and relation to food

intake. For example, pain due to ulcer in the stomach occurs often on an empty stomach, is relieved by food and typically wakes you up at night whereas heartburn occurs soon after eating and especially on lying flat, stooping or bending.

Detailed below are the common disorders of the digestive system that are associated with indigestion.

What diseases of the food pipe cause indigestion?

Three main conditions of the food pipe including heartburn, contraction of the food-pipe and occasionally cancer of the food-pipe. All these conditions cause discomfort or a sensation of blockage of food just behind the breast-bone.

What is heartburn?

Heartburn is also called "*reflux oesophagitis*". This is a common condition and is caused by abnormal function of the muscle valve situated at the junction of the food pipe and the stomach. This abnormality allows the stomach juices along with its acids enter back into the food pipe. When the stomach acids enter the food pipe, they corrode its lining. This corrosion results in the symptoms listed in Box 18.3.

The symptoms of heartburn are normally felt more during three conditions: (a) bending or stooping, (b) after a heavy meal and (c) on lying flat. This is because these conditions increase pressure in the abdomen. Increased pressure in the abdomen push the stomach juices into the food pipe. The severity of the symptoms can increase either when you eat acidic foods such as tomatoes, oranges or drinking aerated drinks, coffee and alcohol.

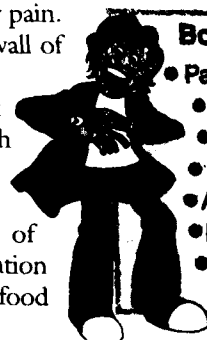
Chronic heartburn, especially if it is severe, may result in narrowing of the food pipe and therefore block the passage of food. Very rarely the structure of the lining of the food pipe may change and lead to cancer like condition.

How is heartburn diagnosed?

Mild cases of heartburn can be diagnosed on the basis of your symptoms. However, if your symptoms are very troublesome and/or have been present for a very long time, your doctor is likely to suggest *endoscopic* examination to view the inner lining of the food pipe and if necessary, take biopsy of the affected lining. Endoscopy is an invasive procedure in which a tube with light at its tip is inserted into the upper part of the digestive tract. Through this tube,

Box 18.2. Common symptoms of indigestion

- Pain or discomfort in the upper part of the abdomen
- Excessive burping or belching
- Poor appetite
- A feeling of fullness after eating little food
- A feeling of heaviness or distension in the abdomen
- Burning sensation or pain in the chest
- Nausea or vomiting
- Increased gas in the bowels

**Box 18.3. Common symptoms of heartburn.**

- Burning sensation and occasionally cramp-like pain just behind the breastbone;
- Pain in the neck and the upper arms;
- Difficulty in swallowing;
- Small amount of secretions of the stomach and gall bladder move backwards into the mouth causing sour or bitter taste respectively; and
- Coughing and inflammation of the lungs (such as bronchitis and pneumonia) if the sour or bitter liquid flows over into the wind pipe.



the doctor can view the lining of the digestive tract directly and detect abnormality, if any. Occasionally, more sophisticated tests such as monitoring pH of the food pipe for twenty-four hours may be necessary for diagnosis. In some cases it may be difficult to differentiate between pain arising from the food pipe and due to heart conditions such as heart attack and *angina*. In such cases, your doctor will recommend appropriate tests to rule out heart disease.

What is the treatment for heartburn?

Mild cases of heartburn can be managed with simple measures, which are detailed in Box 18.4. Medicines normally recommended for treatment of heartburn include:

● **Antacids:** These medicines neutralize the acids in the stomach and therefore the burning sensation and pain. Antacids may provide instant relief for heartburn but their action lasts for a short time only.

There are two types of antacids: (a) those that are absorbed in the intestines and (b) those that are not absorbed. Since medicines that are absorbed in the intestines can affect other parts of the body, antacids that are not absorbed are normally recommended for short-term relief of heartburn. Detailed below are the different types of *non-absorbable antacids*:

1. **Aluminium compounds:** Aluminium hydroxide is the most common aluminium salt recommended for reducing acidity in the stomach. Its most common adverse effect is constipation. They are therefore normally recommended in combination with other antacids.

2. **Magnesium compounds:** There are several magnesium salts that are recommended for reducing heartburn and acidity in the stomach. Their action is slower as compared to aluminium salts. The main disadvantage of these salts is increased bowel movements, which may cause diarrhoea. This is why magnesium salts are normally recommended with aluminium salts that cause constipation.

3. **Calcium carbonate:** This is a powerful antacid. It can completely neutralize acids and therefore lead to more secretion of acids when the effect of the medicine is over. Its main side effects are increased production of gas in the digestive tract and constipation. If large quantity of milk is taken with calcium carbonate, the calcium from the milk may be deposited in the kidneys and adversely affect their functions. This is why milk should not be taken with these medicines.

The most commonly used absorbable antacid is sodium bicarbonate or soda. Many people use it regularly to control indigestion. Soda can cause several adverse reactions because it is absorbed from the intestines.

It produces carbon dioxide gas in the stomach and may worsen ulcers in the stomach, if present. Its action lasts for a very short time and therefore results in rebound action. This means that after its action is over, the stomach will secrete more acid. If soda is taken with milk, it may lead to deposition of calcium from the milk in the kidneys and adversely affect kidney functions.

● **Histamine receptor blockers:** These medicines reduce the quantity and concentration of the acids in the stomach but do not alter the secretion of mucus, the protective sticky liquid that lines the inner wall of the stomach. Histamine is a chemical compound found in all cells of the body. One of the several effects of the release of histamine is increased secretion of acids in the stomach. Histamine can act in the stomach only if attaches itself to another type of chemical compound, called *receptors*. Some medicines block the action of these receptors and therefore prevent the attachment of histamine to them. Commonly recommended histamine receptor blockers to reduce acids in the stomach include:

1. **Ranitidine:** It opposes the secretion of acids in the stomach and therefore controls excessive acid secretion. Occasionally, ranitidine may lead to minor side effects such as headache, skin rashes, nausea, constipation and pain in the abdomen. Ranitidine is secreted in the breast milk and is therefore not preferred for lactating mothers.

2. **Cimetidine:** The mechanism of action of this medicine and its side effects are the same as those for ranitidine. However, the severity and frequency of the side effects is marginally more as compared to ranitidine. Also, cimetidine combines with some enzymes in the liver and increases effects of several other medicines. This is why it is not preferred for those who are taking other medicines regularly.

3. **Famotidine:** This medicine is more powerful than cimetidine or ranitidine and has lesser side effects. It may lead to headache, bowel disturbances and muscle pain.

● **Acid pump inhibitors:** The cells in the lining of the stomach that secrete acids have a so-called pump, which is inhibited by this group of medicines. As a result, the last phase of acid secretion is inhibited. Acid pump inhibitors

Box 18.4. General measures for management of heartburn.

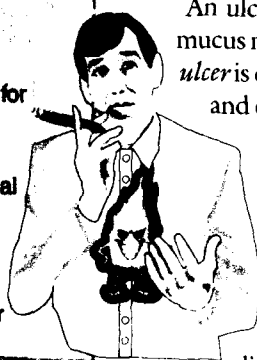
- Loose excess weight, if you are obese;
- Stop smoking;
- Eat small quantities of food at a time;
- Avoid oily foods, coffee and alcohol;
- Do not lie down for at least one to two hours after a meal;
- Keep the head end of the bed elevated by six inches;
- Take medicines, if prescribed by your doctor.



Handwritten note: "JL Laxing"

Box 18.5. Risk factors of gastritis

- Smoking
- Improper diet
- Stress, including surgery and hospitalization for other problems.
- Weakness due to recent illness
- Use of medicines such as aspirin, nonsteroidal anti-inflammatories, steroids, caffeine, etc.
- Excess intake of alcohol.
- Fatigue or excessive physical stress.
- The presence of a bacteria, *Helicobacter pylori*, in the stomach.

**What is an ulcer?**

An ulcer is a well defined wound in either the skin or mucus membrane in any part of the body. The term *peptic ulcer* is commonly used for chronic ulcers in the stomach and duodenum. Normally the digestive juices cannot harm the stomach and duodenum because of a protective layer of mucus on their inner lining. Ulcers occur when there is an imbalance between the aggression — the digestive powers of the stomach juices and the defence — the ability of the stomach and duodenum lining to protect itself from the digestive juices. Box 18.6 lists the important causes of peptic ulcer.

What are the symptoms of peptic ulcer?

Pain in the upper and middle part of the abdomen is one of the common symptoms of peptic ulcer. You can normally locate the site of pain with two to three fingers. The pain usually occurs for two to three weeks at a time but may also be present intermittently during the day. It is present more often when the stomach is empty (hunger pain) and may be relieved by eating. The pain of peptic ulcers tends to wake you up from sleep in the early hours of the morning. Milk, antacids, belching and vomiting may relieve pain. In fact some people voluntarily induce vomiting to relieve the pain. Elderly people with peptic ulcers may not have the above typical symptoms.

How is peptic ulcer diagnosed?

Endoscopy is the best method diagnosing peptic ulcers and is normally performed when you first visit the doctor with the symptoms. It is usually not necessary to repeat the endoscopy to confirm healing of the ulcer. During endoscopy, your doctor will take some tissue for biopsy in order to detect the presence of *H pylori* infection, if any.

What is the treatment for peptic ulcer?

The treatment for peptic ulcer aims at removing factors that either lead to or aggravate the ulcers. These include:

- Stopping smoking and use of non-steroidal anti-inflammatory medicines;
- Eradicating *H pylori* infection using a combination of three medicines;
- Acid reducing medicines and medicines that protect the mucus lining of the stomach wall for chronic cases which may require long-term treatment. (These medicines have been described under the treatment for heartburn); and
- Rarely surgery is recommended if the ulcers do not respond to medicines or there are complications such as bleeding, perforation ("hole" in the stomach) or narrowing of the affected part of the digestive tract.

Peptic ulcer and its treatment will be discussed in greater detail in the upcoming issues of the Health Update.

How do gas syndromes lead to indigestion?

Collections of gas trapped in pockets of bowel are a frequent cause of discomfort of the abdomen. Normally a

person swallows about five hundred millilitres of air per day and this air may reach the large intestine within thirty to sixty minutes. In case more than this amount of gas is swallowed, it can lead to discomfort in the abdomen. People with nervousness tend to swallow more air. Excess gas in the stomach may lead to discomfort in the upper part of the abdomen, belching or a group of symptoms called the *gas syndromes*. These syndromes are because of two main reasons: (a) due to trapping of swallowed air and (b) excessive fermentation of the bacteria in the intestine.

Gas collects mainly in three parts of the large intestine: (a) in the first part called *caecum*, (b) the part close to the liver called *hepatic flexure* and (c) the part close to the spleen called the *splenic flexure*. Collection of gas in the large intestine near the spleen is more common than in other parts. If the gas is trapped here, you are likely to have pain in the upper left part of the abdomen. The pain feels as if it passes through the chest. Sometimes the pain may be associated with burning sensation in the same area. The pain tends to subside if gas is passed from the anus or the bowels are opened.

Gas trapped in the large intestine near the liver causes similar pain in the upper and right part of the abdomen. Gas trapped in the first part of the large intestine causes pain in the right and lower part of the abdomen. This pain is often described as stitch like.

What is irritable bowel syndrome?

This is one of the commonest disorders of the intestine where there is long-term disturbance in the bowel functions and pain in the abdomen for which no apparent cause can be detected.

What are the symptoms of irritable bowel syndrome?

Irritable bowel syndrome may either cause diarrhoea or constipation or both these conditions alternately. The symptoms are normally due to abnormal contraction of the muscles of the large intestine. It is more common among women between the age of twenty to forty years. The pain can be felt in any part of the abdomen and is usually relieved by passing stool. The pain often starts soon after you eat food. Most people with irritable bowel syndrome have ribbon like or pellet like stools with or without mucus at some time or other.

Other symptoms include bloating of the abdomen, sense of incomplete passage of stool, excessive gas and audible sounds from the intestines.

There are no tests to confirm the irritable bowel syndrome and it is therefore a diagnosis of exclusion.

This means that the diagnosis is made when other conditions have been satisfactorily excluded. Your doctor is likely to recommend endoscopic examination of the large intestine in order to exclude other diseases. Sometimes a barium examination of the large intestine is also recommended. Barium examination includes taking a series of x-rays after passing liquid barium compound through the anus into the large intestine. Since barium is opaque, the lining of the intestines can be easily seen on the x-ray. It is important for you to understand and accept that irritable bowel syndrome is not a serious condition and there is no abnormality in the structure or function of the intestines. There are several medicines that can relieve, at least partially, the pain in the abdomen, diarrhoea and constipation because of irritable bowel syndrome.

Irritable bowel syndrome and its treatment will be discussed in greater detail in the upcoming issues of the Health Update.

What gall bladder diseases cause indigestion?

Gall bladder is a small pear-shaped organ situated below the liver on the right upper part of the abdomen. Its main function is to store *bile* secreted by the liver. During digestion of fats, the gall bladder contracts and releases bile into the duodenum.

Stones in the gall bladder and its inflammation are two common causes of symptoms of indigestion. Gall stone disease is very common. It is estimated that about five to fifteen percent people have gall-stones without any associated symptoms. Only ten percent people with gall stones develop symptoms and require treatment. Gall stones may block the tube of the gall bladder that opens in the duodenum and cause moderate to severe pain. This pain will be situated in upper middle and upper right parts of the abdomen and right upper back. The pain often lasts for

Box 18.6. Important causes of peptic ulcer.

● ***Helicobacter Pylori*:** This bacteria accounts for almost ninety percent of ulcers in the duodenum and seventy percent ulcers in the stomach. It is detected by a biopsy of tissue taken from the lower part of the stomach.

● ***Heredity*:** People with peptic ulcers often have a ulcer disease in other family members too.

● ***Non-steroidal anti-inflammatory medicines*:** These medicines damage the protective lining of the stomach and are responsible for about thirty percent of all ulcers in the stomach.

● ***Smoking*:** This increases the risk of developing ulcers in the stomach and duodenum.

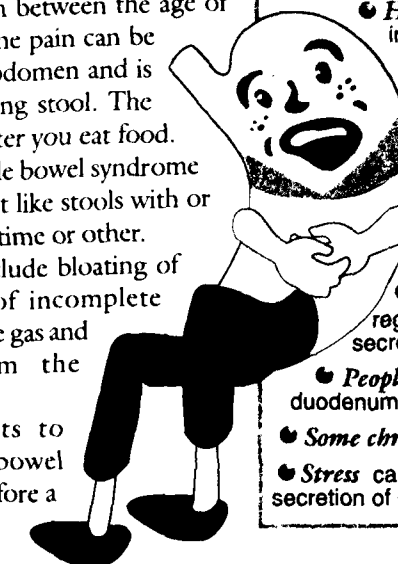
● ***Improper diet*:** Some foods such as spices, sour foods, etc. increase the secretion of digestive juices in the stomach.

● ***Irregular or skipped meals*:** Digestive juices are secreted at regular intervals and if food is not consumed at the time of secretion of these juices, ulcers can occur.

● ***People with Type "O" blood group*,** especially for ulcers of the duodenum.

● ***Some chronic diseases*** such as diseases of the liver:

● ***Stress*** can precipitate or aggravate peptic ulcers by increasing the secretion of digestive juices in the stomach.



Box 18.7. Causes and risk factors of gall stones**Causes:**

- Infection in the tubes that carry bile out of the liver.
- Increased bilirubin in bile.
- Inefficient emptying of the gallbladder.
- Alterations in the quality of the bile.

Risk factors:

- Regular intake of diet rich in fats and poor in fibres.
- Obesity.
- Gall stones in other family members
- Excessive intake of alcohol.
- Prolonged use of contraceptives containing the hormone, oestrogen.
- Sudden and rapid loss of weight.
- Smoking.
- Heart disease, damage to the structure and function of liver and disorders of the small intestine.



two to six hours and may be accompanied by vomiting. If the pain lasts longer or fever develops, it usually means that there is inflammation of the gall bladder.

Box 18.7 details the causes and risk factors of gall stones.

How are gall stones diagnosed?

An ultrasound examination is the best way to diagnose gall stones. Sometimes, a special x-ray test called *oral cholecystography* is also recommended. Ultrasound examination involves taking images of deep structures of the body by measuring and recording the reflection of high frequency sound waves.

Cholecystography involves taking a fat-free meal along with tablets of contrast medium that contains iodine. After about twelve hours, a series of x-rays will be taken. By this time, the liver would have excreted iodine, which is opaque to x-rays, into the bile in the gall bladder. Next, you will be asked to take a fatty meal or a hormone called *cholecystokinin*. This hormone stimulates contraction of the gall bladder and therefore pushes the bile along with the opaque iodine into the tube that connects the gall bladder to the duodenum. An hour after taking a fatty meal or the hormone cholecystokinin, additional x-rays are taken. Gall stones, if any, either in the gall bladder or the tube connecting it to the duodenum can be seen on the x-rays.

What is the treatment for gall stones?

Gall stones need treatment only if they cause symptoms. Surgery is the main treatment for troublesome gall stones. There are two main types of surgery for gall stones: (a) conventional, where the abdomen is cut and gall bladder removed or (b) laparoscopic or keyhole surgery, where the gall stones are removed through a special equipment inserted in the abdomen through a small cut.

Some new techniques such as shock wave dissolution, bile acid dissolution and other solvent dissolution are being tried but these have not yet given better results than the surgery.

Sometimes gall stones fall into the tube connecting the gall bladder to the small intestine and cause obstruction and *jaundice*. Jaundice is the yellow discolouration of the skin, mucous membrane, and eyes because of higher than normal amounts of bile pigments. In cases of obstruction to bile due to gall stones, they are removed through an endoscopic procedure called ERCP (endoscopic retrograde cholangio pancreatography).

Gall stones will be discussed in greater detail in the upcoming issues of the Health Update.

What liver diseases lead to indigestion?

Inflammation of the liver, called *Hepatitis*, is the main condition that leads to symptoms of indigestion. Hepatitis, a viral disease, is caused by hepatitis viruses A, B, C and E. Its symptoms include pain in the upper and right part of the abdomen, loss of appetite, nausea, vomiting and jaundice. Most people recover from hepatitis within six to ten weeks. Chronic liver disease, such as chronic hepatitis due to viruses B and C and liver damage due to excessive intake of alcohol can also cause indigestion. In such cases, no disease process is normally found. Congestion of the liver as a result of heart failure causes pain in the right upper abdomen and discomfort associated with meals.

Hepatitis and its treatment will be discussed in greater detail in the upcoming issues of the Health Update.

What diseases of the pancreas cause indigestion?

Pancreas is an organ that secretes digestive enzymes and *insulin*, which is necessary for digestion of carbohydrates. Chronic *pancreatitis* (infection of the pancreas) can cause pain in the upper abdomen, which is often related to meals.

Box 18.8. Prevention of Indigestion.

- Chew food properly.
- Avoid smoking, especially immediately before and after a meal.
- Avoid exercise immediately after a meal.
- Avoid tight clothing.
- Reduce stress by practicing relaxation techniques such as yoga, meditation, etc. regularly.
- Avoid medicines such as aspirin and other nonsteroidal anti-inflammatory medicines.
- Avoid foods that cause you discomfort. Improperly cooked food; high fat foods, gas-forming foods such as beans, cucumbers, cabbage, turnips and onions often cause indigestion.
- Maintain a food diary in which you record what you eat or drink just before the symptoms. This will help you identify foods and drinks that cause indigestion.



It can also lead to deficiency of the digestive enzymes produced by the pancreas. This deficiency can cause bloating, excessive gas and large, bulky and foul smelling stools that may contain undigested food matter. Pancreatic enzymes given orally along with meals improves the latter symptoms but the pain can be severe, persistent and very difficult to treat. *Diseases of the pancreas will be discussed in detail in the upcoming issues of the Health Update.*

Can indigestion lead to serious disease conditions?

Normally, indigestion that is not associated with diseases of the organs of digestive system do not lead to serious

AYURVEDA

Indigestion is called "*Ajeerna*" in Ayurveda. All Ayurvedic literatures describe *Pachan* (digestion) to be performed by *Pachaka Rasas* (digestive juices), which are regulated by *Pachaka pitta* or *Pachaka Agni*. Pachaka Pitta is one of the five pittas responsible for digestion of food. Deficiency in quality and quantity of digestive juices is called *Mandagni* (deficient digestive fire). Ajeerna or indigestion is due to mandagni.

What are the causes of indigestion?

According to Ayurveda, excessive intake of food and water, irregularities in diet and sleep and emotional factors such as envy, fear, anger, etc. can lead to indigestion. This is mainly because of reduction in *jatharagni* compared to *pachakagni* (digestive juices). As a result, even wholesome foods taken in small quantities may not be digested properly.

Indigestion can also be due to uncomfortable postures, controlling natural urges and changes in the period and pattern of sleep. Indigestion can lead to waking up frequently at night, several diseases and psychological disturbances.

Ayurveda describes seven types of indigestion, of which four are based on the type of *dosha* affected. These are detailed in Box 18.9.

What are the symptoms of indigestion?

As per Ayurveda, the symptoms of indigestion depend upon the type of *dosha* involved. These include:

- *Amajeerna* — Swelling on the face, around the eyes and cheeks. Heavy feeling in the abdomen. Belching with

disease conditions. However, indigestion that appears for the first time in a middle-aged person needs detailed examination and investigation by a doctor. Even though most people in this age group do not have a major disease, it is important to be alert to the earliest signs and symptoms of a cancer. The common sites for cancer in the digestive system are stomach, oesophagus, liver, gall bladder and pancreas. Your doctor will be able to detect cancer in these organs, if any, by appropriate investigations.

How can indigestion be prevented?

You can prevent indigestion through simple measures that are listed in Box 18.8.

smell of undigested food. Increased secretion of saliva.

- *Vidagdha jeerna* — Belching with sour taste in the mouth. Feeling of dryness or smoke in the mouth. Increased thirst and giddiness. Burning sensation on the chest and abdomen. Increased sweating.
- *Vishtabdha jeerna* — Piercing pain in abdomen with distention. Increased gases in the bowels and constipation. Feeling of stiffness and pain.
- *Rasashe jeerna* — Normal belching, unhappy feeling, lack of desire to eat food. Feeling of heaviness in the chest.

What is the treatment for indigestion?

The principles for treatment of indigestion depend on its type. Fasting is recommended for *Amajeerna*, forced vomiting for *Vidagdha jeerna*, forced sweating and appropriate diet for *Vishtabdha jeerna* and establishing suitable sleeping pattern for *Rasashe jeerna*. After these initial procedures, *Dipan* and *Pachana* medicines are recommended to improve digestion.

The following **single medicines** are recommended for indigestion:

- Dried ginger and jaggery to be taken with pure water two to three times a day.
- One to three grams of powdered fruit rind of black variety of *Haritaki* (small Chebulic myrobalan) to be taken with equal volume of raw sugar twice a day before meals.

Simple preparations recommended for management of indigestion include:

- One gram powder of equal parts of (a) rock salt, (b) fruit rind of chebulic myrobalan, (c) fruit of long pepper

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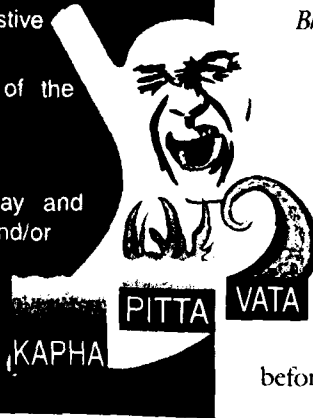
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Box 18.9 Classification of indigestion as per Ayurveda

- **Amaajerna:** Increase in kapha doshas, especially kledaka kapha. Reduced secretion of digestive juices in the stomach.
- **Vishanabajerna:** Abnormality of vata, where foods are not digested uniformly.
- **Vidagadbajerna:** Imbalances in doshas, with excess of pitta dosha. Reduced secretion of alkaline digestive juices in the stomach.
- **Rasashehajerna:** Presence of residual juices of the stomach, called annarasa.
- **Vishanajerna:** Toxic condition of the food ingested.
- **Dinapoka:** Food is digested for the whole day and continues to do so even the next day. Excessive and/or frequent intake of food or intake of incompatible food leads to this condition.
- **Prakriti:** This condition is found in everyone everyday where food remains undigested before the prescribed time for digestion.



choorna and hingvasthaka choorna to be taken thrice a day after meals.

- One to three grams of *ajamodadi choorna* or *panchakola choorna* to be taken thrice a day before meals.
- One to three grams of *Astanga Lavan* or *Lavan Bhaskar Choorna*, *Jagata Bhaskara Choorna* or *Siddha Bhastar Choorna*, *Amrita Yoga*, *Maha Swadisha Pachaka Choorna* to be taken thrice a day.
- One to two tablets of *Agnitunadi* or *Krayadirasa* or *Chitrakadivati* or *Sankhavati* or *Rasonadi* or *Gandhakavati*, *Sanjeevani Vati* or *Ksaradi Vati* or *Arkadi Vati* or *Ksudha Vati* to be taken twice or thrice a day before meals.

What dietary recommendation for**indigestion?**

Listed below are the main recommendations for dietary modifications for indigestion:

- Eat low-calorie foods that can be easily digested;
- Consume larger portions of curd, yoghurt or milk;
- Consume larger portions of juicy fruits;
- Avoid tobacco, wine, cannabis, butter and ghee; and
- Fast once a week or eat till you feel just full.

HOMOEOPATHY

The causes and symptoms of indigestion as per Homoeopathy are the same as those detailed in the section on Allopathy. A Homoeopath also makes a final diagnosis of indigestion on the basis of your symptoms and a detailed examination to rule out any underlying disease.

How is indigestion diagnosed?

Just as for all diseases, a detailed history forms the basis of diagnosis and management of indigestion. Your doctor will especially inquire about specific physical and emotional factors that not only increase the risk of indigestion but can also obstruct the recovery with treatment and increase the risk of relapse. **Physical factors** that can cause indigestion include faulty dietary habits, irregular timings for eating

and sleeping, sedentary lifestyle, lack of exercises and fresh air and indiscriminate and excessive use of some medicines.

Emotional factors that can cause indigestion include exposure to situations or events that lead to grief, anxiety and emotional disturbances. These disturbances could be work related stress, family disturbances, financial losses, loss of loved ones, etc. In addition, people who are very sensitive to trivial things and have an exaggerated emotional reaction to day-to-day pressures of work and living, take sedatives or alcohol are also at higher risk of having indigestion.

What is the treatment for indigestion?

Treatment of indigestion as per Homoeopathy includes three main steps. These include: (a) treatment of the

symptoms in order to provide you immediate relief; (b) treatment of the underlying cause(s) in order to provide permanent relief; and (c) improving general health.

There are several effective Homoeopathic medicines for treatment of indigestion. Your doctor will select the medicine most suited to you on the basis of four main factors. These include (a) your symptoms; (b) underlying physical or emotional causes; (c) your family medical history; and (d) your general build up, which will include your eating habits, likes or dislikes, lifestyle, temperament etc.

Medicines normally recommended for treatment of indigestion include the following:

- **Nux vomica:** This medicine is very effective for abnormalities in the lifestyle such as sedentary life, addiction to alcohol, pain killers, sedatives and indiscriminate use of some allopathic medicines. People with such a lifestyle are likely to have constipation and poor appetite, are normally very ambitious, easily irritated and difficult to please.
- **Lycopodium:** This medicine is very effective for gas in the bowels, poor appetite, bloated feeling in abdomen and a sluggish liver. People with these symptoms are likely to have excessive craving for sweets and hot drinks. They tend to have a very dominating personality and are unable to accept any criticism or contradiction.
- **Cinchona off:** This medicine is recommended for increased gas in the bowels, diarrhoea and weakness in people who have had a debilitating disease with bleeding or fluid loss and associated with intense weakness.
- **Arsenic album:** This medicine is effective for people who are anxious, worry a lot and fear even little things. These tendencies can cause mental and physical distress that lead to heartburn, gas in the bowels and loose motions.
- **Carbo veg:** This medicine is recommended mainly for heartburn, belching with sour taste in the mouth, general weakness and a sinking feeling.
- **Ipecac:** This medicine is useful when the main symptoms are nausea, vomiting and a poor sensation of thirst.
- **Pulsatilla:** This medicine is effective for a wide range of symptoms such as pain in the abdomen, nausea, diarrhoea

and increased gas in the stomach. It is normally recommended for people who are mild, timid, very sensitive and weep easily. It is also effective for women who have menstrual disorders.

• **Argentum nitricum:** This medicine relieves anxiety and symptoms if digestive system disturbances that occur in anticipation of some events. For example, some people have diarrhoea just before exams or an important social event.

• **Gelsimum:** This medicine has action similar to Argentum nitricum and is therefore recommended for people with "tension" diarrhoea and a poor thirst sensation.

In addition to the above, there are several other medicines that are recommended for indigestion. For example, asafoetida and ignatia are effective for people who have digestive disorders as a result of emotional imbalance. Other medicines used for some specific symptoms include Abies Nigra, Natrum phos and Magnesia phos.

Homoeopathic medicines recommended for indigestion act in a very gentle way, without causing any uncomfortable side effects. They also improve and regulate the digestive powers of the digestive system.

General measures: In addition to medicines, Homoeopathy strongly recommends the following general measures for management of indigestion:

- Modification and regulation of diet with regular intake of a balanced diet and avoiding excessive intake of any particular food;
- Regular physical exercises to improve digestion;
- Mental relaxation through meditation, yoga, etc.; and
- Avoiding addictive substances such as alcohol and tobacco.

How do Homoeopathic medicines act?

Homoeopathic medicines for indigestion have five main actions. These include (a) improvement in the appetite; (b) regulation of the bowel movements; (c) enhanced functions of the liver so that the digestive enzymes function at an optimum level; (d) providing immediate relief to the symptoms; and (e) providing a general sense of well being.

NATURE CURE

According to Nature Cure, indigestion is the first step towards development of any acute or chronic diseases. When the food is not digested properly, it ferments and produces heat. This heat further increases the fermentation of the undigested food and leads to increased production of gases and acids in the stomach. As a result, toxins are produced in the digestive tract, which are absorbed by the blood. Increased toxins in the blood can lead to several diseases.

What are the causes of indigestion?

The main causes of indigestion are (a) excessive eating, (b) inappropriate combination of foods, (c) processed or artificially flavoured foods, (d) inappropriate cooking methods, (e) use of condiments and spices, (f) use of coffee, tea, aerated drinks and alcohol, (g) irregular timings for

meals and (h) emotional disturbances.

Excessive intake of food is one of the main cases of indigestion. Food is like medicine. In appropriate amounts, it is good for the health but excess of it can harm the body. The most effective way of determining the amount of food your body requires is to eat till your hunger is satisfied. If there are too many items during a meal or several varieties of spices have been used, there is a tendency to eat more than what your body require. Thus, prepare few dishes for every meal and restrict the use of spices.

Appropriate **combination of food** is very important for proper digestion. The type of food influences the quantity and quality of secretion of digestive juices in the stomach and intestines. Thus, if one of the food items limits the production or a particular type of digestive juice necessary

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for another food item, indigestion can occur. The main guidelines for appropriate combination of foods is as detailed below are summarized in Box 18.10.

- **Avoid carbohydrates with acid foods:** "Ptyalin", an enzyme present in the saliva, is important for digestion of carbohydrates. Acid foods prevent the action of ptyalin on carbohydrates and therefore adversely affect its digestion.
- **Avoid protein and some carbohydrates:** Proteins are digested in the acidic medium of the stomach and carbohydrates are mainly digested in the alkaline medium of the salivary juice. Combination of some proteins and carbohydrates prevent secretion of digestive juices that are appropriate both for proteins and carbohydrates.
- **Avoid two complex proteins:** Digestion of different types of protein requires different concentrations of digestive juices in the stomach. Eating more than one type of protein will not allow secretion of appropriate concentration of digestive juices for all types of protein.
- **Do not mix fats and proteins:** Fats can reduce the secretion of digestive juices in the stomach and therefore adversely affect digestion of proteins. Foods eaten along with fats tend to stay in the stomach for longer time and therefore lead to fermentation of food.
- **Avoid starch with simple sugar:** Simple sugar increase secretion of the saliva in the mouth. But the saliva secreted due to simple sugar does not contain the enzyme, ptyalin, essential for digestion of starch or complex carbohydrates. Decreased ptyalin secretion prevents appropriate digestion of complex carbohydrates.
- **Avoid fruits with other foods:** Fruits are digested very easily and therefore leave the stomach faster than most other foods. Fruits eaten with other foods tend to remain in the stomach for a longer time and therefore lead to fermentation.
- **Avoid milk with other foods:** Milk tends to form a coating on the inner lining of the stomach. This lining reduces secretion of the digestive juices. Foods eaten with milk will

therefore not have adequate quantity of digestive juices for appropriate digestion.

- **Avoid two complex starches:** Cereals are most difficult to digest. Combination of two cereals may be difficult to digest at the same time. Cereals tend to ferment faster than any other foods if they remain in the stomach for longer time. Also, combination of cereals can also lead to overeating.
- **Eat fruits only in the morning:** Most toxins are removed from the body between 4.00 a.m. and 12 noon. It is desirable that foods that require more energy for digestion are avoided during the time when toxins are being removed from the body. This is because if more energy is spent on digestion, the toxins may not be eliminated from the body properly. Increased toxins in the body can lead to several diseases.
- **Avoid very frequent meals:** Eating food very frequently prevents proper digestion of food. This is because the food eaten earlier may not be digested completely. The digestive juices and energy for digestion will then be used for digestion of new food. It is desirable that you allow about six to seven hours between two meals.

Processed foods: Most foods can be consumed in their natural forms and do not require canning, processing, preservation, pickling, dressing, etc. Processed foods lose their natural characteristics. They lead to secretion of poor quality of quantity of digestive juices. This is because of loss of vital vitamins and minerals. Preservatives, artificial food colours, condiments and spices and salt may make the food tastier but adversely affect the health.

Method of cooking: Many people tend to cook food in boiling water at a high temperature and for a long time. As a result, vitamins, especially the water-soluble vitamins and minerals are lost. Also, when the food is cooked for a long time, it becomes very soft. As a result, you are not likely to chew it well. Inadequate chewing results in

inadequate secretion of saliva and therefore inadequate digestion of carbohydrates. It is therefore desirable that you cook food for a short time without adding a lot of water. Half-boiled or steamed vegetables are good for digestion. Vegetables that retain their natural consistency and colour after cooking are not over-cooked. Frying also adversely affects the quality of nutrients in the food.

Condiments: Most people believe that condiments and spices increase appetite and improve digestion. This is not true. Mustard, pepper, cloves, garlic, onions, ginger, capsicum, salt, etc. are irritants to the digestive system. They may stimulate digestion temporarily but in the long

run tend to inhibit the digestive process. Condiments reduce the sensitivity of the nerves in the digestive tract and increase the risk of overeating. It is therefore desirable that you use anise seeds, celery, caraway seeds and vegetable salts instead of condiments. Also, avoid the use of vinegar and replace it with lemon juice.

Use of coffee, tea, beverages, smoking and alcohol: Coffee, tea and other beverages increase the secretion of acids in the stomach and therefore adversely affect the digestion. Alcohol initially increases the secretion of acids but in the long run decreases its secretion. It therefore is an irritant to the stomach. Carbon dioxide emitted from smoking interferes with transportation of oxygen. Reduced oxygen in the blood adversely affects digestion because the energy required for digestion is not released.

Irregular meal timings: The organs involved in digestion of food secrete digestive juices at specific times every day and this is why there is a tendency to feel hungry at specific times. If regular hours of meals are not maintained, the cycle of secretion of digestive juices is adversely affected. Thus, the quantity of digestive juices is reduced. It is also desirable that you avoid physical and mental stress immediately after food as it can reduce the blood flow to the digestive tract.

Emotional disturbances: Depression, anxiety, fear, jealousy, anger, frustration, etc. can inhibit the secretion of saliva and stomach juices. They also tend to reduce the normal bowel movements that push the food forward.

What is the treatment for indigestion?

Detailed below are the management options for indigestion as per the Nature Cure system of medicine.

- **Fasting:** Fasting for one to three days is one of the effective ways to correct indigestion. Although it is desirable that you take only plain water during fasting, you may drink fruit juices and tender coconut water, if necessary. Fasting provides rest to the digestive tract and therefore rejuvenates it. It also removes toxins from the body and therefore purifies the blood. Fasting once a week can prevent indigestion.
- **Enema:** Taking enema with warm water cleanses the bowels and avoids re-absorption of toxins from the large intestines. Initially, enema is recommended for three

consecutive days and thereafter as and when necessary.

- **Induced vomiting:** As soon as you feel uncomfortable because of indigestion, it is desirable that you drink three to four glasses of warm salt solution. This will result in vomiting of the undigested foods. It is important to remember that you should not strain to vomit.
- **Cold compress:** Application of a cold compress to the abdomen everyday for twenty to thirty minutes prevents fermentation of food and production of excessive heat in the digestive tract. It also improves blood circulation to the digestive tract and therefore improves digestion. It is important to apply cold compress on empty stomach.
- **Gastro-hepatic pack:** This pack helps improve the functions of the stomach and liver. Application of gastro-hepatic pack for one hour two or three times a week helps maintain normal functions of all the organs of the digestive system such as liver, stomach, pancreas, intestines, etc.
- **Abdominal pack:** Abdominal pack taken for an hour before going to bed improves the tone of the muscles of the digestive tract and therefore improves digestion. You can take abdominal pack everyday.
- **Dietary modification:** The first step for management of indigestion is to avoid overeating. The next step is to eat the correct combination of food. It is also important to chew the food properly. Eat larger portions of raw salads, half-boiled or steamed vegetables. Avoid condiments, spices, tea, coffee, alcohol and other beverages. Smoking should also be strictly avoided. Eat at regular timing everyday and try to avoid fruits and salads along with the main meals. Have early dinner in such a way that you sleep at least three hours after dinner. There is a famous sixteenth century proverb that says "to rise at six, dine at ten, sup at six and go to bed at ten makes a man live ten times longer."
- **Exercise:** Regular exercises such as walking, jogging, and cycling maintain normal digestion.
- **Herbs:** Herbal teas made out of peppermint, hibiscus, lemon grass and fennel help maintain the normal quality and quantity of digestive juices and therefore prevent indigestion. It is desirable to take one teaspoon of herbal tea powder for every cup of tea half an hour before or after meals. Tea prepared with fresh ginger also improves digestion.



UNANI

Indigestion is commonly known as "Bad-Hazmi" or "Sue-Hazm" in the Unani system of medicine. As per the Unani system of medicine, the digestive system breaks down the food and modifies it into four types of humours so that the blood can absorb the nutrients of these humours.

The main aim of Unani physicians is to ensue efficient digestion of food, as they believe that production of abnormal quality and quantity of humours can lead to several diseases. They believe that stress, exercise and other factors of the muscles and skeletal system often affect the digestive system. Assessment of efficiency of the digestive system and the effect of other factors on digestion is a part of diagnosis

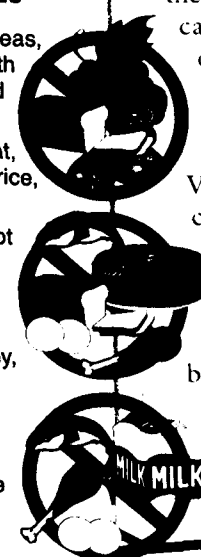
and management of all disease conditions. This is why Unani physicians review intake of food and drinks for all the patients. Indigestion or *Bad-Hazmi* is known as incomplete or abnormal digestion of foods and drinks due to weakness of *Quwat-e-hazima* (digestive power) of the digestive system. This weakness results in several diseases with abnormal humour.

What are the causes of indigestions?

Disturbance in the frequency, time, quality of food intake, change in food habits, excessive eating, frequent eating, not chewing food properly, excessive hot or cold

Box 18.10. Guidelines for correct combination of foods

- Avoid carbohydrates with acid foods in a single meal. For example, peas, potatoes, bread, beans, dates and cereals should not be combined with sour fruits such as orange, lemon, sweet-lime, grapes, pineapple and tomatoes.
- Do not mix protein with some carbohydrates. For example, nuts, meat, eggs, cheese should be avoided with carbohydrates such as potato, rice, bread, cakes and sweet fruits.
- Avoid two complex proteins during a single meal. For example, do not combine nuts, meat, eggs, cheese and milk in a single meal.
- Do not mix fats and proteins. For example, avoid ghee, butter, creams and oils with meat, eggs and nuts.
- Do not combine starch with simple sugar. For example, avoid honey, sugar syrup, jelly, cake, jam, etc. with bread and other cereals.
- Avoid eating fruits with other foods.
- Avoid drinking milk with other foods.
- Avoid two complex starches in a single meal. For example, eat only one type of cereal such as rice, wheat, jowar, etc. during a single meal.
- Eat fruits only in the morning.
- Avoid very frequent meals.



foods and drinks, poorly cooked or uncooked foods are the main causes of indigestion. All these factors weaken the digestive power of the alimentary canal. Most people have indigestion because of excess of *safra* or choleric humour.

What are the signs and symptoms of indigestion?

Belching and heaviness and pain in the abdomen are the commonest causes of indigestion. If indigestion persists for more than four to five days, it can lead to nausea and vomiting. Sometimes loose motions and constipation may also be associated with indigestion. You may have a feeling of heat or burning in the chest or the upper and middle part of the abdomen. Occasionally, there may be white coloured urine with weakness. If the urine is left for some time in a container, white powdery substance may settle down at the bottom.

What is the treatment for indigestion?

In case of severe indigestion, fasting is recommended until the pain and heaviness subside. Subsequently, it is recommended that you take a light, easily digestible, semi-solid or liquid diet and avoid heavy, hard and spicy food.

There are two main principles of treatment of indigestion as per Unani system of medicine. These include (a) to avoid

factors that increase the risk of, or cause indigestion and (b) to strengthen the digestive power or *Quwat-e-hazima*. Unani physicians recommend single or compound medicines to strengthen the digestive power. Single medicines include:

- Zarishk or Indian Barberry (*Berberis aristata*)
- Badiyan (*Foeniculum Vulgare*)
- Zafaran or Saffron (*Crocus sativus*)
- Podina or Mint (*Mentha arvensis*)
- Elaichi or Cardamom (*Elettaria cardamomum*)
- Tamar Hindi or Tamarind (*Tamarindus indica*)
- Ajwain (*Trachyspermum ammi*)
- Zeera or cumin seed (*Cuminum cyminum*)
- Aloo Bukhara or Prunes (*Prunus domestica*)
- Gulab or Persian Rose (*Rosa damascena*)

Compound medicines recommended for indigestion include Jawarish Kamooni, Jawarish Jalinoos, Jawarish Tamar Hindi, Arq-e-gulab, Majoon Nan Khawah, Hab-e-Kabid Nausadri, Manak Jalinoos, Jawarish Ood Tursh, Sharbat Deenar and Arq Elaichi. All these medicines are recommended after meals. Your doctor is the best person to recommend the type of medicine, its dose and duration of treatment. It is recommended that you avoid self medication as it may cause more harm.

DEFINITIONS

Angina is the term used for chest pain that normally occurs during or after exercise or emotional stress and is relieved by rest. Angina is an indication that the heart is not receiving adequate blood supply.

Bile is a bitter, yellow-green secretion of the liver that is stored in the gall bladder. It is important for digestion of fats.

Bilirubin is a yellowish substance in the bile that is formed by the breakdown of haemoglobin in the red-blood-cells. The blood carries this waste product to the liver.

Biopsy is removal of small part of living tissue from an organ for examination under a microscope. It is used to establish diagnosis and estimate progress of the disease or treatment.

Cholecystography is an x-ray examination of the gall bladder.

Cholecystokinin is a hormone produced by the lining of the upper intestine. It stimulates contraction of the gall bladder and secretion of the enzymes of the pancreas.

Chyme is the semi-fluid contents of the stomach present during digestion of a meal.

Endoscope is an illuminated instrument for visualization of the inner parts of a body cavity or organ.

Endoscopy is the visualization of the inner lining of the organs and cavities of the body with an instrument called endoscope.

Enzyme is a protein produced by living cells. Digestive enzymes are produced in large quantities and act in the digestive canal.

Gall bladder is a pear shaped organ situated below the liver. It stores bile and releases it into the duodenum during digestion of the fats.

Ileum is the last part of the small intestine.

Inflammation is the protective response of the tissues of the body to any irritation or injury. It may be acute or chronic.

Insulin is a naturally occurring hormone secreted by the pancreas. It regulates the digestion and glucose and helps digestion of carbohydrates, fats and proteins.

Jaundice is yellow discolouration of the skin, lining of the organs and the outer covering of the eyes. It is caused by increased levels of bilirubin in the blood.

Jejunum is the middle portion of the small intestine.

Liver is the largest gland of the body and has more than five hundred functions. It produces bile, secretes glucose, proteins, vitamins, fats and most of the other compounds used by the body.

Mucous is the slipper secretion of mucous membranes and glands.

Pancreas is a fish-shaped gland situated at the back of the upper middle part of the abdomen. It secretes substances such as insulin and digestive enzymes.

Peristalsis is a coordinated, rhythmic and serial contraction of the intestine that pushes food forward.

In the next issue: Diarrhoeal Diseases

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Diabetic Retinopathy

ALLOPATHY

Diabetic retinopathy is the term used for damage to the innermost layer of the eye called *retina* as a consequence of Diabetes Mellitus, normally called just diabetes. There are two main mechanisms through which diabetes — a disease of some abnormal chemical reactions in the body — develops. These include:

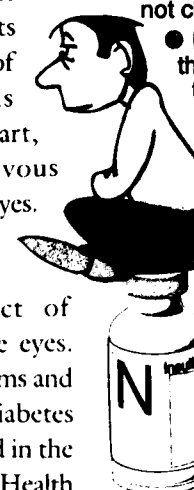
1. **Abnormal production or secretion of a hormone called insulin by pancreas:** Hormones are chemical substances secreted by some organs of the body in small quantities and have effect on parts of the body. Pancreas is fish-shaped organ situated at the back of the upper middle part of the abdomen. It produces insulin and secretes it in response to increased level of glucose in the blood. Insulin also helps digestion of fats, carbohydrates and proteins.
2. **Resistance to insulin by receptors in the organs where insulin action takes place:** Receptors are chemical compounds present on the cell walls of all organs of the body. Chemical substances such as *enzymes* and hormones need to attach themselves to the receptors in order to produce the desired action. Thus, if insulin cannot attach itself to its matching receptors, it cannot act on the body.

Diabetes leads to high blood sugar and adversely affects the digestion of carbohydrates, fats and proteins. It also adversely affects the functions of various organs such as the heart, kidneys, nervous system and the eyes.

This issue focuses on the adverse impact of diabetes on the eyes. Causes, symptoms and treatment of diabetes will be discussed in the next issue of the Health

Box 26.1 Diabetes at a glance

- Diabetes is one of the major diseases all over the world.
- It is mainly a disorder of abnormal chemical reactions of glucose in the body.
- The exact mechanism of why and how diabetes develops is not clearly understood.
- Diabetes is the result of either decreased production of the hormone insulin or increased resistance of the body to use insulin.
- Both hereditary and environmental factors contribute to the disease.
- There are two main types of diabetes: Insulin dependent and non-insulin dependent. The former can be controlled only with insulin injections while the latter can be controlled with oral medicines and dietary modifications.
- Diabetes adversely affects the functions of many parts of the body.
- The complications of diabetes cannot be prevented but their progress can be slowed down.
- Adequate and continuous control of blood sugar level is the most important factor for reducing the risks of complications of diabetes.



Box 26.2. Complications of diabetes**Abnormal chemical reactions:**

- **Hypoglycemia** — sudden decrease in the blood glucose below normal level; and
- **Diabetic ketoacidosis** — very high levels of blood glucose.

Complications of the heart

- Angina
- Heart attack

Complications of the kidneys:

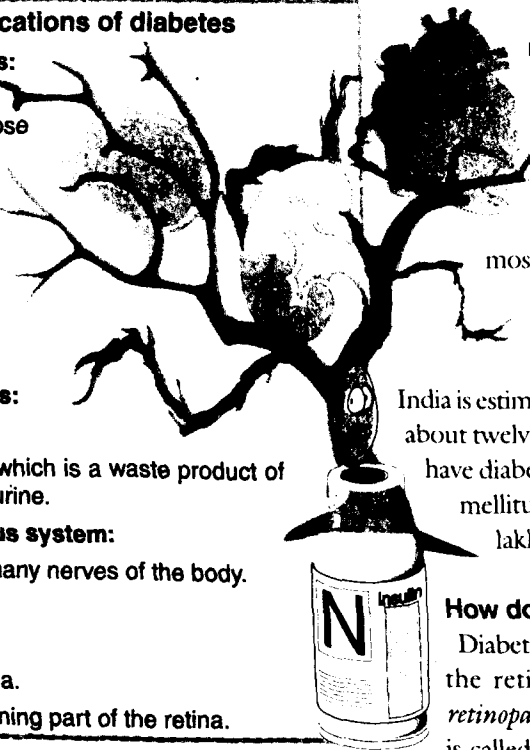
- Kidney failure
- High levels of blood urea, which is a waste product of the body and excreted in the urine.

Complications of the nervous system:

- Damage to either one or many nerves of the body.
- Paralytic attacks

Complications of the eyes:

- Abnormalities in the macula.
- Abnormalities in the remaining part of the retina.

**How common is diabetic retinopathy?**

Damage to the retina is the most common complication of diabetes.

About eighty-five percent people with diabetes develop retinopathy over a period of time. Retinopathy is also the most common cause of loss of vision among people above forty years of age.

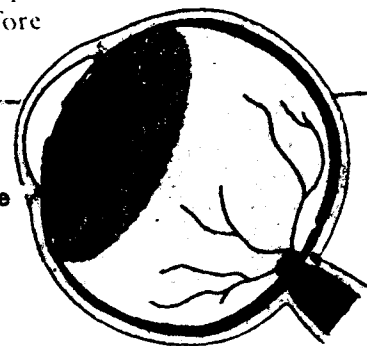
The number of people with diabetes in India is estimated to be about eighteen million. Of these, about twelve to sixteen million people are estimated to have diabetic retinopathy. Total blindness in diabetes mellitus is estimated to be about three to four lakhs people in India.

How does diabetes affect your vision?

Diabetes can damage the retina and macula. When the retina is damaged, the condition is called *retinopathy*. When macula is damaged, the condition is called *maculopathy*. Normally, both retinopathy and maculopathy occur at the same time.

Any damage to the retina and/or the optic nerve leads to defective vision. This is because the retina is either not able to generate good quality images or is not able to transmit good images to the brain. Depending upon the extent of damage to the retina, the defective vision can vary from minimum loss of clarity of images to complete blindness.

Just as all parts of the body, retina and optic nerve also derive their nutrition from their blood supply. Inadequate blood supply to these two parts of the eyes will therefore adversely affect the

**Box 26.3. Effects of diabetes on vision****Adverse effects because of damage to the retina:**

- Maculopathy
- Proliferative retinopathy
- Vitreous hemorrhage
- Detachment of the retina

Adverse effects because of damage to other parts of the eye:

- Temporary variations in refraction — change in the direction of light rays when they enter the eye and pass through its various structures.
- Decreased ability of the eye to adjust to distant and near vision.
- Cataract
- Wasting of the optic nerve
- Glaucoma — abnormally high pressure in the eye that may lead to loss of vision.

Update. Boxes 26.1 and 26.2 list the main features and complications of diabetes mellitus respectively.

What is normal structure of the eye?

In order to understand how diabetes affects the eyes, it is important to understand how a normal eye functions. The normal eye can be compared with a camera and can be broadly divided into three parts. These include: (a) a body called *sclera*, (b) a film that lies below this coat called *retina* and (c) focussing system consisting of *cornea* and *lens*. The cornea and lens together focus sharp images of distant and near objects on the retina. Since retina is sensitive to light, it creates a complex image of the object and transmits it to the brain through a cable of nerves called the *optic nerve*. The area of the retina just above the optic nerve is called the *disc*.

The brain interprets the image and you are able to recognize the object. Even in the normal eye, the quality of the images generated in different parts of retina is not the same. The central part of the retina called *macula* produces images of highest quality. Macula is an oval, highly specialised part that lies close to the nerve that carries the images of the eyes to the brain. Thus, a normal macula is essential for sharp and accurate vision.

For further information on the structure and functions of the various parts of the eye, refer to the Health Update issue on Cataract, Volume 2, Issue No. 1, September 1997.

vision. Diabetes can affect the blood vessels of the eye and reduce its blood supply.

Boxes 26.3, 26.4 and 26.5 detail the adverse effects of diabetes on various parts of the eye.

Damage to the retina cannot be reversed. This means that any loss of vision because of damage to the retina cannot be restored. This is why it is desirable that you maintain normal blood sugar level by strictly following your doctor's advice and get the eyes tested regularly, even if there is no defect in the vision. Regular check-ups will help detect abnormalities, if any, at an early

stage and therefore enable your doctor to start treatment that would help in slowing down further damage to the retina.

Diabetic retinopathy mainly leads to abnormalities in the small blood vessels of the retina, especially at its centre, the macula. As mentioned earlier, any damage to macula greatly increases the risk of loss of vision.

How are abnormalities of retina detected?

Your doctor can examine the retina, macula and the optic nerve using an instrument called *ophthalmoscope*. The procedure of examination of the eye using an ophthalmoscope is called *ophthalmoscopy*. Before examining the eye, the doctor will recommend some eye drops to dilate the pupils. Normally, you need to put a few drops of the medicine in both the eyes once in ten minutes. After about forty-five minutes, the pupils will be dilated and the doctor will be able to have a more clear view of the retina, macula and the optic nerve. The effect of the medicine lasts for a few hours during which you are likely to have hazy vision. It is therefore desirable that you avoid driving and other similar risky activities for at least six hours after the eye drops have been used. Your doctor can also take pictures of the retina, macula and optic nerve through a special camera called the *fundus camera*.

What are the stages of diabetic retinopathy?

There are two main stages of diabetic retinopathy: (a) Pre-clinical stage, where abnormalities cannot be detected

Box 26.4. Effects of diabetes on the structures around the eye

● **Stye**, which may be recurrent. This is a condition in which there is an acute inflammation of a gland at the base of an eyelash. The gland becomes hard, is painful to touch and has a pus filled sac at its centre.

● **Chalazion**, a condition where there is a swollen "oil" gland in the eyelid. It is caused by chronic inflammation as a result of blockage of the tube draining the gland. The gland becomes a jelly-like mass and tends to disfigure the eyelid.

● **Chronic Blepharitis**, a condition in which there is inflammation of the eyelids. Ulcers form on the margins of the eyelids and are covered with yellow-coloured crusts.

● **Orbital cellulitis**, a condition in which inflammation of the tissue connecting the eye to its surround structures. This inflammation is due to bacterial or fungal infection.

● **Pre-orbital xanthelasma**, a condition in which there are one or more yellow deposits of fatty material in the skin around the eyes.



by examination with an ophthalmoscope and (b) clinical stage, where abnormalities can be detected through an ophthalmoscope.

Until recently, clinical retinopathy was further classified into three types: (a) background retinopathy; (b) diabetic maculopathy; and (c) proliferative retinopathy. Maculopathy was further classified into four types. However, in recent times, a newer classification based on "Early Treatment Diabetic Retinopathy Study" is being used by most specialists. This classification is based on the damage to the retina seen on special photographs of the retina. As per this classification, there are three main types of diabetic retinopathy. These include: (a) non-proliferative retinopathy, (b) proliferative retinopathy and (c) maculopathy. These three types are further sub-divided as listed in Box 26.6.

What is non-proliferative retinopathy?

Non-proliferative retinopathy is a condition in which there are three main abnormalities in the retina:

- Micro-aneurysms:** The blood vessels of the retina bulge out in several places just like small balloons or pouches on the outer surface;
- Bleeding:** There may be bleeding on the surface of the retina that looks like very small dots and blots; and
- Exudates:** There may be leakage of fluids on the surface of the retina. This is normally because of weakness in the walls of the blood vessels. The leaked fluid is called exudate.

Normally, the various contents of the blood, such as

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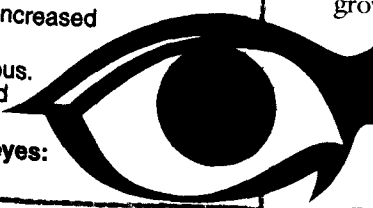
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Box 26.5. Effect of diabetes on the front part of the eye

- **Conjunctiva:** Excessively congested blood vessels
- **Cornea:** Abnormal basement membrane. Decreased sensation. Increased thickness. Persistent or delayed healing of the wounds on the outer layer. Increased risk of infection.
- **Uvea** (pigmented layer of the eye with blood vessels. It consists of choroid, ciliary body and the iris): Increased risk of infection. Increased dispersion of the pigment. Changes in the blood supply to the iris.
- **Pupils:** Increased sluggishness or rigidity of the pupils. Decreased ability of the pupils to adjust its size according to amount of light.
- **Pressure inside the eyes:** Increased risk of Glaucoma
- **Lens:** Early development of cataract. Increased rate of maturation of the cataract.
- **Vitreous:** Bleeding in the vitreous. Deposits of star-shaped bodies called "asteroid".
- **Nerves of the muscles of the eyes:** Paralytic squint



fats, red blood cells, white blood cells, etc., stay inside the blood vessel. In case of bleeding and leakage of fluids on the retina, these components leak from the blood vessel and make the retina "wet". As a result, the retina becomes swollen. If this swelling is present in the macula, which is responsible for clear vision, blurring of the vision occurs. You are more likely to notice the blurring of the vision while reading or looking at close objects. The objects that you see from the outer part of the eyes are likely to be less blurred. The water from the leaked fluid is normally absorbed back into the eyes but the fats and other components tend to deposit in a small circle around the damaged part of the blood vessel.

What is proliferative retinopathy?

Proliferative retinopathy is the next stage of damage to the retina due to diabetes. It normally occurs a few years after initial damage to eyes has started because of non-proliferative retinopathy. As the damage to the blood vessels of the retina increases, the blood supply to the retina decreases. As a result new and abnormal blood vessels are formed on the surface of the retina and the disc. The disc is the part of the retina from which the optic nerve emerges. This stage when new and abnormal blood vessels are formed is called proliferative retinopathy.

Reduced blood supply to the retina reduces its supply of oxygen and nutrition. It is believed that the retina produces a chemical signal because of lack of nutrition and

oxygen. This signal is called, in simple terms, a vessel-producing factor. This factor spreads in the vitreous and stimulates growth of new blood vessels on the retina.

The rate of growth of new vessels varies from person to person. Some people have a rapid growth of new blood vessels over a few months while it might take several months or years for others. It is believed that the variation is largely due to the balance of factors that stimulate and inhibit the growth of new blood vessels in the eye. When the factors that stimulate the growth of blood vessels are stronger than the factors that inhibit them, damage to the eyes is more rapid.

What are the complications of proliferative retinopathy?

Normally, growth of new blood vessels because of reduced blood supply may be considered as a desirable effect. This is however not true for the eye because the new blood vessels may not be located at the same place where there is reduced blood supply to the retina. New blood vessels that are formed at the site of origin of the optic nerve are called "*new vessels on the disc or NVD*" and the new blood vessels on the other parts of the retina are called "*new vessels elsewhere or NVE*". These new blood vessels are very delicate and weak. They therefore have natural tendency to burst. The bursting of the blood vessel leads to bleeding. If the bleeding is inside the eye, it is called *vitreous haemorrhage* and if it is on the surface of the retina, it is called "*pre-retinal bleed*". This bleeding can be recurrent and may occur again and again over a period of time.

Bleeding in the eye obstructs the passage of light from the vitreous humour, which is normally clear. When the light cannot pass through the vitreous and reach the retina, there may be decrease in, or complete loss of vision. This is because there will not be any image of the object on the retina.

If the bleeding is not severe, the eye may be able to clean the vitreous. The red blood cells move to the front of the eye and are removed through the normal drainage of the eye. The white blood cells also "eat" the red blood cells and carry them to the front of the eye from where they are drained out. It is important to remember that cleaning of the eye on its own is a very slow process. It may take a few weeks to even a few months. Sometimes the

Box 26.6. Classification of diabetic retinopathy**A. Non-proliferative retinopathy**

- Mild
- Moderate
- Severe

B. Proliferative retinopathy

- With high risk characteristics
- Without high risk characteristics

C. Maculopathy

- Clinically significant swelling of the macula
- Clinically insignificant swelling of the macula

bleeding may need to be treated cleared with surgery.

Bleeding in the eye has another major disadvantage. Vitreous in the eyes may also prevent your doctor from having a clear view of the eye inside. Thus, he may not be able to detect if the new blood vessels are continuing to grow or there is further damage to the retina, such as its detachment or formation of scars.

Sometimes the blood leaked in the vitreous may become "*organized*". This means that the blood in the vitreous may make it opaque with the formation of membranes. The ruptured blood vessels may also develop scars. These scars and the "hardened" vitreous begin to pull on the retina and finally cause it to detach. Detachment of the retina is the advanced stage of diabetic retinopathy. A major surgery is necessary to remove the "solidified" vitreous and prevent pulling of the retina. In case the retina is already detached, the severity of the loss of vision will depend on the extent and site of detachment. The retina can normally be re-attached with a major surgery if the detachment is detected early. However, if the detachment is in the central part of the retina, the vision may not return to normal even after the surgery.

Most people with diabetes tend to seek treatment from an eye specialist only at the advanced stage of diabetic retinopathy. This is because the damage to the eyes is painless and the loss of vision in its early stages is attributed to cataract since the main age group at risk of cataract and diabetic retinopathy is the same. Box 26.7 details the clinical signs likely to be present in people with diabetic retinopathy. These signs can be seen through an ophthalmoscope.

What are the effects of diabetic maculopathy?

Diabetic maculopathy is a condition where there is damage to the macula, the central part of retina responsible for sharp vision. It is the commonest cause of loss of vision among people with diabetes. Loss of vision due to swelling of the macula is five times more common than the loss of vision due to complications of proliferative diabetic retinopathy. Damage to the macula is twice more common among diabetics who take oral anti-diabetes medicines than those who take insulin. About seventy-five percent people with diabetic maculopathy are those who take oral anti-diabetes medicines.

How is diabetic maculopathy detected?

Diabetic maculopathy is detected through three main procedures. These include:

- a. Examination with an ophthalmoscope;
- b. Slit-lamp bio-microscopy using a three-mirror contact lens or a plus 90D lens; and

c. Fluorescein angiography.

Fluorescein angiography involves injecting a chemical compound called sodium fluorescein through the vein in the forearm. Immediately after injecting this chemical, your doctor will examine your eyes with the help of a fundus camera and study the circulation of this dye in the blood vessels of the retina. He/she is also likely to document the various phases of angiography. Very rarely, fluorescein angiography may cause a life-threatening allergic reaction. After the procedure, your skin, outer white portion of the eye and the urine may have a yellow discoloration for a few days. This is a normal reaction, is not dangerous and does not require any treatment. You may have nausea during the angiography procedure and therefore your doctor will recommend that you remain on empty stomach before the procedure.

During the test, your doctor will be able to identify the type of leakage from the macula or detect lack of blood supply to the macula, if present. This test can also be used to detect leakage from new vessels formed in the proliferative stage of diabetic retinopathy.

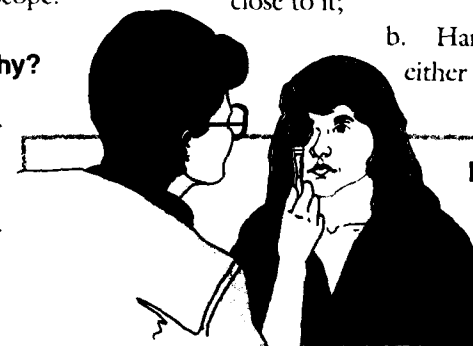
What are the types of diabetic maculopathy?

Diabetic maculopathy is classified into two main types:

1. Clinically significant diabetic maculopathy; and
2. Clinically not significant diabetic maculopathy.

Diabetic maculopathy is said to be clinically significant when there is:

- a. Thickening of the retina either at the macula or very close to it;
- b. Hardened leaked fluid residues either at the macula or very close

**Box 26.7. Clinical signs of diabetic retinopathy****Non-proliferative stage**

- Dilation of veins
- Small pouching of the blood vessels

- Bleeding from the retina
- Hardened leaked fluids

Maculopathy

- Thickening of the macula
- Hardened leaked fluids
- Scattered or localised leakage as seen through Fluorescein angiography

Proliferative stage

- New blood vessels on the disc
- New blood vessels elsewhere
- Pre-retinal bleeding or vitreous haemorrhage.
- Detachment of the retina

Box 26.8. Approach to management of diabetic retinopathy**Primary level:**

- Prevention of diabetes, not possible at present.
- Postpone development of retinopathy with appropriate management of diabetes and other high-risk conditions such as kidney diseases and high blood pressure.
- Frequent check-up by diabetes and eye specialists in order to detect abnormalities of the eye and uncontrolled diabetes, if any, at the earliest.

Secondary level:

- Early diagnosis and treatment.
- Follow your doctor's advice very strictly and go for regular check-ups even if you do not have any symptoms.
- Laser treatment, if necessary.
- Controlling risk factors such as high blood pressure, kidney diseases, etc.

Tertiary level:

- Visual rehabilitation with low-vision aids.
- Social and vocational rehabilitation with the help of trained professionals.



to it and associated with thickening of the retina around it; and

c. Any thickening of the retina that is greater than the size of the disc, some of which is very close to the macula. Hardened leaked fluid residues may or may not be present.

What are the high-risk characteristics of diabetic retinopathy?

High-risk characteristics are the damages to the retina that increase the risk of more rapid loss of vision. This rapid loss of vision is because of the complications of the proliferative stage of diabetic retinopathy. These include:

- New vessels on the disc that cover at least one-third to half of the area of the disc;
- New vessels on the disc associated with pre-retinal or vitreous haemorrhage; and
- New vessels elsewhere that is at least half the size of the disc and is associated with pre-retinal or vitreous haemorrhage.

What is the treatment for diabetic retinopathy?

The treatment of diabetic retinopathy can be broadly divided into three phases:

- Primary level**, when there is no damage to the retina;
- Secondary level**, when the damage to the retina is in the early stages and the further loss of vision can be prevented or postponed; and
- Tertiary level**, when the damage to the retina is

extensive and there is irreversible loss of vision.

Detailed below are the management options recommended for each of the above three levels that are summarised in Box 26.8.

Primary level: The only option at this level is to postpone beginning of diabetic retinopathy. An ideal condition would be to prevent diabetes and its complications. Since this is not possible, the only option is to detect diabetes at the earliest and treat it appropriately. If the blood sugar level remains normal, damage to the eye can be prevented for a longer time.

Several research studies have indicated that development of diabetic retinopathy and its progress depends largely on the duration of diabetes, efficiency of blood sugar level control, presence of high blood pressure, associated diseases of the kidney and pregnancy. These research studies have not clearly indicated the role of high blood cholesterol, smoking, alcohol intake and physical activities on the progress of diabetic retinopathy. It is therefore desirable that diabetes, high blood pressure and diseases of the kidney are treated with timely and appropriate measures in order to prevent damage to the eyes.

The risk of developing non-proliferative diabetic retinopathy among pregnant women with normal eyes before pregnancy is about eight percent. Of these pregnant women, about two percent are at a risk of developing proliferative retinopathy. About twenty-five percent women who have proliferative retinopathy at the beginning of pregnancy are at risk of further damage to the retina and loss of vision during pregnancy. This is why it is desirable that women with diabetes get their eyes tested very frequently during pregnancy.

Secondary level: Early diagnosis and treatment of diabetic retinopathy is recommended at this level. Laser treatment and surgery are the two main types of treatment at this stage. Laser treatment may be necessary even after surgery in order to complete the treatment. If you go for regular eye check-ups, even if there are no symptoms, your doctor will be able to detect retinopathy in very early stages. Thus, early diagnosis depends on how cooperative you are

about regular check-up. During these check-ups, your doctor will not only test the sharpness of your vision but also examine the retina using an ophthalmoscope. Table 26.9 details the frequency of check up for diabetic retinopathy.

Tertiary level: At this stage, low visual aids for both near and distant vision may help, especially if you are motivated to use these aids and lead as much normal life as possible.

What is laser treatment?

Laser is a equipment that produces a very thin beam of light in which high energies are concentrated. The main aim of laser treatment is not to restore vision but to prevent or delay the risk of further loss of vision. Laser treatment "burns" the small patches of damaged retina and therefore reduces the oxygen and nutrition demand. It also increases the amount of oxygen that reaches the retina from the blood vessels situated below it. Increased oxygen and nutrition reduce the rate of formation of new blood vessels. Laser also "seals" the damaged blood vessels of the retina so that they do not bleed further.

The maximum benefit of laser treatment in diabetic retinopathy is seen when the eyes are treated early, especially among those whose eyesight is not very adversely affected already. Laser treatment reduces the risk of moderate loss of vision by fifty percent and may also improve sharpness of vision to some extent. Box 26.10 lists the conditions for which laser treatment is recommended in diabetic retinopathy.

When the laser light hits blood, it is absorbed as heat energy and produces a small burn. The burn produced by the laser creates a faint scar under the retina that will not affect your vision. Decreased swelling of the macula and improved vision is normally observed about one month after laser treatment. Sometimes the benefits may be observed even within a few days or after several months. There may also be initial loss of vision after laser treatment. This is because of increased swelling of the macula. This swelling observed after laser treatment is not serious and usually improves within a few weeks.

Laser treatment does not require any hospitalisation. Your doctor will put a few eye drops in the

affected eye in order to reduce pain sensation on the outer surface of the eye. It is desirable that you avoid lifting heavy weights and taking medicines such as aspirin for a few days after laser treatment. It is important to remember that you need to go for regular follow-up even after completion of laser treatment. The response to laser treatment is better if other risk factors such as high blood pressure and kidney diseases are under control. Sometimes more than one session of laser treatment may be necessary in order to complete the treatment.

When is surgery recommended in diabetic retinopathy?

Surgery is recommended for people with advanced diabetic eye disease is a major surgery and needs hospitalisation for a few days to a week. This could either be for persisting vitreous haemorrhage or detachment of retina. Surgery on the vitreous is called *vitreotomy* and surgery on both, the vitreous and retina is called *vitreoretinal surgery*. Your doctor will recommend surgery only after reviewing several factors such as the extent of visual activities you normally perform, vision at the time of examination, general health status, age, etc.

After the surgery, the eye may be swollen, red and painful for a few days. These symptoms reduce over a period of

Box 26.9. Frequency of eye examination for diabetic retinopathy**First examination:**

- Five years after diabetes starts or at puberty for diabetics dependent on insulin
- As soon as diabetes is diagnosed for those not dependent on insulin for effective control of diabetes.
- Subsequent follow-up:
- If no abnormality is detected at first examination, check up is desirable at least once a year.

The following frequency of check-up is desirable for different stages of retinopathy:

Non-proliferative diabetic retinopathy without maculopathy:

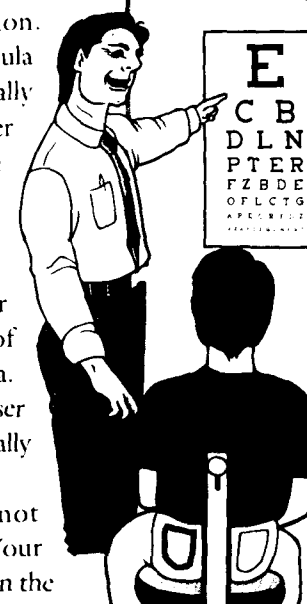
- Mild Once in eight to twelve months
- Moderate Once in six to eight months
- Severe or very severe Once in four to six months

Non-proliferative diabetic retinopathy with maculopathy:

- Once in three to four months
- Proliferative diabetic retinopathy

Pregnant woman:

- Consult an eye specialist before you plan pregnancy in case you have diabetes.
- Plan to complete the family early.
- First check-up in the first three months of pregnancy
- Follow-up once in three months if no abnormality is detected.
- Repeat check-up as soon as any symptoms occur
- Three to six months after delivery.



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Box 26.10. Conditions requiring laser treatment

- Clinically significant swelling of the macula.
- Proliferative diabetic retinopathy with high-risk characteristics. Immediate laser treatment is recommended at this stage.
- Some cases of severe or very severe non-proliferative diabetic retinopathy.
- Some cases of early stages of proliferative diabetic retinopathy.
- People with non-proliferative diabetic retinopathy who are unable to go for regular check-ups;
- Pregnant women with diabetic retinopathy.
- Diabetics who are likely to undergo cataract surgery in near future.
- People with advanced diabetic retinopathy and loss of vision in the other eye.



time by taking some medicines as advised by your doctor. The recovery of vision after surgery depends on the area of remaining healthy retina, especially the macula. The

recovery is likely to be better if the retina had been treated with laser before the stage of advanced disease. However, additional angiography and laser treatment may be required after surgery also. You also need to maintain a strict follow-up routine with your doctor. Simple precautions recommended after surgery are the same as those detailed in the section on laser treatment.

Research studies have indicated that the chances of recovery of vision are better with early vitrectomy than performing the surgery only if bleeding has been present for over one year or if the macula is detached from the eye. Similarly, people who are dependent on insulin for control of diabetes, have with severe proliferative diabetic retinopathy and "useful" vision have better chances of recovery if vitrectomy is performed early rather than wait till bleeding has been present for over six months or there is detachment of the retina.



AYURVEDA

Diabetic retinopathy is called *Madhumeha Padruta Drstinadi Gata Ksaya* in Ayurveda. Sushruta, the famous surgeon of ancient times, has described more than seventy-six eye diseases. Madhavakar, another famous Ayurvedic physician, has added two more eye diseases. These include *Kunchan* and *Psamshata*. Sushruta has described diseases of the cornea and sub-classified them into four subgroups. These include (a) *Sabrana Shukla* (ulcer on the cornea) (b) *Arana Shukla* (opacity in the cornea), (c) *Aksipakatyaya* (complication of inflammation of the cornea with ulcers) and (d) *Ajakajata* (abnormal bulging of the cornea). However, in the list of complications of diabetes mellitus (called *Madhumeha* in Ayurveda), there is no mention of retinopathy (called *Drstinadigata ksaya* in Ayurveda).

What are the causes of diabetic retinopathy?

There is a very clear description of diabetes (Madhumela) in Ayurvedic literature but the complications of diabetes, especially its adverse effects on the eyes, kidneys and nerves, has not been described clearly. This is why Ayurvedic physicians follow guidance of Charaka, the ancient Ayurveda physician. He has said, "one should not feel hesitation if he cannot declare name of a particular disease, because it is impossible to name all the diseases found in the universe. These diseases are nothing other than abnormal 'doshas'.

There can be several causes for abnormal doshas, and they can lead different diseases in different people. This is

why it is important to focus on the nature of disease and its symptoms before deciding on the treatment most suited for the condition.

Based on the above concept, diabetic retinopathy can be considered to be due to the impact of abnormal doshas with 'bahu' and 'abadha' medas and other disorders such as *mansa*, *kleda* etc. lead to the abnormality. Normally, aggravation of the dosha "vata" is due to obstruction of any channels through which the body fluids flow and *Dhatuksaya*. If the vata that is aggravated by *Dhatu ksaya* combines with *ruksa* property, it changes the vital fluid called *ojas*. Ojas is "sweet" (madhur) in nature and its abnormality leads to incurable diabetes and its complications.

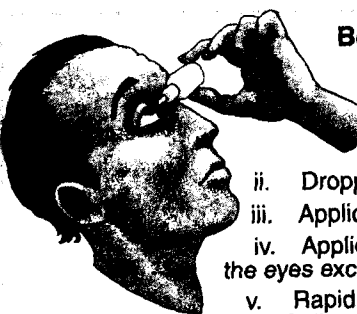
Sushruta states that *tejobhuta sara* of *samyakparinata ahara* is known as "rasa" which is transformed into fine essence of all the seven *dhatu*s from *rasa* to *shukra* and is called *ojas*. This is responsible for *Tarpana*, *Varadhana*, *Dharana* and *Yapana* in living beings. Therefore, reduction in *ojas srotodushti* leads to abnormalities in the structure and functions of several organs of the body. This abnormality can lead to conditions such as progressive retinopathy with loss of vision. Observations by several Ayurvedic physicians have indicated that severe and long-term diabetes influences the development of diabetic retinopathy. The severity of diabetes also determines the severity of diabetic retinopathy. They have also observed that high blood pressure hastens the development of diabetic retinopathy and there is a higher risk of associated abnormal kidney functions.

What is the treatment for diabetic retinopathy?

Box 26.11 details the principles of treatment for diabetic retinopathy as per Ayurveda.

Ayurveda recommends the following **single medicines** for management of diabetic retinopathy:

- Eye drops prepared from *Mamisa* Bark of *Coptis teeta* (strychnos potatium) and *Nirmali* *strychnos* potatium seeds of *Cassia Absus* (Chakshushya) are recommended for internal use to improve vision.
- One to five drops of *Jyotishmati* oil extracted through *Patala yantra* with fresh juice of *Amalaki* (Phyllanthas Emblica) are recommended for improving the eyesight.
- Two to five grams of powdered *Nagakesara* (Mesua Fenea), *ilaichi* fruit (Eleteria Cardamomum) and *Vansalochan Twaka sara* (Bambusa Arundinacea) is recommended with water twice a day for forty days to improve functions of the nerve that carries images from the retina to the brain (Optic nerve).
- Five grams of *Amala ki rasayan* (Amala powder with twenty-one Bhawana of Amala juice) is recommended twice a day with water.



Box 26.11. Principles of treatment of diabetic retinopathy as per Ayurveda

1. Appropriate use of seven types of eye treatments. These include:
 - i. Dry or wet fomentation (Sheka)
 - ii. Dropping or (Ashachyotana)
 - iii. Application of pods (Pindika)
 - iv. Application of medicated paste around the bony cage of the eyes excluding the eyelids (Vidal)
 - v. Rapid blinking after filling the eyes with medicated ghritta fat based preparations or Taila oil based preparations (Tarpana)
 - vi. Instillation of special herbal medicines after completions of Tarpan described in treatment option "v" above (Putapaka). There are three types of Putapaka: Snehan, Lekhana and Ropana.
 - vii. Medicated Kajal used after the netragata dosha abnormalities of the eye have matured and liquified (Anjana).
2. To delay, and if possible, prevent the onset of diabetic retinopathy by maintaining normal chemical reactions of the body and high blood pressure and giving low protein diet.
3. To prevent the progress of retinopathy and adverse impacts on the nerves major blood vessels.
4. Improve the natural defence mechanism of the body by rasayana and selective procedures of pancha karma treatment that gives relief from symptoms.

- Medicated Kajal or oil based preparation of *White lodhara* (Symploco/Racemosh), *Haritaki* (Terminalia chebula) and *Daruhaldi* (Berberis Aristata) is recommended to relieve pain in the eyes.
- Two hundred fifty to five hundred milligrams of *Saptamrta Lauha* or *Abhayagugulo* is recommended three times a day.
- *Ashchyotan*, *Vidalaka*, *Sheka* or *Pinda* are recommended only under a specialist's care for treatment of disorders of the optic nerve.



HOMOEOPATHY

The signs, symptoms and causes of diabetic retinopathy as per the Homoeopathic system of medicine are the same as those detailed in the section on Allopathy.

What is the aim of Homoeopathic treatment for diabetic retinopathy?

There are four main aims of treating diabetic retinopathy with Homoeopathic medicines. These include:

- To control diabetes and maintain normal blood sugar levels;
- To stop further damage to the retina;
- To dissolve the discharge formed on the retina; and
- To control bleeding in the eye, if any, and absorb the blood.

What is the Homoeopathic approach for treatment of diabetic retinopathy?

Just as for other health problems, your Homoeopath will ask you several questions in order to determine the medicines that are most effective for you. He/she will

particularly inquire about illnesses within your family and physical or mental stress just before the symptoms either started or increased in their severity.

● **Family history:** Diabetes is often inherited. This means that the tendency to develop diabetes is more common among people whose blood relatives (such as parents, grandparents, etc.) had diabetes. There are some Homoeopathic medicines that can either prevent diabetes in such people, or at least reduce its severity. For example, *Thuja* is recommended for those whose family members have diabetes, *asthma*, *arthritis* or heart diseases. Similarly, *Tuberculinum* is recommended for those whose family members have had tuberculosis.

● **Mental and physical stress:** According to Homoeopathy, physical and mental stresses can either hasten the development of diseases or increase their severity. Sometimes blood sugar levels increases even among those who otherwise do not have diabetes during excessive stress. Such a stress could be due to injury, major illness and mental stress such as grief, prolonged anger, etc. Homoeopathy

advocates that controlling blood sugar level during stress can prevent damage to the eyes.

Homoeopathy offers several medicines to control the adverse effects of grief. For example, *Natrum mur* and *Ignatia* are recommended for grief and *Aconite*, *Pulsatilla* and *Phosphorus* are recommended for shock and fright.

What laboratory investigations are recommended for diabetic retinopathy?

Homoeopathy also recommends all the laboratory investigations that have been detailed in the section on Allopathy.

What is the treatment for diabetic retinopathy?

Homoeopathy offers medicines that can reduce the severity of diabetes and prevent its adverse impact on the eyes. However, your Homoeopath will recommend you to Allopathy specialists in case of (a) dangerously high or uncontrolled blood sugar levels or (b) severe damage to the eyes. Detailed below are the medicines normally recommended for diabetic retinopathy.

- **Syzygium, Jaborangi and Gymnema Sylvestra:** These three medicines are used in the form of a tincture (a medicated liquid). They act directly on the pancreas and control the blood sugar levels, especially among those who are not dependent on insulin injections. These medicines prevent damage to the eyes by maintaining normal blood sugar levels.
- **Argentum Nitricum:** This medicine is recommended for people who have diabetes with blurring of vision. It is especially effective for people who have a nervous and

impulsive temperament and have an excessive craving for sweets.

- **Arnica:** This medicine is very effective for bleeding from the retina.
 - **Crotalus Hor and Lachesis:** Both these medicines are recommended for bleeding from the retina, especially for people who have tendency to bleed easily from other parts of the body also. These medicines are effective for people who are easily depressed and are talkative by nature. Both these medicines are prepared from snake poisons.
 - **Phosphorus:** This is a very effective medicine for treating diabetic retinopathy, especially if there is bleeding from the retina, *thrombosis* and degenerative changes in the blood vessels of the retina. Thrombosis is an abnormal condition of the blood vessels in which blood clots get attached to the inner walls of the blood vessels. As a result, there is reduced blood supply from the affected part. Phosphorus is normally recommended for people with diabetic retinopathy who also have flashes of light before the eyes. Such people are normally tall, thin built, timid and affectionate, have a tendency for indigestion and crave chilled drinks, even in winter.
 - **Phosphoric acid:** This medicine is recommended for people who are very weak and tired, have had grief or mental shock and are therefore depressed and withdrawn, have grey hair at young age and have poor sexual ability.
- In addition to the above medicines, there are several other medicines that are effective for treating diabetic retinopathy. These include *Kali Iod*, *Thuja*, *Medorrhinum*, *Uranium Nitricum*, *Terebinth*, *Acetic Acid*, *Lecithin*, *Lactic acid*, etc.

NATURE CURE

Causes and signs, symptoms of diabetic retinopathy as per Nature Cure are the same as those detailed in the section on Allopathy. According to Nature Cure, the consistency of the blood changes due to diabetes. As a result, the blood cannot flow easily in blood vessels, especially in the capillaries. Poor blood flow leads to inadequate blood supply of the eye and therefore inadequate nutrition and oxygen. The capillaries blocked with thickened blood cannot dilate and rupture easily when the blood tries to flow forcibly.

Nature Cure also opines that vision gets affected only when three basic requirements of the eye are inadequate. These include (a) nutrition, (b) drainage of the waste or excess fluid and (c) normal functions of the nerves of the eye. Unless these three functions return to normal, the damage to the eyes cannot be cured. Obstruction to the free flow of blood, lymph and nerve impulses to the eye can lead to diminished vision. This obstruction is due to accumulation of waste products or toxins on the inner layer of the eye.

What is the treatment for diabetic retinopathy?

Just as in other systems of medicine, Nature Cure also emphasises the importance of controlling blood sugar levels in order to prevent or slow the progress of diabetic retinopathy. In addition to management options for diabetes, Nature Cure recommends the following measures for maintaining normal vision among people with diabetes.

- **Cold application:** Cold applications to eye improve the tone of the blood vessels, strengthen walls of the capillaries and prevent leakage of fluids from the blood vessels of the eye. They also improve (a) flow of blood and lymph and (b) drainage of the eye and therefore reduce heat and swelling of the eyes.

Detailed below are some methods of applying cold to the eyes.

- Fill a basin up to its brim with cold water. Dip the forehead and eyes in the cold water in the basin and open and close the eyelids six to eight times under the water.

- Immerse a cloth in cold water and squeeze it slightly to remove some of the excess water. Apply this wet cloth on the eyes for twenty minutes and press it gently so that the cold pack touches the eyeballs.
- Fill an eyecup with cold water, bend forward to fix the eyecup firmly in the bony cage of the eye and bend backwards so that the eyecup is above the eyes. Open and shut the eyelids ten to fifteen times in this position.
- Fill your hands with cold water from the tap and splash it on open eyes repeatedly for one minute.
- Apply mud dressing to the eye for twenty minutes.
- **Alternate hot and cold application:** Immerse a cloth in hot water, squeeze it gently to remove some of the excess water and apply it on the eyes for two minutes. Next, immerse the same cloth in cold water and squeeze it gently to remove the excess water. Apply it for thirty seconds. Repeat the process for about five minutes and end with a cold compress for three to four minutes. Alternate hot and cold applications also improve blood supply, improve tone of the blood vessels and prevent the fluids from leaking.
- **Massage:** A gentle massage to the eyes also improves blood supply and helps prevent adverse effects of diabetic retinopathy.



UNANI

Diabetic retinopathy is called *Ziabetusi Amraz Shabkia* in the Unani system of medicine. Damage to the retina is often due to some underlying disease. This is why normally retinal of both the eyes gets affected at the same time. The severity of the damage may however differ in the two eyes. Diseases that can damage the retina include blood cancer, *anaemia*, *tuberculosis*, high blood pressure, diabetes and *toxemia of pregnancy*.

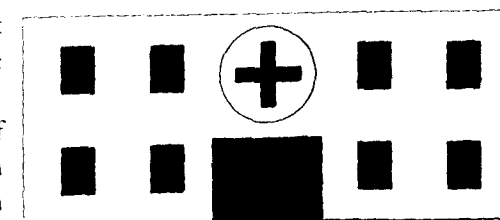
The damage to the retina as a result of these diseases can lead to reduced clarity of vision, difficulty in seeing distant objects, reduced sense of light, inability to tolerate bright lights and pain, discomfort and watering of the eyes. The most common disease that can damage the retina is diabetes.

According to Unani system of medicine, excess of blood sugar as a result of inadequate liver function leads to excessive production of Burnt Phlegm (*Muhtariq*). This type of phlegm is corrosive and damages the soft walls of arteries of the retina. This damage may lead to bleeding from the retina. This Muhtariq phlegm deposits on the surface of the retina and may cause blindness gradually.

How can diabetic retinopathy be prevented?

Unani system of medicine recommends the following for preventing diabetic retinopathy:

- Maintain normal blood sugar level with Unani medicines normally recommended for diabetes.
- Improve liver functions with medicines that protect the liver. These include *Mako*, *Kasni*, *Gulab*, *Sumbulutech*, *Anar*, *Amla*, etc.
- Avoid excessive use of foods that produce burnt phlegm. These include sugar, meat and other foods that are very rich in carbohydrates and proteins.
- Eat larger quantities of green leafy vegetables.
- Use fruits and vegetables such



HEALTH TIP OF THE MONTH

Management of diabetes is not just limited to maintaining normal blood sugar level. It is also not just taking care of your eye or any other organ. Since diabetes can affect several organs such as heart, kidneys, eyes, nerves, etc., it is desirable that you get regular check-ups done by concerned specialists such as cardiologist, nephrologist, neurologist, ophthalmologist, etc. Appropriate and timely management of adverse effects of diabetes, if any, can help you lead a normal life for a longer time.

DID YOU KNOW THAT

Retina is a light sensitive layer that is highly specialized to respond to stimulation by light. At very high speeds, the light sensitive cells cannot recharge fast enough. This is why the eye cannot detect any movement at high speed.

as gooseberry, carrot, cucumber, dates, walnut, papaya, and pomegranate everyday.

- Instill Araq-e-Gulab (Rose Water) in the eyes every day.
- Instill one or two drops of pure honey into the eyes.
- Use goat liver as far as possible.
- Avoid green chillies.

What is the treatment for diabetic retinopathy?

Unani medicines commonly recommended for diabetic retinopathy include:

- Two to three drops of rose water three to four times every day.
- Use a decoction of ten grams of coriander prepared in water every morning on empty stomach.
- Put two to three drops of a woman's breast milk in the eyes three to four times a day.
- Six grams of *Itrifal Kashmiri* to be taken twice a day.
- One tablet of *Qurs Kushta Marjan* taken twice a day.
- Twenty grams of *Murabba Halela* to be taken twice a day.
- One piece of *Murabba Amla* to be taken once a day.
- Six grams of *Khamira Gaosuban* to be taken twice a day.

DEFINITIONS

Ciliary body is the thickened part of the eye that joins the iris with the front of the choroid.

Cornea is the transparent part in the front of the eye.

Disc is the small blind spot on the surface of the retina located very close to the macula. It is the only part of the retina that is not sensitive to light.

Glaucoma is an abnormal condition of increased pressure in the eyes because of obstruction to the outflow of aqueous humour.

Hormones are chemical substances produced by specific organs. They have effect on other parts of the body.

Inflammation is the protective response of the tissues of the body to irritation or injury.

Insulin is a naturally occurring hormone secreted by the pancreas in response to increased levels of glucose in the blood.

Iris is a circular, contractile disc in the eye located between the cornea and the lens. It is perforated with the circular pupil.

Lens is a biconvex body formed from long, thin and regularly arranged fibres. It measures about nine millimetres in diameter and four millimetres in young adults. The light enters the eye through the lens.

Macula the central part of the retina where the images formed are sharper than in any other part of the retina.

Ophthalmoscope is an instrument for visualizing the inner part of the eye.

Optic nerve is the nerve that transmits impulses from the retina to the brain.

Retina is the ten-layered, delicate nervous tissue membrane of the eye. It receives images of external objects and transmits visual impulses to the brain through the optic nerve.

Sclera is the tough, inelastic, opaque membrane covering the eye. It maintains the size and form of the eyeball and attaches to muscles that move the eye.

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In the next issue: Diabetes

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MULTIPLE PERSPECTIVES ON HEALTH EMPOWERMENT

ALLOPATHY AYURVEDA HOMOEOPATHY NATURE CURE UNANI

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Diabetes — I

ALLOPATHY

Diabetes mellitus, commonly called diabetes, is a condition that makes many people worry about the quality and longevity of their life after being told that they have diabetes. Anyone can get diabetes but almost all of them can lead a full, active life with regular control of their diet and medicines. About eighteen million people in India are suspected to have diabetes.

Diabetes is a disorder of the chemical reactions that are necessary for proper utilization of carbohydrates, fats and protein from the diet along with inadequate or lack of insulin. In other words, diabetes results when the body cannot use some foods because of inadequate production of insulin. Insulin is a hormone produced in the pancreas to regulate the amount of blood in the sugar. Pancreas is an organ that is located behind the stomach as indicated in Figure 27.1. It has small groups of cells called the *Islets of Langerhans*. Inside these islets are specialised cells called *beta cells*. These beta cells produce insulin.

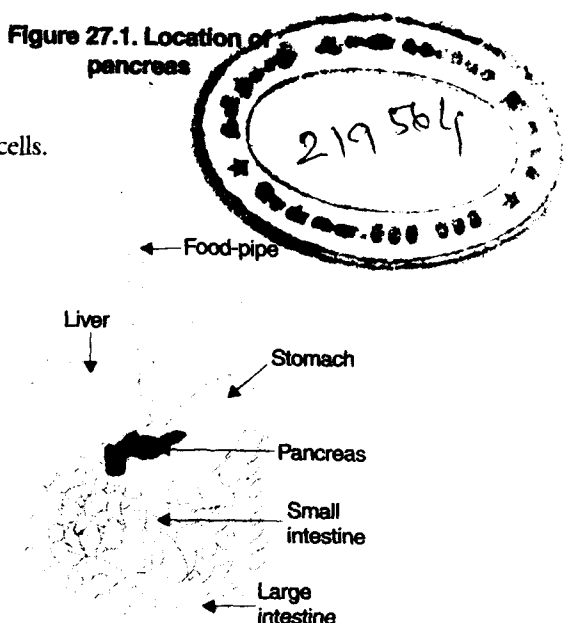
What is the role of insulin in our body?

All cells in your body need energy in order to function normally. This energy is derived from the food you eat which is made up of carbohydrates, proteins and fats. After digestion, the carbohydrate, which mainly comes from cereals and starch such as wheat, rice, fruit, etc. is converted into glucose, or simple sugar. This glucose is the main source of energy for all the body cells. Excess glucose is stored in the liver and muscles as a compound called *glycogen*.

The glucose enters the cells through *receptors*, which are proteins on the surface of the cells. All the hormones in the body can act on the target cells only after they attach to the receptors. Thus, the glucose can enter the cells only if the insulin, which is a hormone, attaches itself to the receptors on the cell wall. When the insulin is either inadequate, absent, or abnormal, it is difficult for the glucose to enter the cells and provide energy.

In addition to helping glucose enter the cells and providing them with energy, insulin is also involved in storage of glycogen in the liver and muscles. Thus, it is involved in storage of reserve energy. In between meals when the cells need

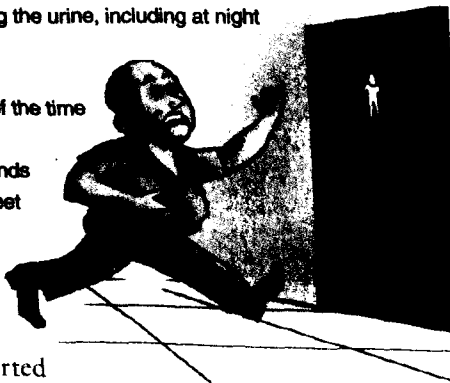
Figure 27.1. Location of pancreas



Definitions of all technical terms used in this issue are given on the last page.

Box 27.1 Symptoms of diabetes

- Increased frequency of passing the urine, including at night
- Excessive thirst
- Excessive hunger
- Feeling tired and weak most of the time
- Loss of weight
- Slow healing of cuts and wounds
- Numbness or tingling in the feet
- Skin infections
- Blurred vision
- Dry or itchy skin



Also, in the absence of insulin, the cells cannot derive any energy. Energy is therefore derived from the fat and muscles. When energy is derived from fats and muscles, you will lose weight, even if you eat enough to satisfy your hunger.

- **Skin problems:** Excess blood sugar suppresses the body's natural defense mechanism. This is why cuts and wounds heal very slowly if there is high blood sugar. Also, sugar is a very good food for the bacteria to grow. Thus, skin infections are more common in diabetes. The skin, especially around genitals may be itchy.

What are the types of diabetes?

There are two main types of diabetes:

- **Type I or insulin dependent diabetes.** About ten percent people with diabetes have Type I diabetes. Their bodies do not produce any insulin and therefore regular insulin injections are necessary to maintain normal blood sugar.
- **Type II or non-insulin dependent diabetes.** About eighty-five percent people with diabetes have Type II diabetes. Their bodies produce some insulin but it is either inadequate or is defective.

Some of the major differences between Type I and Type II diabetes are listed in Box 27.2 and various types of diabetes are listed in Box 27.3.

Malnutrition related diabetes: Diabetes among young people with severe malnutrition and starvation is called malnutrition-related diabetes. Although this condition leads to high blood sugar, some of the complications associated with other types of diabetes are absent. Insulin is necessary to control malnutrition related diabetes.

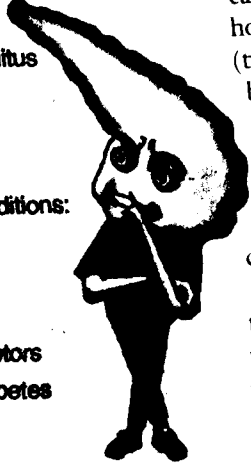
Gestational diabetes: Some women have high blood sugar during pregnancy. Diabetes during pregnancy is called gestational diabetes.

What are the predisposing factors of diabetes?

Predisposing factors are those that increase the risk of your getting a particular disease. There are many conditions

Box 27.3. Types of diabetes

- Insulin dependent diabetes
- Non-insulin dependent diabetes mellitus
- Malnutrition related diabetes
- Due to diseases of the pancreas
- Due to protein deficiency
- Diabetes associated with other conditions:
- Cancer of the pancreas
- Abnormalities of other hormones
- Due to medicines such as steroids
- Abnormalities of insulin or its receptors
- Some hereditary conditions off diabetes



that increase the risk of diabetes. Box 27.4. lists the most important predisposing factors.

- **Hereditary:** Blood relatives of people with diabetes are more likely to develop diabetes than those who do not have it in their family. The risk depends upon the number of family members who have diabetes. Higher the number of relatives with diabetes, greater is the risk. There is five percent risk of your developing diabetes if your parents or siblings have diabetes. This risk may increase to fifty percent if you are overweight.
- **Obesity:** Almost eighty percent people who develop diabetes later in life are overweight. Excess weight increases the body's demand for insulin. Obese adults have larger fat cells in their bodies. It is believed that large fat cells do not respond well to insulin. Symptoms of diabetes may disappear with loss of weight.
- **Age:** The risk of diabetes increases with age, especially after forty years, mainly because the number of beta cells in the pancreas that produce insulin decrease as age advances.
- **Sex:** Both men and women have the same risk of developing diabetes till early adulthood. After thirty years, women are at higher risk as compared to men. Women who develop diabetes during pregnancy are at higher risk of developing Type II diabetes later in life.
- **Viral infections:** Some viral infections may destroy the beta cells in the pancreas and therefore cause diabetes.
- **Injury:** An accident or injury that damages the pancreas may also destroy the beta cells, thus leading to diabetes.
- **Stress:** Some hormones released during stress may block the effect of insulin on the cells, thus causing diabetes.
- **Sedentary life:** Some recent studies have indicated that people with sedentary lifestyle are more likely to have diabetes as compared to those who lead an active life. It is believed that exercise and physical activity increases the effect of insulin on the cells.

How is diabetes diagnosed?

Diabetes can be diagnosed by blood and urine tests. In case of a routine check-up where you do not have any symptoms, your doctor is likely to suggest *random blood sugar test*. This means that your blood can be tested at any

time of the day irrespective of when you have last eaten. In case diabetes is suspected, *fasting blood sugar* (after twelve hour fast) and *post-prandial blood sugar* levels are tested (two hours after food). Diabetes is diagnosed if your random blood sugar level is more than 200mg/100ml of blood and fasting blood sugar is more than 140mg/100ml.

Until some years ago, urine tests were routinely recommended for diagnosis of diabetes. However, it is not recommended anymore because several other health conditions and medicines may give false positive results.

Glucose tolerance test: Occasionally, an oral glucose tolerance test is necessary to confirm diagnosis. This test, which indicates your body's capacity to use glucose, is performed in the morning after an overnight fast. You should have had normal diet for three days before taking the test. In this test, blood for measuring fasting blood sugar level is first taken. Next, you will be given seventy-five grams of glucose. Blood samples are taken half an hour, one hour and two hours after taking glucose. The results of glucose tolerance test are interpreted as normal, impaired glucose tolerance and diabetes. Impaired glucose tolerance test is considered to be a risk factor for future diabetes. It however is not included in the diagnosis of diabetes. The blood sugar levels for each of the these conditions is listed in Box 27.5.

Glucose tolerance test is not recommended for people who are either on bed rest or are suffering from some diseases, especially infections.

What are the complications of diabetes?

Complications of diabetes can be either *acute* because of insulin deficiency, which increases blood sugar to very high levels and *chronic* because of changes in the blood vessels of various parts of the body.

Acute complications include diabetic ketoacidosis and repeated infections.

- **Diabetic ketoacidosis or coma:** When insulin levels are low, the body cannot use glucose for energy and therefore body fats are mobilised from their stores. The breakdown of fats to release energy results in formation of *fatty acids*. These fatty acids pass through the liver and form a group of chemical compound called *ketones*. Ketones are excreted in the urine. Presence of ketones in the urine is called *ketonuria*.

Increased level of ketones in the body tissues is called *ketosis*. Ketosis may increase acidity of the body fluids and tissues to abnormally high levels and cause a condition called *acidosis*. Acidosis as a result of increased ketones is called *ketoacidosis*. Box 27.6 list the symptoms of ketoacidosis.

Box 27.4. Predisposing factors of diabetes

- Obesity
- Hereditary
- Age
- Sex
- Pregnancy
- Viral infections
- Injury to the pancreas
- Stress
- Sedentary life

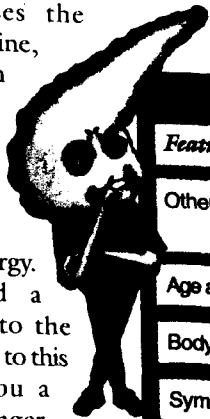


What are the symptoms of diabetes?

There are three main symptoms of diabetes. These include (a) increased thirst, (b) increased hunger and (c) increased frequency of passing the urine. You may also have some or all of the symptoms listed in Box 27.1.

- **Frequent passing of the urine and increase thirst:** Kidneys filter about fifteen hundred litres of blood per day. They excrete some water and waste products as urine and absorb most of the filtered blood including glucose. If the blood has more glucose than what the kidneys can reabsorb, it passes out with the urine. As the glucose passes out of the body, it takes a lot of water along with it in order to flow easily out of the body. Increased water in the urine increases the frequency of passing urine, which in turn results in increased thirst.

- **Excessive hunger:** When adequate insulin does not attach to the receptors, the cells in the body do not get any energy. They therefore send a message of "hunger" to the brain. The brain responds to this message by giving you a feeling of excessive hunger. Despite eating more, the glucose derived from the food cannot be used for energy as it passes out in urine. Lack of energy in the cells results in general weakness and tiredness.



Features	Type I diabetes	Type II diabetes
Other names	Insulin dependent diabetes Juvenile diabetes	Non-insulin dependent diabetes Adult onset diabetes
Age at onset	Usually below forty years	Normally above forty years
Body weight	Thin	Normally overweight
Symptoms	Appear suddenly	Appear slowly
Production of insulin	Absent	Inadequate or defective
Control of diabetes	Requires insulin injections	May be controlled with medicines. If not, insulin may be required.

Box 27.5. Interpretation of glucose tolerance test

Timing of blood sample	Normal	Impaired Glucose tolerance	Diabetes
Fasting	<115	<140	140 or above
Two hours after taking glucose	<140	140-199	200 or above

Diabetic ketoacidosis is an emergency condition, and if not treated on time, can cause death. Appropriate dose of insulin and intravenous fluids can reverse diabetic ketoacidosis. In case you have symptoms suggestive of ketoacidosis, you can take the following measures until you reach the hospital.

- Increase regular insulin dose by at least twenty percent;
- Drink as much fluids as possible; and
- Get urine tested for ketones and blood for glucose levels every four to six hours.
- **Infections:** People with diabetes are more likely to have infections because of three main reasons: (a) bacteria grow very well if blood glucose levels are high; (b) natural defense mechanism of people with diabetes is low and (c) associated complications of diabetes increase the risk of infections.

Common infections among people with diabetes include skin infections, urinary tract infections, diseases of the gums, tuberculosis and some fungal infections.

Chronic complications are more common if normal blood sugar levels are not maintained regularly. People with diabetes are more likely to have diseases of the heart, blood vessels, kidneys, eyes and the nerves.

- **Diseases of the heart and the blood vessels:** Atherosclerosis is a condition in which there is (a) hardening of the arteries and (b) narrowing of the arteries due to deposits of fat in its inner lining. It is a slowly progressive disease. It however develops faster in people with diabetes. This is why diabetics are twice more likely to have heart attack or angina as compared to non-diabetics. They are also at higher risk of developing high blood pressure.

Hardening of the arteries of the legs can affect the leg muscles because of reduced blood supply. This may result in cramps, discomfort or weakness while walking. If the blood supply to the leg is greatly reduced or cut off of a long time, there may be death of the tissues. If this happens, the affected part may have to be cut off to save life.

- **Damage to the kidneys:** Diabetes can affect small blood vessels of the kidneys. As a result, the efficiency of the kidneys to filter waste products is adversely affected. Adverse kidney functions result in excretion of a protein called "albumin" in the urine. Damage to the kidneys may continue to deteriorate, especially if blood sugar levels are not under control. Kidney damage due to diabetes is more common in Type I diabetes

as compared to Type II diabetes.

- **Damage to the eyes:** People with diabetes are more likely to have partial or complete loss of vision as compared to those without diabetes. For detailed information on this condition, refer to the Health Update issue on Diabetic Retinopathy, Volume 3 Issue no. 2.

- **Damage to the nerves:** Almost seventy percent people with diabetes have varying degrees of nerve damage. Damage to the nerves is called *neuropathy*. Neuropathy as a result of diabetes is called *diabetic neuropathy*.

High blood sugar destroys nerve fibres and a layer of fat around the nerves. Damaged nerves cannot pass the signals to and from the brain properly. As a result, you may either have loss of sensation, increased sensation or pain in the affected parts. Damage to the nerves on the periphery of the body is more common than in other parts of the body. The damage normally starts from the toes, and progresses to feet and legs. This can lead to numbness, tingling sensation, burning, dull pain, stabbing pain or cramps. The skin may become so sensitive that even pressure from the shoes and clothes may not be tolerated.

How can complications of diabetes be prevented?

You can prevent complications of diabetes through the following seven measures:

- Always maintain good control over blood sugar levels.
- Maintain normal blood pressure. If you have high blood pressure, take medicines prescribed by your doctor regularly.
- If you are obese, reduce your weight through proper diet control and regular exercise.
- Reduce intake of fats and cholesterol in your diet.
- Develop a routine of regular exercise *after* consulting with your doctor.
- Do not smoke

Box 27.6. Complications of diabetes

Acute:

1. Ketoacidosis. Symptoms include:

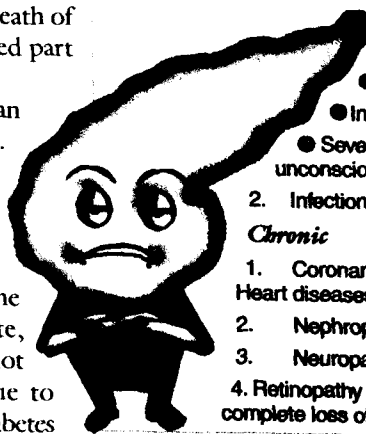
- Dehydration as indicated by dryness in the mouth and loss of elasticity of the skin

- Fruity smell of breath
- Nausea, vomiting and pain in the abdomen
- Deep breathing
- Increased rate of breathing
- Severe weakness, drowsiness that can lead to unconsciousness or coma

2. Infections

Chronic

1. Coronary artery disease — blood vessels of the heart affected. Heart diseases such as heart attack and angina may therefore occur.
2. Nephropathy — kidney functions affected
3. Neuropathy — nerves in various parts of the body affected
4. Retinopathy — Retina of the eyes mainly affected. Partial or complete loss of vision may occur.



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Box 27.7. Aims of treatment of diabetes

- To achieve best blood sugar level that is appropriate for you
- To provide relief from symptoms of diabetes.
- To balance diet, exercise and medicines or insulin.
- To reduce risk factors associated with complications such as obesity, smoking, high cholesterol and high blood pressure.
- To ensure normal growth among children and young adults who have diabetes.
- To maintain normal body weight.
- To prevent acute complications such as ketoacidosis and infections.
- To prevent, if possible, or else detect at the earliest and manage chronic complications.

- Get regular general check-up done in order to detect complications of diabetes, if any, at the earliest.

What is the treatment for diabetes?

Diabetes cannot be cured but can be controlled through several ways. These mainly include insulin, medicines, diet control and exercises. Management options for diabetes depend upon the type of diabetes and its severity. Box 27.7 lists the main aims of treatment of diabetes.

What is the treatment for Type I diabetes?

A regimen of insulin injections, diet and exercise are recommended for management of Type I diabetes. Insulin can only be given as an injection. This is because insulin is a protein and if taken orally, it is broken down during digestion and destroyed.

What are the types of insulin?

There are several types of insulin. All these types differ in three major characteristics: (a) when it begins its action on the body cells after injection, (b) when it reaches the peak activity and (c) the duration for which its action lasts. Based on these criteria, insulin injections can be grouped as short-acting, intermediate acting or long-acting.

The peak action of short acting insulin is about one to three hours and the action lasts for four to eight hours. Intermediate acting insulin reaches peak action within four to six hours and its action lasts for eight to twelve hours. Long-acting human insulin reaches peak within four to eight hours and its action lasts for eight to fourteen hours.

Short-acting insulins are also known as *soluble* or *regular* insulin. It is transparent in appearance.

Intermediate acting insulin includes *NPH* (Neutral Protamine Hagedorn) and *Lente insulin*. NPH is a modified insulin that contains small amount of *protamine*, one of a group of simple proteins. Its action begins early and effect lasts for intermediate duration. Lente insulin, which is made from *unlente* and *semi-lente* insulin, has the same characteristics as NPH insulin.

Long-acting insulin include *protamine zinc insulin* and *ultralente*. They have prolonged duration of action. These insulins are not commonly used for treatment of diabetes.

In recent times, *pre-mixed insulins* are available and are

preferred. These contain short-and intermediate acting insulins. Pre-mixed insulins avoid the likely risk of manually mixing incorrect doses of more than one type of insulin. They are however recommended only if blood sugar levels are under good control.

Earlier, insulin was extracted from the pancreas of some animals. In recent times, however, bio-synthetic insulin is also available that is similar to human insulin. Although human insulin is expensive, it is preferred because it greatly reduces the risk of complications such as *insulin resistance*.

Human insulin is prepared by copying and putting the human *gene* (the basic unit of genetic material) that codes for insulin protein inside a bacteria. Several techniques are employed on this gene to make the bacteria want to use it so that insulin is made by it regularly. The insulin from the bacteria is then converted into human insulin through sophisticated techniques. Human insulin is also prepared by using yeast cells instead of bacteria.

When is insulin recommended for control of diabetes?

Insulin is recommended for five main conditions:

- Diabetes among children
- Diabetes among people who are underweight and malnourished
- Tendency to develop ketoacidosis among diabetics
- In emergencies such as surgery, pregnancy, high fever, or diabetic coma
- If other methods of blood sugar level such as medicines, diet and exercise have not been effective.

What are the insulin injection regimens?

Several insulin regimens are used to treat different people with insulin dependent diabetes. Your doctor will choose the regimen most suited to you based on (a) your blood sugar levels, (b) desired degree of diabetic control, (c) extent to which the insulin produced by the pancreas can fill the gap left by the insulin injections, (d) your lifestyle and (e) ability to adjust to insulin injections.

Once-daily injections, even if it is mixture of short and delayed action insulins cannot achieve desired insulin levels throughout the day among those who have little or no insulin being produced by the body. *Twice daily mixed insulins* is the simplest and most commonly used regimen. It aims to provide (a) background and mid-day meal insulin requirement with an intermediate action insulin and (b) cover the two main meals of the day (breakfast and evening meal) with short-acting insulin. Both insulins are injected before breakfast and evening meal.

Normally, about two-thirds of total daily insulin requirement is given in the morning and remaining one-third in the evening. The ratio of short- and intermediate acting insulin normally differs in the morning and evening. Your doctor will recommend the desired ratio and dose based on the results of blood sugar measurements

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throughout the day. If insulin regimen is not well regulated, blood sugar levels may fall below normal, especially between meals and early in the morning.

What is the correct method of taking insulin injection?

Your doctor is the best person to advise you on the correct method of taking insulin injections. The information included here may be used as a guideline or reference.

If you use one type of insulin:

1. Wash your hands. Turn the insulin bottle on its side and roll it between your palms to mix it. Do not shake the bottle.
2. Wipe the top of the insulin bottle clean.
3. Pull the plunger of the injection syringe to draw in air equal to your insulin dose in units.
4. Push the needle through the top of the bottle and inject air into the bottle.
5. With the needle in the bottle, turn it upside down and pull the plunger to fill the syringe just beyond the marking of your dose of insulin.
6. Carefully and slowly, push the plunger till the marking line of the correct dose of your insulin.
7. Check for air bubbles. If they are present, gently tap the injection syringe so that the bubbles rise to the top. Repeat steps 5 and 6 above and check for bubbles again. Continue these two steps till there are no air bubbles in the injection syringe.
8. Remove the needle from the bottle.
9. Wipe the area where you want to take insulin injection clean. Some people prefer to clean the injection site with a cotton swab dipped in alcohol. This is not always essential.
10. Hold a large pinch of skin between your thumb and fingers. If you do not do it, you may inject insulin into the muscle, especially if there is little fat below the skin.
11. Push the needle straight into the skin or at a slight angle.
12. Pull out the needle and wipe the injection site clean.

If you use more than one type of insulin:

1. Wash your hands and wipe the tops of both the insulin bottles clean.
2. Turn the bottle containing intermediate or longer-acting insulin such as NPH or Lente insulin upside down and roll between your hands to mix it. Do not shake it.
3. Pull plunger of the syringe to draw in air equal to your dose of NPH or Lente insulin.
4. Push the needle through the top of the NPH or Lente insulin bottle and inject the air into the bottle.
5. Remove the empty syringe and needle from the bottle.
6. Pull the plunger to draw in air equal to the dose of your regular or plain insulin. Push the needle through the top of

the regular insulin bottle and inject air into the bottle.

7. With the needle in the bottle, turn it upside down and pull the plunger to fill the syringe just beyond the mark of your dose or regular insulin. Push the plunger slowly up to the line of your correct dose of regular insulin.
8. Check for air bubbles. If they are present, gently tap the syringe so that they come to the top of the syringe. Repeat steps 7 and 8 and check for bubbles again. Repeat these steps till there are no bubbles.
9. Remove the needle from the bottle with regular insulin and push it through the top of the bottle containing NPH or Lente insulin.
10. Carefully pull the plunger back till the mark of your total dose of insulin.
11. Inject the dose of insulin as detailed in steps 9-12 for taking one type of insulin.

Where is insulin injection taken?

Suitable sites for insulin injection include lower abdomen, upper outer arm, upper outer thighs, and buttocks. Avoid injecting insulin near joints or bony areas. Injection sites are normally rotated to avoid formation or "lumps".

It is important that you learn to inject insulin yourself rather than depend on others in order to become more self-reliant. It will also allow flexibility in your normal day to day activities and routine.

What are the devices to inject insulin?

Devices for giving insulin include:

- **Insulin syringes:** These are special injection syringes that are available in several sizes, such as 30 units, 50 units and 100 units. *It is important to remember that you should use the size of the syringe that corresponds to your insulin dose.* For example, if your dose is 40 units and you use a 50 units size of syringe, you will not be able to measure 40 units exactly. Avoid buying bulk disposal insulin syringes, either from India or from abroad as they may not be suited for the changes made in the insulin dose after you have bought the syringes.
- **Insulin pens:** This device minimizes the inconvenience of injections and may also improve the accuracy of insulin delivery. It holds a pre-filled cartridge of the desired type of insulin and has a disposable needle that can be changed for each injection. In some pens, you need to give the correct dose by pressing the plunger repeatedly after the needle is pushed into the injection site. Each time you press the plunger, a fixed dose of insulin is injected. In some other types of pen, you need to dial the correct dose of insulin

before the injection. This withdraws the plunger with the part that has insulin. After you have inserted the needle in the injection site, you need to push the plunger to deliver the dose you had adjusted in the pen.

If the needle is left on the pen between injections, air may enter the part of the pen that contains the insulin. This can slow the delivery of the dose and so cause wastage of insulin after the needle is withdrawn. It is therefore important that you learn the correct technique of using the pens from your doctor.

- **Jet injectors:** These devices are designed to eject insulin as a spray of small drops under such high pressure that these small drops enter the skin. These devices are not very popular because the absorption of insulin into the body may not always be uniform. They may also cause bruises at the site of giving insulin.

- **External insulin pump therapy:** A portable insulin pump is an alternative method of injecting insulin that allows an intermediate dose of insulin to be given at any time of the day or for pre-programming changes in the rate of insulin delivery throughout the day. It has a small portable pump with an *infusion* set that ends in a needle or *cannula*. Infusion means a slow injection of a liquid into a vein or under the skin. Cannula is a hollow tube designed for putting into a body cavity such as blood vessel. The needle or cannula is put below the skin and changed once in twenty-four to seventy-two hours.

To take full advantage of external insulin pump therapy, you need to do self monitoring of blood sugar level several times a day and then make adjustments on the insulin dose as recommended by your doctor. *Methods of self monitoring of blood sugar will be discussed in the next issue of the Health Update.*

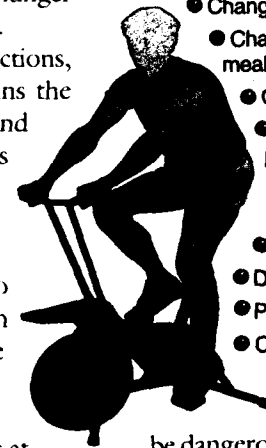
The main advantage of external insulin pump therapy is improved flexibility in matching insulin with variations in your schedule. It also helps to make necessary changes in the rate of insulin delivery at all times, especially in between meals. The main disadvantage of external insulin pump is the possibility of infections at the site of infusion. It has a higher risk of developing ketoacidosis because of interruption in insulin flow.

- **Implanted insulin pump therapy:** In this option, small pumps that can be controlled from outside are put inside the abdomen. Insulin is released into the space around the organs of digestive system inside the abdomen. The insulin thus released is absorbed directly into the various organs. This method seems to reduce the risk of low blood sugar while trying to maintain normal blood sugar levels throughout the day. More research is needed before this technique can be recommended for control of diabetes.

Disposal of insulin syringes and needles: It is desirable that you collect old syringes and needles in special containers for sharp objects. Whenever you visit a major hospital, request someone handling wastes to dispose your syringes and needles along with those of the hospital.

Box 27.8. Causes of low blood sugar during insulin therapy

- Inaccurate self monitoring of blood glucose.
- Changes in the timing of meals and snacks.
- Changes in the type and quantity of food taken during meals and snacks.
- Changes in insulin absorption.
- An acute illness, especially if nausea and vomiting is present.
- A chronic illness that reduces insulin requirements. For example, inadequate functioning of kidneys, liver.
- Loss of weight
- Drinking alcohol.
- Pregnancy
- Changes in the exercise or normal day to day activities.



Improper disposal of needles and syringes can be dangerous for those handling them in the municipal bins.

What are the complications of insulin injections?

There are four main complications of insulin injections. These include (a) low blood sugar, (b) insulin allergy and resistance, (c) local reactions at injection site and (d) swelling of the body.

- **Low blood sugar:** This is the most common complication of insulin injections. Box 27.8 lists the factors that lead to low blood sugar. Until you achieve good control over blood sugar levels, you may have two to three mild to moderate *insulin reactions*. Insulin reaction is a condition where the normal blood sugar level falls below normal. The normal blood sugar level is between 60-120 mg/100 ml. You may have insulin reaction in any of the following three conditions:

- The blood sugar level falls below 60mg/100ml;
- Blood sugar falls rapidly from high level to low level; or
- Blood sugar falls below your normal level.

An insulin reaction is the body's response to low blood sugar. Whenever there is low blood sugar, the brain releases some hormones that cause paleness, sweating, increased heart beat, irritability, etc. These hormones also release sugar stored in the liver as glycogen. Released glycogen increase blood sugar levels. Box 27.9 lists the symptoms of insulin reaction.

Treatment: Whenever you have the symptoms of insulin reaction, do not wait to see if they go away on their own. Eat some sugar or candies immediately. It is desirable that you keep sugar with you all the time. You should also stop all activities and sit or lie down in order to reduce the body's demand for energy and therefore sugar. In case the symptoms persist for more than ten or fifteen minutes, have some sugar again. Avoid eating continuously till the symptoms disappear or eating whatever food is available as it will prevent blood sugar levels from stabilizing.

Prevention: You can prevent insulin reaction by eating meals at fixed time everyday, avoiding sudden changes in diet, exercise or insulin dose and eating a light snack before doing exercises. *It is important to carry an a diabetic card with information about your diabetes condition so that others around can help you seek immediate medical help..*



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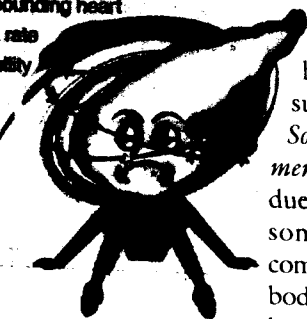
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Box 27.9. Symptoms of insulin reaction

- Sweating and a cold, clammy feeling
- Numbness or tingling in lips or fingertips
- Dizziness, weakness
- Difficulty in speaking or slurred speech
- Palpitations or pounding heart
- Increased heart rate
- Increased irritability
- Nervousness
- Headache
- Blurred vision
- Hunger
- Pale skin
- Convulsions



Somyogi phenomenon may be responsible for worsening of diabetes.

● **Formation of lumps:** Sometimes, a firm round lump may form at the site of repeated insulin injection. The absorption of insulin from these lumps may not be complete. This complication is not commonly observed in those who take human insulin injections because they are more than ninety-eight percent pure.

● **Insulin allergy and resistance:** Insulin allergy is also not a common complication in those who use purified insulins, especially human insulins. Allergic reaction to

Sometimes, high blood sugar and ketoacidosis may occur after taking excessive insulin.

This type of rebound high blood sugar is called *Somyogi phenomenon*. It occurs due to release of some chemical compounds in the body as a result of low blood sugar.

insulin injection may be either at the site of injection or all over the body. Local reactions result in hardness, itching, red discolouration or pain at the injection site. The symptoms normally appear after thirty minutes to four hours after taking insulin and are first observed within the first week or month after starting insulin treatment. Insulin allergy disappears after some time.

Insulin resistance is a condition in which *antibodies* are formed in the body in response to insulin injections. Antibodies are special kinds of blood protein that are produced in response to a foreign or disease causing agent.

The most common cause of insulin resistance is obesity. It may also be due to periodic stress and illness. Insulin resistance in people who are not over-weight may be due to antibodies to insulin, abnormalities in the insulin receptors, increased local destruction of insulin or secretion of abnormal insulin.

Insulin resistance is a condition in which the more than two hundred units of insulin are required to control blood sugar for several days. This demand should not be because of ketoacidosis, infection or some associated diseases of the *endocrine glands*. Endocrine glands are ductless glands that produce hormones one or more hormones and secrete them directly in the blood stream.

● **Swelling:** Insulin may rarely cause swelling of the body.

Other aspects of diabetes will be included in the next issue of the Health Update.

AYURVEDA

Diabetes is called *Madhumeha* in Ayurveda. Ancient scriptures of Ayurveda describe twenty types of *Prameha*. Some Ayurvedic physicians believe that *Prameha* is very similar to diabetes as described by Allopathy and therefore should be considered the same as diabetes. All the twenty types of *Prameha* finally lead to *Madhumeha*. Some other Ayurvedic physicians consider *Prameha* as twenty different types of disorders or the urinary system. For example:

- *Udakimeha* is considered as diabetes mellitus;
- *Sandhrameha* as *Chyluria* (presence of an alkaline milky liquid in the urine);
- *Sukrameha* as *spermatorrhoea* (involuntary discharge of semen without orgasm);
- *Rakta/Manjishtameha* as Hematuria (presence of blood in the urine);
- *Madhumeha* as diabetes mellitus;
- *Iksameha* as glycosuria (presence of glucose in the urine in abnormally large amounts), etc.

The word *Prameha* is derived from the root *Mih*, which means to pass urine and *Pra*, which means in excess. Thus, *Prameha* means passing excess of urine. All types of *Prameha* of long duration, or which continue to be neglected, lead to the condition known as *Madhumeha* or diabetes mellitus. It may also occur independently. In this disease, you will pass sweet urine like honey and the your blood sugar level will be higher than normal.

Diabetes is difficult to treat as it leads to many

complications. The natural, soft, simple, Ayurvedic remedies cannot often cure it, especially if diabetes starts at younger age. However, Ayurvedic medicines can relieve many side effects and improve the quality of your life.

What are the types of diabetes?

Ayurveda broadly describes three types of diabetes. These include:

- **Vatika**, where vata dosha accumulates in the intestines and travels to the pancreas and adversely affects its function. This type of diabetes is generally considered to be incurable.
- **Paittika**, where pitta dosha accumulates in the small intestines. It initially affects liver and ultimately disturbs the functions of pancreas. This type of diabetes can be controlled with appropriate medicines and life-style changes.
- **Kaphaja**, which is due to kapha dosha. This type of diabetes is attributed to *kaphogenic* foods such as excessive intake of sweets-sour-salty (*madhur-amla-lavan*) foods. These foods increase kapha in the last part of the stomach, affect the uppermost part of the duodenum and reduce the efficiency of pancreas. This condition also affects other tissues of the body and results in weight gain. Other symptoms include increased frequency of passing urine, which may be muddy. Ayurvedic literature indicates that this condition can be managed with effective life-style changes, balanced diet and medicines.

There are three main doshas in *Prameha*, Kapha, Pitta

and Vata and the affected organs include (1) *Medas* or fat tissue, (2) *Mamsa* or muscles, (3) *Kledam* or blood, semen and other body fluids excluding lymph, (4) *Lasika* or lymph, (5) *Majja* or bone marrow, (6) *Rasa* or Plasma and (7) *Ojas* or vital essence of the body tissues.

Based on the above description, Sushruta, the ancient Ayurveda surgeon has classified *Prameha* into two types: (a) hereditary (*Kulaja sahaja*) and (b) acquired (*Apathyaja*). Similarly, for effective treatment, Charaka, the ancient Ayurvedic physician has classified people with diabetes into two groups: (a) obese (*Atishaulya*) and (b) asthenic (*Krishna*).

What is the treatment for diabetes?

Ayurveda recommends single medicines, simple preparations, compound preparations and dietary modifications for treatment of diabetes. **Single medicines** include the following:

- Fifteen to thirty millilitres of juice of a leaf of *Bilva* (Bael — *Aegle marmelos* Corr) three times a day.
- Fifteen to thirty millilitres of juice of the stem of *Guduchi* (Heart leaved moonseed — *Tinospora cordifolia*) three times a day.
- Three to six grams of powder of *Madhunasanani* (*Periploca* of the woods) with water three times a day.
- Fifteen to thirty millilitres of decoction of juice of the fruits of *Karvalleka* (Bitter gourd) three times a day.
- Five to ten grams of *Swertia chirayita* (Chirata powder) three times a day.
- Five to ten grams of powder prepared from equal parts of seeds of *Jamun* (Black plum), *Karvalleka* (Bitter gourd), *amba beeja* (Mango seeds) and leaves of *Gudmar* (*Periploca* of the woods) three times a day.
- Five grams of powder of bark or inner wood of *Asana* (*Terminalia tomentosa*) two or three times a day.
- Five grams of powder of *methika* seeds (fenugreek — *Trigoella foenum graecum*) three times a day.

Simple preparations recommended for management of diabetes include:

- Fourteen to twenty-eight millilitres each of fruit juice of *amalaki* (Indian gooseberry) and juice of rhizome of tamarind three times a day.
- Fourteen to twenty-eight millilitres of decoction prepared from equal portions of *triphal*, roots of barbery, tamarind and *motha* (*Mustaka*) to be taken with three to six grams of rhizome of turmeric twice a day.
- Fourteen to twenty-eight millilitres of decoction prepared from equal portions of barks of *lodhra* and *katphala* (boxmyrtle), fruit rind of *Haritaki* (*Chebulic myrobalan*) and root of *Mustaka* (*motha*) to be taken with three to six grams of powdered rhizome of turmeric twice a day.
- Fourteen to twenty-eight millilitres of decoction prepared from equal portions of leaves of *patola* (a variety of small cucumber-snake gourd) and *neem*, fruit rind of *amlakai* (*Embelic myrobalan*) and stem of *guduchi* three times a day.

● Fourteen to twenty-eight millilitres of decoction prepared from equal portions of roots of *Manjistha* (madder), *Salmala* (Indian cotton tree), *Kusa*, *Kasa* (sacred grass) and *Danti* (wild croton) and whole plant of *Durva* (doob grass) thrice a day.

● Fourteen to twenty-eight millilitres of decoction prepared from equal portions of wood of *Devadaru* (deodar), roots of *Daruharidra* (barberry) and *Mustaka* (*motha*) and fruit rind of *Amalaki* (*Embelic myrobalan*) thrice a day.

● One gram of powder prepared from one part of stem of *Sariva* (Indian sarsaparilla), one part of *Tejapatra* (*Tamala* leaf), one part of root of *Tastimadhu* (*glycyrrhiza*) with fifty to hundred millilitres of water twice a day.

Compound preparations recommended for diabetes include:

- One to three grams of *Narasimha churna* to be taken with hundred to two hundred fifty millilitres of milk twice a day.
- One gram of *suddha* (purified) *silajatu* to be taken with sufficient honey to make a paste twice a day.
- One or two tablets of *Chandraprabha vati* or *Shivagutika* to be taken with seven to fourteen millilitres of leaf juice of *Bimbi* (scarlet fruited gourd) thrice a day.
- One to two *Mamajjaka-Ghana vati* to be taken with hundred to two hundred and fifty millilitres of milk thrice a day.
- One hundred twenty to three hundred fifty milligrams of *Vangesvara rasa* to be taken thrice a day with sufficient to form a paste.
- One vati of *Vasanta Kusumakara rasa* or *Makaradhaja* to be taken thrice a day with sufficient honey to make a paste.
- One hundred twenty to two hundred fifty milligrams of *Svarna vanga* to be taken with hundred to two hundred fifty millilitres of milk thrice a day.
- One hundred twenty to two hundred fifty milligrams of *Vangabhsma* to be taken with one hundred to two hundred fifty millilitres of milk twice a day.
- One to two pills of *Goksuradi* (*Prameha Adhikara*) to be taken with one hundred to two hundred fifty millilitres of milk twice a day.

Foods recommended for management of diabetes include barley seeds, wheat, *Kodrava* (a kind of grain), Italian millet, *Mudga* (phaselous bean), *kulattha* (*dolichos* bean) and *Adhaki* (*Pigeon grain*); fruit and leaf of *patola* and *Sigru* (*horse radish*), fruits of *karvellaka* (*bitter gourd*), *udumbara* (*gular-fig*), *Kapittha* (*wood apple*) and *Jambu*; leaf and stem of *Guduchi* and *Triphala*.

Foods that you need to avoid in case of diabetes include sour, sweet and excessive salt, freshly harvested grain, rice, sweet drinks, jaggery, curd, excessive ghee and oil

In addition to the above treatment options and dietary modification, you should also avoid sedentary life, sleeping during the day, suppressing the urge to pass urine and eating excessive food. Control of diabetes and its complications requires medicines, diet and exercise.



HOMOEOPATHY

The definition, signs and symptoms, causes and types of diabetes mellitus as per Homoeopathy are the same as those detailed in the section on Allopathy. Homoeopathic medicines are not recommended for insulin dependent or Type I diabetes.

What is the aim of Homoeopathic treatment for diabetes?

There are three main aims of Homoeopathic treatment for diabetes. These include:

- To control the blood sugar levels;
- To reduce the dose of allopathic medicines for diabetes; and
- Prevent complications of diabetes on other parts of the body such as eyes, kidneys, nerves, etc.

What is the Homoeopathic approach for treatment of diabetes?

Just as for all health problems, a detailed case history forms the basis of management of any disease as per Homoeopathic system of medicine. Your Homoeopath will lay special emphasis on the following before deciding on the medicine and its dose that is most suited to you.

- **Onset:** It is important that you tell your doctor of any physical or mental stress that may have been present when the symptoms first appeared. It is likely that these stresses might have precipitated diabetes. It has been observed that many people in who do not have diabetes in other family members develop the disease after a period of physical illness, fatigue or mental stress such as due to grief, shock, etc.

The stress triggers off a reaction in the body that affects (a) its natural defence mechanism and (b) hormonal functions. As a result, diseases such as diabetes develop. This type of reaction to stress is observed more often in people with Type A personality. Such people are overworked, have a high profile work, are easily stressed, are over anxious or have nervous temperament. They may also be short-tempered and have a dominating character.

Homoeopathy offers a wide range of medicines that are beneficial to such stressed people. These medicines therefore enhance the body's natural defence mechanism and control the disease process.

- **Family history:** As mentioned in the section on Allopathy, diabetes tends to run in families. There are several Homoeopathic medicines that are effective in such cases. These include Thuja, Tuberculinum, Medorrhinum, etc.
- **Individual symptoms:** Your doctor will ask detailed questions regarding your eating habits prior to onset of diabetes, likes and dislikes, digestion, bowel movements, sleep pattern, etc. He/she will lay special emphasis on any unusual, unique or unexpected symptoms as they will facilitate selection of medicines that are most suited to you.
- **Laboratory investigations:** A detailed case taking is incomplete without laboratory investigations. Your doctor

will therefore recommend tests to determine the blood and urine sugar levels.

What is the treatment for diabetes?

There are several Homoeopathic medicines that are specific to diabetes and aim at reducing the blood sugar levels. There are also some other medicines that are deep acting constitutional medicines. These medicines act directly on the defence mechanism of the body and enhance the body's natural ability to fight disease. As a result the root cause of the disease can be eradicated.

Medicines that are commonly used for treatment of non-insulin dependent diabetes include the following:

- **Syzygium, Jaborandi, Gymnema sylvestre:** These three medicines act on the pancreas directly and control blood sugar levels. They also help prevent complications of diabetes.
 - **Uranium nitrate:** This medicine controls increased frequency of passing the urine and reduces blood sugar level. It also helps correct associated problems such as improper digestion of food, weakness, lethargy and weight loss despite having increased appetite.
 - **Phosphoric acid:** This medicine is recommended for diabetics who have mental stress, grief, anxiety and excessive worries. People with these problems are physically and mentally weak and nervous. They are also more likely to suffer from recurrent boils and pain in the muscles.
 - **Lactic acid:** This medicine is recommended for those who have increased frequency of passing the urine that is light yellow in colour and other associated symptoms such as nausea, constipation, dry skin and tongue and pain in the abdomen.
 - **Acetic acid:** This medicine is effective for increased thirst, severe weakness and hot, dry skin.
 - **Phosphorus:** This medicine is very effective for diabetics whose family members have either tuberculosis or gout. It is especially effective for symptoms such as dryness of the mouth with desire for chilled water, physical restlessness and craving for salty and spicy food. People with such features are more likely to be tall, thin and extremely sensitive, both physically and mentally.
- There are several other medicines for diabetes that are recommended on the basis of your symptoms. In addition to medicines, Homoeopathy strongly recommends the following **general measures** for management of diabetes.
- **Restricted diet:** A controlled dietary regimen is extremely important. A nutritionist is the best person to recommend a diet chart for you on the basis of your age, sex, physical activities, existing weight, etc.
 - **Exercises:** Regular exercises to maintain normal weight is very important for effective control of diabetes.
 - **Relaxation:** A regular routine of relaxation techniques such as yoga, meditation, etc. will help you deal with stress better and maintain normal blood sugar levels.



NATURE CURE

The definition, signs, symptoms, causes and types of diabetes and its complications as per Nature Cure are the same as those detailed in the section on Allopathy. Nature Cure further opines that treatment of diabetes includes measures to improve functions of the liver and the pancreas.

What is the treatment for diabetes?

Nature Cure recommends four approaches for management of diabetes. These include: (a) dietary modifications; (b) water therapy and mud therapy to improve functions of the pancreas and the liver and to remove toxins from the body; (c) exercises including deep breathing; and (d) change in lifestyle.

Dietary modifications recommended for diabetes include:

- **Regular meals:** Your Nature Cure practitioner is the best person to recommend the type of food and its quantity most suited to you. You can however use the following as a guideline to prepare a diet chart.

Breakfast: It is desirable that breakfast consists of salads and fruits such as guava, papaya, orange, sweet lime, pomegranate, pineapple and pears. You should avoid banana, mango, custard apple and chickoo.

Lunch should consist of hundred or hundred twenty-five grams of rice or three rotis, two hundred grams of steamed vegetables, one cup of dal, fifty grams of leafy vegetables and one cup of curds. You should avoid desserts or fruits during lunch. The main aim of this meal is to consume complex carbohydrates and high fibre foods. This is because complex carbohydrates release sugar in the blood gradually. Also, fibre in the diet helps regulate blood sugar.

Dinner should consist of one bowl of vegetable soup, two hundred grams of steam cooked vegetables, three rotis and one-cup curds.

- **Water and salads:** It is desirable that you drink a total of at least eight to ten glasses of water everyday at an interval of two hours. Drinking adequate water will help maintain consistency and quality of blood. You should also increase intake of fresh vegetables that contain high water content. Avoid dry vegetables. Eat larger portions of onions along with raw salads. Bitter salads prepared from chicory, dandelion, endives are very effective for controlling diabetes. Since diabetes is an acidic disease, alkaline foods such as salads and leafy vegetables are recommended.

- **Reduce weight:** Develop a routine of regular exercise such as walking, cycling, swimming, etc.
- **High fibre diet:** Consume larger portions of green leafy vegetables, unpolished cereals, wheat bran, cabbage, celery, raw salads, whole grain cereals and Soya beans.

- **Proportion of foods:** It is desirable that you eat up to two hundred grams of cereals, sixty grams of protein and about one to two teaspoon of oil per day. The amount of calories derived from various foods is very important in maintaining regular blood sugar.

- **Avoid foods such as** all flesh foods, coffee, tea, ice cream, biscuits, cakes, aerated drinks and alcohol. You should also avoid white sugar. Late meals, fried foods and high protein diet are also not recommended for diabetes.

- **Drinks:** Drink fresh fruit juices, buttermilk, tender coconut water in between meals instead of beverages. Drinking whey water everyday is also beneficial.

Water therapy recommended for diabetes include:

- **Cold water:** Taking bath with cold water increases the rate of all chemical reactions in the body related to absorption and utilization of nutrients. It therefore increases oxidation of sugar. Weak people should not start having cold water bath suddenly but gradually reduce the temperature of water from hot to warm to luke warm to cold.

- **Douche:** Nature Cure recommends an alternate douche on the upper part of the abdomen with a stream of bearable hot water for two minutes followed by cold water application for fifteen to twenty seconds with a hose pipe. You need to alternate douche four to five times in one sitting.

Alternate hot and cold water application on the entire body is also helpful as it activates the skin, which is likely to be relatively inactive among diabetics.

- **Abdominal pack:** An abdominal pack taken for an hour at night before bed or in the evening improves functions of the liver and pancreas. Abdominal pack should always be taken on an empty stomach.

- **Gastro-hepatic pack:** A pack covering the upper middle and upper right parts of the abdomen taken for forty-five minutes twice a week helps improve functions of the liver and pancreas.

- **Fomentation:** Fomentation of the abdomen for five minutes and application of mud pack is recommended twice a week.

- **Mud pack:** Daily application of mud pack or cold towel pack to the abdomen for twenty minutes in the morning helps control diabetes. Mud pack to the entire body once a week is also recommended.

- **Oil massage:** An oil massage is recommended once a week as it will activate the skin and improve blood circulation to all parts of the body.

- **Sweating treatments:** Steam bath, sauna bath, green leaf pack and full wet sheet pack are recommended once or twice a week.

- **Hip bath:** Cold hip bath for fifteen minutes followed by a brisk walk for half an hour is recommended at least once a day. It is one of the most effective measures for controlling diabetes.

Exercise plays a very important role in controlling diabetes as it helps burn excess sugar, improves functions of various organs of the body and improves blood and nerve supply to all parts of the body. As a result, liver and pancreas functions also improve. Exercises such as brisk walking, jogging and Yoga are very effective. It is desirable that you

exercise for at least half an hour every day followed by deep breathing. Deep breathing increases the amount of oxygen inhaled by the body and therefore increases utilization of sugar.

Herbal medicines recommended by Nature Cure include the following:

- Eating one-cup curds with one-teaspoonful fenugreek seeds soaked overnight to be taken on empty stomach everyday.
- Taking celery juice everyday on empty stomach early in

the morning everyday.

- Bitter gourd juice to be taken everyday as the first drink of the day.

- Tea prepared from leaves of walnut trees, french bean pods and alfalfa clover are also recommended.

In addition to the above measures, a regular lifestyle that is in harmony with nature and its principles such as regular dietary timings and regime, exercises help control diabetes and prevent its complications. Medicines cannot be effective until lifestyle changes have been initiated.



UNANI

The Unani system of medicine defines diabetes mellitus as a condition in which there is excessive thirst and increased volume and frequency of passing urine. It is caused due to "hot" temperamental derangement of the liver. Unani medicine opines that diseases are believed to be of two types according to their causes. One, whenever any of the four humours is involved, it is called "*Maddi disease*". The second type is in which only the temperament of the organ is affected is called "*Ghair Maddi disease*". Diabetes is a Ghair Maddi disease in which the temperament of the liver is altered.

The causes that alter the normal temperament of liver are continuous mental tension, anxiety, frustration, anger, fear, weakness of the nervous system and use of excessive hot and cold foods and drinks. These predisposing factors alter the temperament of the liver. This in turn affects the kidney indirectly. As a result, there is increased absorption. Because of the altered temperament of the liver, the food is not properly cooked and converted into humours by the liver. The improperly metabolised humours are excessively absorbed by the kidneys. Increased absorption leads to excessive heat in the kidneys which in turn adversely affects the kidney functions. Increased heat in the kidneys also result in increased absorption of water content by Tabiat (body's natural defense mechanism) to reduce heat, dryness and burning. This results in increased volume of the urine. The retentive power of the kidneys is weakened due to which "*Ratubat*" coming from the kidney is not retained. This results in increased frequency of passing the urine.

What are the signs and symptoms of diabetes?

According to Unani system of medicine, diabetes can lead to excessive thirst, frequent passing of the urine,

excessive hunger, loss of body weight, tiredness, burning sensation in the palms and sole, constipation, heaviness in the abdomen and back, dryness in the tongue, indigestion, weakness in sex, pain in the abdomen, and giddiness.

What is the treatment for diabetes?

The main aim of treatment of diabetes as per Unani system of medicine is to restore the normal temperament of the liver. This aim can be achieved through diet, medicines and exercise.

Diet: Cold and moist food is recommended for diabetes. This means that diet that contains excessive sugar or protein should be avoided.

Medicines recommended for diabetes include single medicines compound medicines. **Single medicines** include Tabasheer, Karela, Jamun, Kashneez, Kateera, Khashkash, Shaznaj, Gulnar, Gurmar, Mastagi, Khurfa Siyah, Gilo, TukhmKahoo, Gil Armani, Gil Makhtoom, Afsanteen and Juft-Baloot.

Compound medicines recommended for diabetes include Qurs Tabasheer, Safoof Ziabetus, Sharbat Anar, Safoof Khisht, Jawarish Mastagi, Majoon Falasfa, Kushta Qalai and Kushta Baiza Murgh.

Exercise: Unani recommends barefoot walking on the green grass in the morning for control of diabetes. It is desirable to walk as much as possible. A light nap or rest after lunch is desirable but it is important not to sleep immediately after dinner. You should sleep only after two hours of having dinner.

In the next issue: Diabetes — II

(Type II diabetes, diabetes in pregnancy, monitoring blood sugar, exercise, diet, diabetes care in sickness and traveling and care of the feet)

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A MONTHLY BULLETIN OF THE SOCIETY FOR HEALTH EDUCATION AND LEARNING PACKAGES

HEALTH UPDATE

MULTIPLE PERSPECTIVES ON HEALTH EMPOWERMENT



ALLOPATHY



AYURVEDA



HOMOEOPATHY



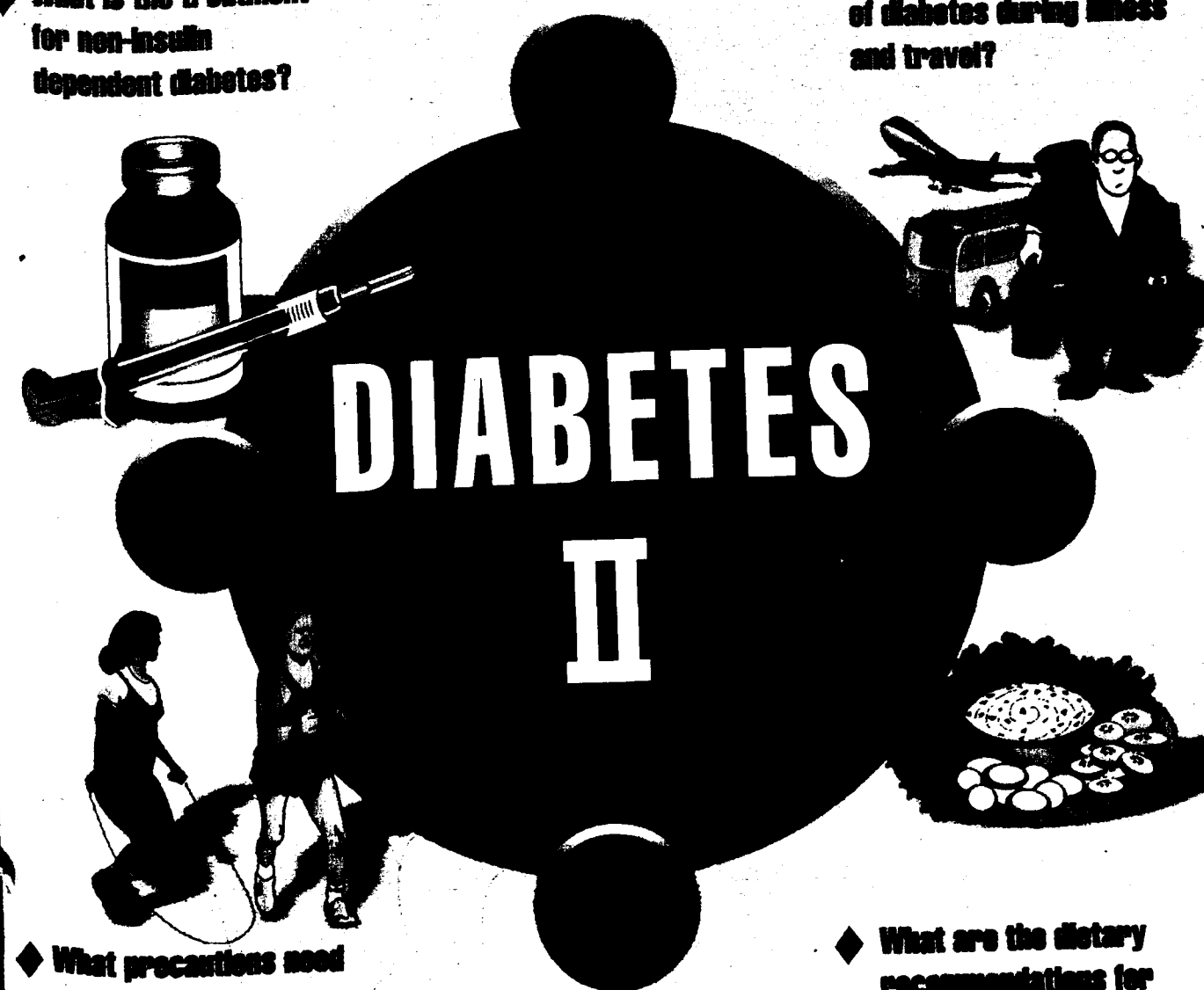
NATURE CURE



UNANI

◆ What is the treatment for non-insulin dependent diabetes?

◆ How to ensure good control of diabetes during illness and travel?



◆ What precautions need to be taken during exercise in diabetes?

◆ What are the dietary recommendations for diabetes?

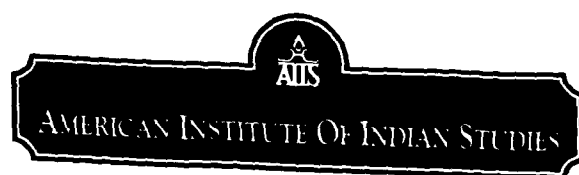
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HEALTH UPDATE

ALLOPATHY AYURVEDA HOMOEOPATHY NATURE CURE UNANI

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Diabetes — II

Diabetes is a disorder in which the body cannot use the carbohydrates, fats and proteins from the diet because of inadequate or lack of insulin, a hormone, produced by the pancreas. The pancreas, a long, thin organ located behind the stomach, has two main functions. These include (a) to produce digestive enzymes that digest proteins and fat and break down carbohydrates such as starch and (b) to control the level of sugars in the blood. A group of cells in the pancreas called the *islets of Langerhans* secrete two hormones into the blood. These hormones regulate the amount of sugar released into the blood stream by the liver. One of the hormones, *insulin*, decreases blood sugar levels whereas *glucagon*, the other hormone, increases it. Diabetes can occur when there is either inadequate or lack of production of insulin or production of defective insulin by the pancreas. A schematic diagram of the mechanism through which pancreas blood sugar level is illustrated in Figure 28.1

The earlier issue of the Health Update (November 1998, Volume III, Issue no. 3) had focussed mainly on the causes, symptoms and complications of diabetes along with management of insulin-dependent diabetes as per Allopathy. It also focused on management options of diabetes as per Ayurveda, Homoeopathy, Nature Cure and Unani. This issue mainly focuses on non-insulin dependent diabetes and other issues such as diet, exercise, care of the feet, etc.

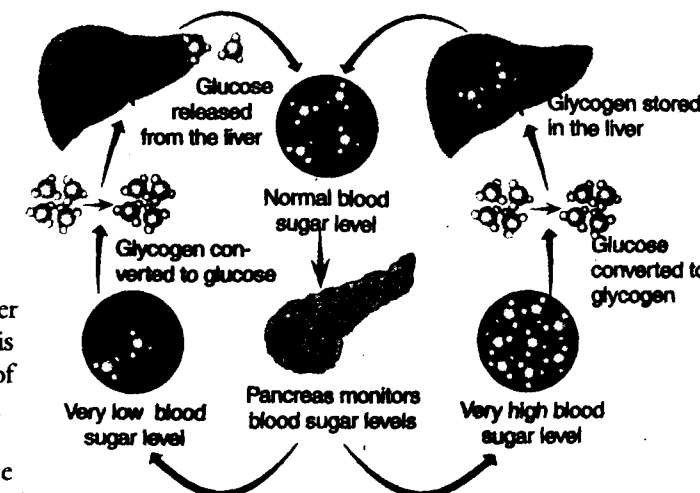
What is non-insulin dependent diabetes?

Non-insulin dependent diabetes, as the name suggests, is a condition where insulin

injections are not essential to maintain normal blood sugar levels. It is also called "*Type II diabetes*". Sometimes, insulin may be necessary to control blood sugar levels in people who have this type of diabetes especially if maximum doses of medicines have not been effective. Non-insulin dependent diabetes is more common in people above forty years and obese.

Non-insulin dependent diabetes can occur when either the pancreas produces inadequate insulin or the insulin is defective. Insulin is necessary for effective utilization of glucose by the cells for energy. This is because insulin attaches itself to specialized proteins called *receptors* on the cell walls and act as gateways for glucose to enter the cells. Defective insulin cannot attach to these specialized proteins.

Figure 28.1. Mechanism of control of blood sugar by pancreas



What are the causes of non-insulin dependent diabetes?

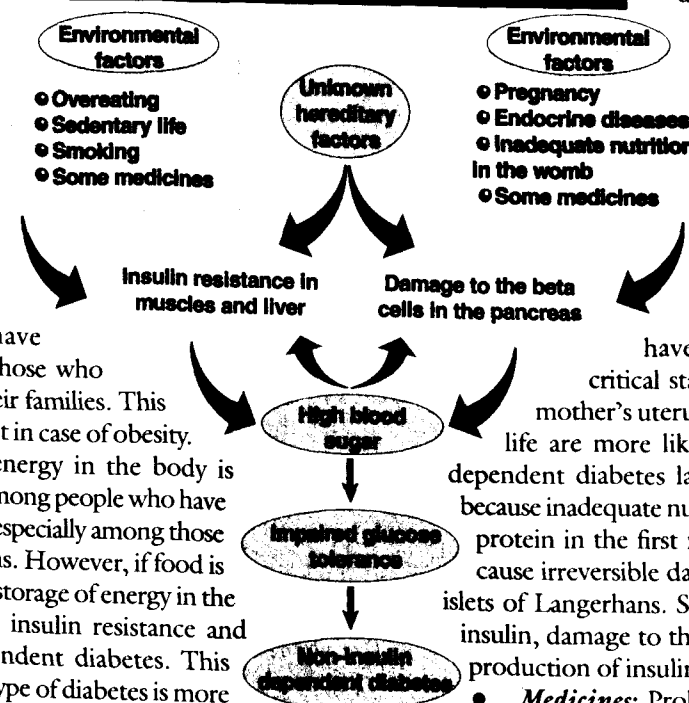
There are several causes of non-insulin dependent diabetes. Detailed below are some of the important ones.

• **Hereditary factors:** Non-insulin dependent diabetes is five times more common among people whose blood relatives have diabetes as compared to those who do not have diabetes in their families. This risk increases to fifty percent in case of obesity.

Increased storage of energy in the body is considered advantageous among people who have unpredictable food supply, especially among those who live in harsh conditions. However, if food is readily available, increased storage of energy in the body can lead to obesity, insulin resistance and perhaps non-insulin dependent diabetes. This perhaps explains why this type of diabetes is more common among people who adopt westernized life-styles.

• **Obesity:** Sedentary life-style of the urbanized society and excessive energy intake increases the risk of developing non-insulin dependent diabetes. The risk of developing diabetes decreases by six percent for every five hundred kilo-calories used through exercise everyday. It is believed that the distribution of fat in different parts of the body as well as the total fat in the body are important for determining the risk of developing non-insulin dependent diabetes. People who have excessive fat in the trunk region, especially if it is within the abdomen, are more likely to develop non-insulin dependent diabetes. This is because fat in the organs of the

Figure 28.2. Probable mechanism of development of non-insulin dependent diabetes



abdomen appears to be broken down for energy more easily.

When fats are broken down for energy, the level of fatty acids in the blood increases. Increased fatty acids in the blood increase resistance to insulin through their action on the liver and muscles.

• **Malnutrition:** It is believed that children who have malnutrition during the critical stages of development in the mother's uterus or during their first year of life are more likely to develop non-insulin dependent diabetes later in life. This is perhaps because inadequate nutrition, especially inadequate protein in the first few months after birth may cause irreversible damage to the beta cells in the islets of Langerhans. Since these beta cells secrete insulin, damage to them can result in inadequate production of insulin later in life.

• **Medicines:** Prolonged intake of medicines such as steroids or some medicines for controlling high blood pressure can cause non-insulin dependent diabetes.

• **Other causes:** Non-insulin dependent diabetes can also occur during pregnancy, or as a result of some diseases of other endocrine glands. Endocrine glands are ductless glands of the body that secrete hormones.

How does non-insulin dependent diabetes develop?

Figure 28.2 illustrates the probable mechanism of development of non-insulin dependent diabetes. It is important to remember that the process of development of non-insulin dependent diabetes may take several years. This process may also be reversed. About twenty five percent people with impaired glucose tolerance (described in the earlier issue of the Health Update) are likely to develop non-insulin dependent diabetes within five years. About fifty-percent people continue to remain in the category of impaired glucose tolerance and the remaining twenty-five percent may go back to normal glucose tolerance. This reversal is more common among those who have lost weight and/or increased physical activity.

What are the symptoms of non-insulin dependent diabetes?

Many people with diabetes may not have any symptoms. It may be diagnosed during routine investigations for skin infections or vision defects. Typical symptoms of

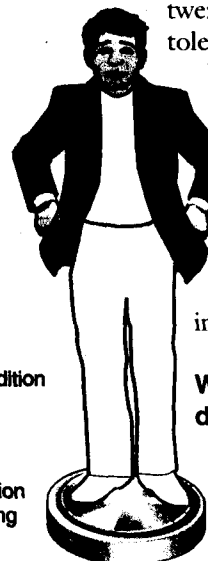
Box 28.1. Benefits of weight loss in non-insulin dependent diabetes.

Benefits of short-term restriction in calorie intake without significant weight loss:

- Reduced glucose output from the liver
- Fall in blood glucose levels
- Relief from symptoms of diabetes

Benefits of long-term restriction in calorie intake with significant weight loss:

- Improved secretion of insulin
- Enhanced sensitivity of the body cells to insulin
- Further fall in blood sugar level
- Fall in blood pressure
- Reduced risk of developing thrombosis (an abnormal condition of the arteries where blood clots form on its inner layer thus reducing or stopping blood flow from the affected part)
- Increased life expectancy
- Reduced risk of faster progress of atherosclerosis (deposition of yellow plaques of cholesterol and fats etc. on the inner lining of the arteries, thus making it narrower and harder)



Box 28.2. Formula for estimating the amount of energy used during twenty-four hours.

Basal metabolic rate (kilo-calories/day)	Physical activity multiplier
Men Age (years) 19-30 (Weight x 0.055) + 2,200 x 240 31-40 (Weight x 0.045) + 2,200 x 240 41-50 (Weight x 0.040) + 2,200 x 240	Physical activity multiplier Light 1.55 Moderate 1.75 Heavy 2.10
Women Age (years) 19-30 (Weight x 0.045) + 2,200 x 240 31-40 (Weight x 0.040) + 2,200 x 240 41-50 (Weight x 0.035) + 2,200 x 240	(Same as Men)

It is assumed that you will at least undertake light activities. If not, 15% of total 24-hour energy expenditure needs to be reduced. For example, if you are a male 50 years old, weighing 75kgs, your total 24-hour energy expenditure will be about 2698 kcal in case light activities are undertaken and 2293 kcal if you are especially sedentary.

diabetes include increased frequency of passing urine, excessive thirst and/or hunger, continuous weakness or tiredness, slow healing of cuts and wounds, numbness or tingling in the feet, skin infections and blurring or loss of vision

What is the treatment for non-insulin dependent diabetes?

Just as for treatment of insulin-dependent diabetes, there are four main aims of management of non-insulin dependent diabetes. These include:

1. To provide relief from symptoms of diabetes and prevent acute complications of diabetes such as ketoacidosis and coma;
2. To reduce the risk of chronic complications such as damage to the eyes, kidneys, nerves or increased risk of heart diseases;
3. To increase life-expectancy proportional to those who do not have diabetes; and
4. To restore quality of life to normal.

There are three approaches to management of non-insulin dependent diabetes. These include (a) diet, (b) exercise and (c) medicines.

What are benefits of reduced calorie intake in non-insulin dependent diabetes?

Weight loss is associated with immediate and long-term benefits in people with non-insulin dependent diabetes, which are listed in Box 28.1.

Moderate restriction in daily intake of calories results in reduced blood sugar levels for most people and therefore the symptoms improve within a few days or weeks. This is because reduced calories result in rapid decrease in the abnormally high output of glucose from the liver. It is believed that glucose

output of the liver is reduced by two main mechanisms: 1. Increased utilization of insulin by the liver; and 2. Suppression of glucose in the liver by ketones. Ketones are chemical compounds that are formed in the liver when fats are broken down to release energy whenever there is inadequate calorie intake. This is why blood levels of ketones increase during weight loss.

Continued dietary restriction that results in weight loss results in further beneficial effects on the body's ability to use glucose for energy. Weight loss has other benefits also, especially for those with non-insulin dependent diabetes. These include:

1. Reduced risk of developing ischaemic heart disease and therefore heart attack and angina;
2. Reduced blood pressure; and
3. Reduced level of "bad" cholesterol and increased level of "good" cholesterol in the blood.

What are the dietary recommendations for management of non-insulin dependent diabetes?

Your doctor and/or dietician will recommend an ideal diet for management of your diabetes depending on several factors. These include your current eating habits, life-style, age, sex, occupation, blood cholesterol levels, presence of high blood pressure and other health problems, if any.

Several studies have indicated that obese people who maintain their weight use more energy than people with normal weight. This can happen only they consume more energy than normal. Detailed below are some effective approaches to reducing calorie intake and therefore losing weight.

• **Calculate your intake and use of energy:** If your weight is steady, your doctor and/or dietician will first estimate the amount of daily energy intake using standard formula. One such approach is described in Box 28.2.

• **Desirable target body weight:** Your doctor will recommend that you work towards an "acceptable range" of weight rather than your "ideal weight". These ranges are normally prepared for different age groups and sex with an aim to provide longest life expectancy. Most specialists

Box 28.3. General guidelines for dietary intake in non-insulin dependent diabetes

- Avoid biscuits, cake or other bakery products as snacks in between meals.
- Use fats and oils that are low in saturated fatty acids (such as olive oil, sunflower oil, corn oil, etc.).
- Drink large volumes of water, skimmed milk and other low-calorie beverages in between meals.
- Eat regular meals.
- Avoid fried and sweet foods.
- Increase intake of vegetables by two times in every meal.
- Have rice, chapati, bread, potato or other cereals as the main part of every meal.
- Drink water or sugar-free drinks whenever you are thirsty.
- Eat smaller portions of meat or eggs.
- Eat smaller portions of pulses.



recommend acceptable weight as per the *body mass index*. You can calculate your body mass index by dividing your weight in kilograms by the square of your height in metres.

Your weight is considered normal and you will be at lower risk of health problems if your body mass index is less than twenty-five. If your body mass index is between twenty-five and thirty, you will be considered as overweight and will have moderate risk of health problems. If your body mass index is more than thirty, you are obese and will have a high risk of health problems.

• **Predicting rate of weight loss:** It is desirable that you avoid unreasonable expectations of slimming diets. An ideal weight loss is about one to two kilograms per month. You are also likely to maintain the lost weight for a longer time if you lose weight gradually and slowly.

• **Planning a suitable diet:** Your doctor will recommend a high carbohydrate, high fibre and low-fat diet to induce and maintain weight loss.

You may lose weight with such a diet even if your total calorie intake does not come down. If you do not consume adequate fibre in your diet, there is a risk of increased blood cholesterol levels, which in turn can worsen diabetes.

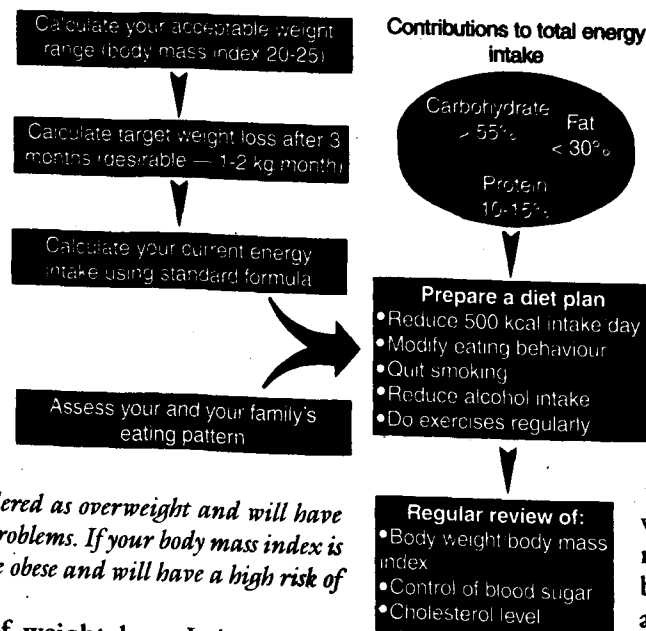
Figure 28.3 illustrates an approach for weight reducing diet in diabetes. Box 28.3 lists general guidelines for dietary intake in non-insulin dependent diabetes.

What is food exchange?

Food exchange is the process through which you can substitute an equivalent amount of calorie in the same group of food. For example, you can substitute one chapati with other cereals such as rice, potato or bread in the amount that give approximately the same calories as one chapati. The various groups for which exchange can be done are cereals, meat, milk and milk products, legumes and grams, fats and oils and fruits and vegetables.

Consistency in your diet is one of the most important factors for effective control of diabetes. This means that you need to consume approximately the same amount of carbohydrates, proteins and fats in each meal. The quantity of each of these foods will be based on your level of physical activity and schedule of insulin and/or medicines for diabetes. This means that the type of food you eat at different times is as important as the total calories you consume during the day.

Figure 28.3. An approach to weight reducing diet in diabetes



You need to follow three rules for food exchange:

1. Substitute the food within the same meal.
2. Substitute correct amount of food exchanged
3. Substitute from the same food group.

Box 28.4 lists some of the food exchanges for the Indian diet.

What is the role of exercise in management of diabetes?

Regular exercises play a very important role in the management of diabetes. This is because of the following main advantages:

1. Exercises help burn calories and therefore help reduce weight. Regular exercises can maintain acceptable weight.
2. Regular exercise can increase the number of receptors on the cell walls where

the insulin can attach itself. This in turn can lead to increased utilization of glucose by the cells for their energy.

3. Exercises improve blood circulation and tone the heart muscles.

4. Exercises increase good cholesterol and reduce the bad cholesterol levels.

5. Regular exercises can help relieve anxiety, stress and tension. It will therefore give a sense of well being.

Starting an exercise routine: Before starting any exercise, it is important that you consult with your doctor first. This is because wrong type or duration of exercise can be harmful. For example, if you are taking insulin, any sport where reduced blood sugar levels can be dangerous need to be avoided. These include diving, mountaineering, motor racing, sailing or rafting, etc. Similarly if the retina in your eye is damaged, strenuous exercises such as jogging can increase the risk of bleeding in the eyes and therefore loss of vision.

People with heart diseases, especially those who have non-insulin dependent diabetes need to consult with their diabetes doctor and cardiologist before starting any exercise routine. They will recommend exercises that have minimal risk of further damage to the heart and those that improve and tone the functions of the heart muscles. Similarly, people with damage to the nerves of the legs are at higher risk of having injuries in the feet and should therefore exercise

with comfortable and well fitting shoes.

General guidelines: It is desirable that you follow the following guidelines:

- As far as possible, exercise everyday.
- It is not necessary that you undertake very strenuous exercises such as jogging. Even simple exercises such as walking will help burn adequate calories.
- Seek your doctor's help to plan exercises that are most suited for your needs and physical fitness.
- Use comfortable and well-fitting footwear that protect your entire feet.
- Avoid exercising in extreme heat or cold temperatures.
- Check your feet for any injuries after exercise everyday.
- Avoid doing exercises when the blood sugar levels are not under good control.

Boxes 28.5 and 28.6 list the specific guidelines for exercise in insulin dependent and non-insulin dependent diabetes respectively.

What medicines are recommended for non-insulin dependent diabetes?

Non-insulin dependent diabetes may be treated with oral medicines, insulin injections or a combination of these. Oral medicines commonly used for treatment of diabetes include:

- **Sulphonylurea:** This group of medicine has several medicines such as acetohexamide, chlorpropamide, glibenclamide, gliclazide, tolazamide, tolbutamide, etc. These

medicines differ from one another mainly in the duration of their action and their recommended dose per day. For example, tolbutamide has a short-term effect and needs to be given two to three times a day. Chlorpropamide may act up to three days and its action may accumulate to severe levels if given every day. Glibenclamide is suitable for giving once a day in the morning.

Sulphonylureas are the first choice of medicines for management of non-insulin dependent diabetes. They stimulate the release of insulin by the beta cells of the islets of Langerhans in the pancreas. They however do not stimulate production of insulin.

There are few and generally mild side effects of these medicines. The most common adverse effect is uneasiness in the abdomen and diarrhoea. Some people may have skin rashes. Chlorpropamide has been reported to affect liver and may therefore cause jaundice. In excessive doses, medicines such as chlorpropamide and glibenclamide may cause excessive lowering of blood sugar.

Sulphonylurea is normally recommended thirty minutes before a meal in order to get best results in lower blood sugar levels two hours after meals.

• **Biguanides:** An example of this group of medicines is Metformin. These medicines decrease absorption of carbohydrates and promote their *oxidation* in the tissues. Oxidation is a process by which the oxygen content of a chemical compound increases. Biguanides also reduce the conversion of fats and proteins into glucose in the liver.

Biguanides commonly produce unpleasant, bitter or metallic taste, loss of appetite, nausea and discomfort in the abdomen. You can reduce these side effects by taking

Box 28.4. List of food exchanges

Cereal exchange: Each exchange contains 15 g carbohydrate, 2 g protein. This amounts to about 70 calories.

- One chapati made from 20 g atta • Three tablespoons of cooked rice (75 g) • One medium sized idli • Half medium sized potato
- One large slice bread • 3/4th cup cooked porridge • Three tablespoons cornflakes • Two Marie biscuits • 1 1/2 tablespoon ragi

Pulses and legumes exchange: Each exchange contains 15 g carbohydrate and 5 g proteins. This amounts to 80 calories.

- One medium bowl cooked moong • One medium bowl cooked Arhar • One medium bowl cooked Chana dal • One medium bowl cooked Rajma • One medium bowl cooked lobia • One medium bowl cooked urad

Meat Exchange: Each exchange contains 7 g protein and 5 g fat. This amounts to about 75 calories.

- Chicken 30 g • One medium egg • One inch cube of cheese • Fish 30 g • Mutton 30 g • One piece paneer 1"x1 1/2"

Milk exchange: Each exchange consists of 12 g carbohydrate, 8 g protein and 7 g fats. This amounts to about 145 calories.

- One glass toned milk (240 ml) • 250 ml of curds from toned milk • 750 ml of butter milk • 50 g of paneer • 3 tablespoons of skimmed milk

Fruit exchange: Each exchange consists of 10 g carbohydrate. This amounts to about 40 cal.

- One medium orange • One small apple • One medium guava • 1/2 medium banana • 1/2 medium mango • 1 small pear • 2" slice papaya • 1 large slice watermelon • 1 glass tomato juice • 4 dry fruits (almonds, cashews, etc.) • 4 dates

Vegetable exchange: There are three groups of vegetable exchange. 100 g vegetables in group I give 20 cal.

- Cabbage • Spinach • Cauliflower • Capsicum • Bottle gourd • Brinjal • Sarson ka saag • Tori.

100 g vegetables in Group II give about 32 calories.

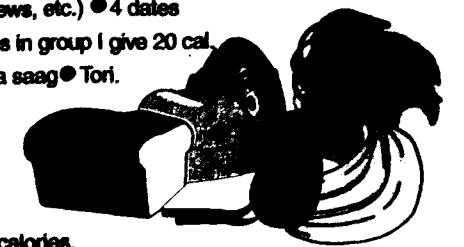
- Ladies finger • Onions • Radish • Carrot • Green peas • Beans • Pumpkin.

25 g Vegetables in Group III give 20 calories.

- Potatoes • Sweet potato • Beetroot • Yam • Colocasia.

Fat/oil exchange: Each exchange contains about 5 g fat, which amounts to about 45 calories.

- 1 teaspoon each of • Sunflower oil • Saffola • Soya oil • Titi oil • Refined oil • Butter • 2 teaspoons of heavy cream



Box 28.5. Guidelines for exercise in insulin dependent diabetes.

- Monitor blood glucose levels before and after exercise.
- Avoid low blood sugar by:
 - Taking extra carbohydrate before exercise and every hour in case exercise is for long duration. You should however avoid eating too much food before exercising.
- Avoid heavy exercise during the peak action of insulin.
- Take insulin injections in areas that will not be used for active exercises.
- Follow your doctor's advice for reducing insulin dose before undertaking strenuous or prolonged exercises.
- Blood glucose can fall even several hours after exercise. It is therefore important to check blood sugar periodically.



the medicines with or just before meals. Biguanides may also result in lethargy, weakness of the muscles and excessive weight loss in some people. They are normally not recommended if you have heart, liver or kidney diseases.

Biguanides are normally recommended for people who are obese, are insulin resistant and have relatively less high blood sugar. It is given in combination with sulphonylurea if the latter does not control high blood sugar levels effectively.

● **Alpha-glucoside inhibitors:** An example of this group of medicines is acarbose. It delays absorption of carbohydrates from the intestines and is normally recommended for those who have high carbohydrate intake. It is also sometimes recommended for obese people who do not follow the recommended diet for diabetes.

Acarbose may result in malabsorption in high doses. It may also result in mild side effects such as increased gas in the stomach, a feeling of bloating sensation in the abdomen and diarrhoea.

Box 28.7 lists the common precautions you may need to take for oral medicines for diabetes.

When is insulin recommended for management of non-insulin dependent diabetes?

If the non-insulin dependent diabetes is not controlled effectively by sulphonylurea, your doctor is likely to either recommend adding metformin or starting insulin therapy. Several studies have indicated that a combination of intermediate and short-acting insulin given before breakfast and dinner is effective in people who do not respond satisfactorily to treatment with sulphonylurea.

There are several options for insulin regimens for management of non-insulin dependent diabetes. These may be either alone or in combination with oral medicines. Major options include:

- Premixed, short and intermediate acting insulin, twice a day;
- Multiple insulin injections (short acting insulin before meals

and NPH insulin at bedtime);

- Combination of NPH insulin in the morning and at bedtime and oral medicines such as sulphonylurea during the daytime.

Normally, about sixty percent of the total dose of insulin is given in the morning and about forty percent before the evening meal. However, your doctor may adjust the dose depending upon your age, weight, dietary habits, etc.

Home monitoring of blood glucose is very important for insulin therapy. Your doctor is likely to recommend that you measure blood glucose level before breakfast, before lunch, before dinner and at bedtime at least twice a week.

For further information on types of insulin, their action and correct technique of taking injection, refer to the previous issue of the Health Update, Diabetes - 1.

Is frequent monitoring of blood sugar levels necessary?

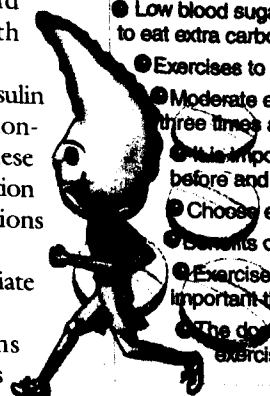
The amount of blood sugar changes throughout the day. If its level rises too high or falls too low, it can lead to serious complications. This is why it is important to measure blood sugar levels several times a day. Self-monitoring of blood glucose is very important in insulin-dependent diabetes. It helps you detect when your blood sugar is too low or too high. It is also important in non-insulin dependent diabetes for making finer adjustments in the medicines, diet or exercise.

When should blood sugar level be tested?

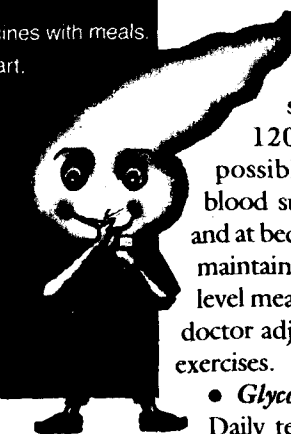
Blood sugar testing is recommended at least three times a day, especially when the dose of insulin and/or medicines is being adjusted. The recommended timings are before meals, at bedtime and one or two hours after meals. Your doctor may also recommend that you check the blood sugar levels at about two in the morning at least once a week. You also need to check blood sugar level when you are sick, have changed the dose or timing of medicines, diet or exercise, or have lost or gained weight and when you suspect low blood sugar.

Box 28.6. Guidelines for exercise in non-insulin dependent diabetes.

- Low blood sugar is not likely during exercises and therefore it may not be necessary to eat extra carbohydrates.
- Exercises to reduce weight need to be supported by reduced calorie intake.
- Moderate exercise needs to be done everyday. Strenuous exercises may be done three times a week.
- It is important to include mild exercises for warming up and cooling down before and after an exercise respectively.
- Choose exercises that are most suited for your general health and lifestyle.
- Benefits of exercise are lost when no exercise is done for three continuous days.
- Exercises can increase appetite and therefore calorie intake. It is therefore important that you avoid eating extra food after exercises.
- The dose of oral medicines for diabetes may need to be reduced during regular exercises. Consult your doctor for adjusting the correct dose.

**Box 28.7. General precautions to be taken for oral medicines for diabetes**

- In case you have acidity or other stomach disturbances, take the medicines with meals.
- Your doctor may use these medicines with extra caution if you have heart, kidney or liver diseases.
- Avoid drinking alcohol while on these medicines as it may react with the medicines and cause unpleasantness and flushing of the face.
- Some medicines increase the action of sulphonylurea and it is therefore desirable that you avoid taking any medicine without consulting with your doctor.
- Inform your doctor if you are pregnant as some medicines are not recommended during pregnancy.
- In case you develop symptoms such as pain in the muscles, stop the medicine and consult your doctor immediately.
- Stop taking the medicines in case allergic reactions develop.



blood glucose levels can be monitored four times a day to adjust diet and medicines in order to maintain fasting blood sugar level to as close as 70-120 mg/100 ml of blood as possible. This means measuring blood sugar levels before each meal and at bedtime. It is important that you maintain a diary of these blood sugar level measurements as it will help your doctor adjust your medicines, diet and exercises.

● Glycosylated haemoglobin testing:

Daily testing of the blood indicates

the blood sugar level at the time of testing. They help adjust the dose of medicines and/or exercise routine. The daily testing however does not indicate if there is long-term good control over blood sugar levels. Glycosylated haemoglobin testing is a test that provides an accurate picture of your overall diabetes control.

Mechanism of action: Sugar that is not used for the energy remains in the blood. It attaches itself to haemoglobin, which is a part of the red blood cells that carries oxygen to various parts of the body. This process of attachment of sugar to haemoglobin is called *glycosylation*.

Glycosylated haemoglobin testing measures the amount of sugar that is attached to the haemoglobin in the red blood cells. These cells live in the blood for about four months. This is why this test shows the average of blood sugar for the past several months. This is just as the average run rate of a cricket player is calculated over a period of time.

One of the main advantages of glycosylated haemoglobin is that it is not affected by short-term changes in the blood sugar levels. This is why even if you have high blood sugar level at some time, a good result of this testing will mean that your overall control of diabetes is satisfactory. There are several methods of glycosylated haemoglobin testing. Each of these tests results need to be interpreted differently. The results of glycosylated haemoglobin testing are normally interpreted as follows:

- Very good control — 6% or 120 mg/100 ml of blood
- Good control — 8% or 180 mg/100 ml of blood
- Poor control — 10% or 240 mg/100 ml of blood
- Dangerous level — 13% or 330 mg/100 ml of blood.

How does diabetes affect the skin?

Detailed below are some of the common skin problems associated with diabetes.

- **Shin spots:** About fifty percent people with diabetes are likely to have this condition. It results in well-defined brownish scars on the shin. They may also be present on the

How is blood sugar level measured?

There are two ways in which you can test your blood to measure the sugar levels. These include testing with strips and with meter. In both these methods, you first need to prick your finger with a special needle to get a drop of blood. The side of the finger is a preferred site for pricking as pain is likely to be less here. Change the sites if you are measuring blood sugar levels several times a day. Some medical professionals recommend that you stimulate blood circulation of the site of prick by massaging the skin towards the site. Keep your forearm and hands below the level of the heart.

● **Testing with strips:** After pricking the finger, you need to place a drop of blood on the test strip that contains a chemical compound. Make sure that the finger does not touch the strip and only the blood comes in contact with it. Wait for the test strip to change colour. Match the colour of the test strip with a standard colour chart on the bottle that indicates different levels of blood sugar. This method is also called visual reading as you need to compare the colour on the strip with that on the standard chart by looking at them.

● **Testing with meter:** There are several types of blood glucose meters available. These are small computerized machines that measure the blood sugar levels. Each of these meters comes with detailed instructions on how to record blood sugar level. You need to put the drop of blood on the test pad and insert the pad into the meter as per the directions given with the instrument. The blood sugar levels will be recorded as number.

How is blood sugar level monitored after starting treatment for diabetes?

There are two common ways in which blood sugar levels are monitored to assess if the diabetes is under control or not. These include (a) frequent measurements of blood glucose and (b) glycosylated haemoglobin testing.

- **Frequent measurement of blood sugar level:** Ideally,



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Box 28.7. Classification of diabetic foot disease

- **Grade 0** — High risk of developing foot disease. No ulcers are present.
- **Grade 1** — Superficial ulcers that are not infected.
- **Grade 2** — Deeper ulcers, often associated with inflammation of the surrounding tissue. No infection of the bones and abscess formation.
- **Grade 3** — Deep ulcers with involvement of the bones and formation of abscess.
- **Grade 4** — Localized gangrene, such as in the toe, front part of the foot or heel.
- **Grade 5** — Gangrene of the whole foot.

forearms, thighs and bony prominences. These scars are normally present on both sides of the body and several of them may appear at the same time. Shin spots are more common among men than women.

- **Redness of the skin:** This is because of a disease condition in which there are well-defined patches of red skin on the legs and feet of elderly people. These patches are often due to damage to the underlying bones. Sometimes there may be rosy discoloration of the face, hands and feet because of damage to smaller blood vessels of the skin.

- **Thickened skin:** This is due to damage to the proteins of the skin. This damage may be a natural process of aging but its progress is more rapid among people with diabetes.

About seventy-five percent people with diabetes who are above sixty years of age are likely to have abnormal skin on the hand with varying severity. Thickened skin on the back of the fingers may adversely affect their movement in the advanced stages. Some people may also develop stiff and painful fingers.

Thickened skin on the back of the neck and upper part of the back is common among people with non-insulin dependent diabetes, especially those who are obese.

- **White patches:** Patchy discoloration of the skin is two times more common among people with insulin dependent diabetes than those without diabetes.

- **Infections:** Bacterial and fungal infections are more common among people with diabetes, especially if the blood sugar levels are not under control. *Diabetes should be suspected in women who have fungal infection of the vagina and external genitalia that does not respond to standard treatment.* These infections result in severe irritation, redness and abnormal white discharge.

Treatment of skin problems in diabetes depend upon their type, severity and whether they adversely affect normal functions of the affected part.

What are the foot problems in diabetes?

Ulcers in the foot, with or without infections and gangrene, either localized or involving the whole foot are two main foot problems in diabetes. Ulcers are crater-like wounds in the skin or mucous membrane with a defined edge. They are formed due to damage to the skin or mucous membrane due to several causes such as inflammation, infections, etc. Gangrene is death of some part of the tissue in the body

due to loss of blood supply, bacterial infection and subsequent decay of the tissue.

The foot problems in diabetes are due to several reasons. These include, damage to the nerves of the feet, lack of or reduced blood supply and infections.

What is the classification of foot problems in diabetes?

Injury to the foot due to diabetes is normally classified into five grades. This classification is used mainly as a guide for management of foot injuries. Box 28.8. lists the five grades that are described below.

- **Grade 0:** Anyone with diabetes who has characteristics listed in Box 28.9 is considered as having high risk of developing ulcers in the foot. Regular care of the feet and check-up by the doctor can prevent foot problems at this stage.

- **Grade 1:** Superficial ulcers that involve only the upper layer of the skin are classified in this group. At this stage, there is no infection. Normally, these ulcers are because of damage to the nerves, which in turn reduce the sensation in the affected parts. This is why these ulcers are located in sites where there is more weight bearing of the body. For example, lower part of the foot or toes that come in contact with the ground are common sites for these ulcers. Sometimes *callus* tissue may be present. Callus means thickening of a well-defined area of the skin. Occasionally, the callus may hide an ulcer below the thickened area.

- **Grade 2:** This stage includes deep ulcers that penetrate the skin and the underlying tissues. There may be infection of the skin and the tissues below it. Several types of bacteria, some of which are difficult to grow in artificial medium in the laboratory, can cause foot infections in diabetes. There is however no infection in the bones of the foot or abscess formation. An abscess a localized collection of pus surrounded by inflamed tissue.

- **Grade 3:** This is the stage of deep ulcers that often affect the bones. There is also associated infection of deeper tissues of the foot. Abscess formation is common in this stage.

- **Grade 4:** In this stage there is lack of blood supply and

Box 28.9. High risks of developing diabetic foot problems

- People with the following characteristics are at a high risk of developing diabetic foot disease.
- Damage to the nerves of the feet
- Diseases of the blood vessels of the legs.
- Having foot ulcers in the past.
- Deformity of the foot.
- Presence of callus.
- Blind or with poor vision.
- Kidney diseases, especially chronic kidney failure.
- Elderly people, especially those living alone.
- People who cannot reach their feet on their own to clean them.
- Poor control of blood sugar levels and
- Reduced sensation in the feet.

therefore gangrene in specific parts of the foot. Nerve damage is often present and may worsen the condition. If nerve damage is present, there will no pain sensation. Infections are common in the damaged and dead parts of the foot.

- **Grade 5:** This is the stage where there is gangrene of the entire foot because of blocks in any major blood vessel of the foot. Damage to the nerves and infections usually worsen the condition.

What is the management of diabetic foot problems?

The first priority for foot care in people with diabetes is to prevent ulcers in the foot from developing. In case you develop an ulcer, your doctor will first assess whether it is because of damage to the nerves or lack of blood supply or infections. This is because each of these contributory factors requires different types of treatment.

- **Management of damage to the nerves:** Most people with diabetes who have foot problems are likely to have pain, decreased sensation or numbness in the foot. The progress of the nerve damage may however be so slow that you may not even notice these symptoms. Sometimes pain may be absent and therefore development of ulcers may not be noticed in the early stages. Thus, lack of symptoms of nerve damage does not mean that there is no damage. This is why your doctor will first carefully examine your feet, especially the areas where there is increased weight bearing such as heel, lower part of the foot at the end of the toes, etc. Damage to the nerves of the feet may result in signs such as ulcers hidden below the callus skin, warm dry skin, enlarged veins on the skin and reduced sensation.

Normally, laboratory tests are not recommended for diagnosis and management of damaged nerves of the feet. Occasionally, some tests may be required. These include measurements of (a) light touch sensation, (b) sensitivity to temperature; (c) sensation of vibration and (d) efficiency of nerves for transmitting messages to and from the brain. Your doctor is also likely to examine your footwear to ensure that they fit correctly. This is because ill-fitting footwear can also cause ulcers in the foot.

Most ulcers because of damage to the nerves heal satisfactorily with simple measures. Your doctor will recommend that you avoid putting pressure on the affected part of the foot. In case you are not able to rest the foot and avoid weight bearing, your doctor may recommend a plaster of Paris cast or a removable boot that protects the foot just as a plaster cast would. It is important that you go for regular check-ups to ensure that the ulcer is healing. This is because a cast that has not been put correctly may cause further damage to the feet.

Some medical practitioners recommend application of a moist dressing to promote healing while some others believe that removing pressure from the affected foot and ensuring adequate blood circulation is adequate for satisfactory healing of the ulcers.

- **Management of lack of blood supply:** Lack of blood

supply to the legs and feet may result in symptoms such as weakness in the legs and cramp-like pain in the calf muscles, thighs or buttocks, pain in the leg even at rest that is often worse at night, etc. Just as the symptoms due to damage to the nerves, these symptoms may also be very mild and you may ignore them. Lack of blood supply may lead to signs such as cold skin, loss of hair and thickening of the nails. Your doctor may find it difficult to feel the pulse in the foot or in the leg.

In order to make an accurate diagnosis and treat you in the most suitable way, your doctor may suggest laboratory tests such as *Doppler ultrasound studies* in the arteries of the legs and foot. Doppler ultrasound studies is a technique in which very high frequency sound waves are used to study the behaviour of moving structures in the body such as blood or heart valves. The types of ultrasound waves that are reflected from a moving surface are different from those reflected from other surfaces.

In case your doctor suspects very severe loss of blood supply or Doppler ultrasound studies indicate any abnormalities, your doctor may recommend *arteriography of the leg*. In this procedure, a chemical substance that shows up on the x-rays is injected into the arteries of the legs and a series of pictures taken. This test is often used to detect blocks in the arteries that may be removed through a balloon attached to the tip of a tube. This tube can be inserted into the affected artery and the balloon inflated at the site of the block. The blood flow therefore returns to normal. If the blood supply is greatly diminished, surgery may be necessary to bypass the blocks in the arteries of the legs and therefore reduce the risk of amputation.

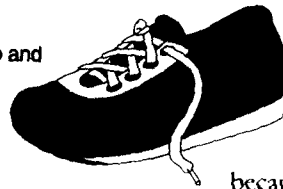
- **Management of infections in diabetic foot ulcers:** It is often difficult to determine the severity of the infections in the ulcers of the foot due to diabetes. It is also difficult to determine if the infection has reached the deeper structures of the leg including the bones. Normally, infection in any injury to the skin leads to redness, pain and painful touch. These symptoms may however be absent in diabetes, especially if there is associated damage to the nerves of the foot. Your doctor is therefore likely to "dig" into the deeper areas of the foot to detect infection in the deeper areas, especially bones, if any. He/she will also look for infection with some bacteria that cause gas formation in the affected part of the foot. Presence of gas in these tissues indicates deep infection that may be difficult to control.

An x-ray is often necessary to determine whether the bones of the foot are also affected or not. Your doctor will also collect some part of the affected foot and send it for *culture sensitivity*. This means that the bacteria from the tissue of your foot will be first isolated and then grown in an artificial medium in the laboratory. Tests will be conducted to identify the most effective antibiotics.

Most people with infections of the foot due to diabetes require hospital admission, especially if the bones are involved or there is abscess formation. This is because in order to control diabetes, insulin injections may be necessary in relatively higher doses. Also, intravenous injections of a

Box 28.10. General guidelines for preventing foot ulcers

- **Inspect your feet everyday** in order to detect ulcers, if any, at the earliest.
- **Check your shoes both inside and outside** before wearing them to detect stones or other similar objects that may be present.
- **Get the feet size measured every time** you buy new footwear.
- **Keep the feet away from heat, hot water, etc.**
- **Wear protective footwear inside the house** also and avoid walking barefoot.
- **Wear shoes that have laces and plenty of space for the toes.**



combination of antibiotics are often needed to control the infection.

Treatment options differ for superficial and deep infections. Normally, the most effective antibiotic for controlling the infection is detected only after doing culture sensitivity tests. Superficial ulcers may be treated by oral antibiotics such as amoxycillin-clavulanate or ciprofloxacin with clindamycin. Oral medicines may need to be taken for several weeks for effective control of the infection. Deep infections are also treated with antibiotics that are initially given as intravenous injections and then as oral medicines for several weeks, sometimes even for twelve weeks.

● **Management of gangrene of the foot:** Death of the tissue of the foot, either a part of it or the entire foot is easy to diagnose. Detailed tests are however necessary to study the amount and extent of blood circulation in the legs and the foot. Repair of the affected portion of the blood vessels in the legs is often recommended for grade 4 of the ulcers. This repair can be done either through an *angioplasty* or bypass surgery. Angioplasty is an invasive procedure in which the blocks in the arteries are removed through "tubes" inserted into it. Bypass surgery is a procedure in which the healthy portion of the artery just above the block is connected with the help of another blood vessel to the artery just below the block. The flow of blood is therefore restored through the bypass. In addition to surgical treatment for the damaged part of the arteries, suitable antibiotics are recommended for control of infections.

People who have gangrene or pain in the foot at rest normally require surgery to remove the affected part. In case of gangrene of the entire foot, amputation of the leg below the knee is often recommended as healing rarely occurs at a level below that.

Box 28.10 lists the general guidelines for preventing foot ulcers.

How does sickness affect diabetes control?

Many illnesses including minor diseases can adversely affect blood sugar control. Viral cold, cough, infections, fever, vomiting, diarrhoea or injuries increase the need for insulin. Emotional stress can also affect blood glucose levels. So can surgery. This is why it is important for you to understand when and how to adjust the dose of your insulin and/or medicines. Do not, however, change the dose of your medicines without consulting with your doctor first.

Box 28.11 lists general guidelines for control of diabetes during illness.

If you have insulin dependent diabetes, your doctor is likely to recommend that you add regular insulin to your normal dose. This will help your body use sugar in the blood and prevent breakdown of the fat cells which can increase the level of ketones in the blood. The additional dose of insulin will depend upon your blood sugar.

In case your blood sugar level is below 150 mg/100ml and you are not able to take normal meals because of illness, nausea, vomiting, etc., your doctor is likely to recommend that you avoid taking regular insulin and take only NPH or Lente insulin in a modified dose, if necessary. These are intermediate acting insulins.

If you have non-insulin dependent diabetes and you are taking oral medicines, it is important that you watch for symptoms of low blood sugar. Your blood sugar levels are likely to go down especially if you have nausea or vomiting.

It is important that you consume as much carbohydrate as possible. If you are unable to consume normal diet, you can substitute carbohydrates with liquids or soft foods such as khichdi. The carbohydrates will provide the necessary sugar for the body's energy requirements. If you do not consume adequate carbohydrate, the body will burn fat for energy. Burning fat for energy can increase ketones in the blood, which in high levels can be dangerous. For further information on symptoms, causes and treatment of high ketones in the blood, refer to the previous issue of the Health Update, Diabetes I.

How does diabetes increase the risk of infections?

There are several factors that increase the risk of infections in diabetes. High blood sugar levels provide a good medium for the infectious agents such as bacteria to grow. In addition, it is believed that diabetes alters the functions of the white blood cells, which are responsible for "killing" the disease causing germs.

Detailed below are some of the infections that are common in people with diabetes.

● **Urinary tract infections:** These infections are more common among people with diabetes, especially women. They are more common in older people who have had diabetes for several years. It is also common in people who have nerve damage, as a result of which they are unable to empty their bladder completely.

Urinary tract infections may not cause any symptoms, especially if the infection is limited to the bladder. It is however important to treat bladder infection as soon as it is diagnosed even if there are no troublesome symptoms. This is because the infection may not allow good control of blood sugar levels and may also spread upwards to the kidneys.

People with diabetes are likely to need antibiotics for a longer duration than normal people. Your doctor is likely

Box 28.11. Guidelines for blood sugar control during sickness

- **Do not miss any dose of the insulin.** Your dose may vary, depending upon the type and severity of illness.
- **Do not take additional oral medicines for diabetes** during illness.
- **Drink increased volume of water or other clear fluids** and eat frequent, light meals.
- **Avoid doing any exercises** during illness.
- **Consult your doctor again** if the illness lasts for more than two days, or you have vomiting and diarrhoea for more than four to five hours.
- **In case you have insulin dependant diabetes,** you need to test your urine every three to four hours for ketones.



to suggest repetition of urine culture in order to make sure that the infection is completely cured.

● **Respiratory tract infections:** Diabetes increases the risk of getting pneumonia. On the other hand, pneumonia worsens diabetes and may lead to very high levels of ketones in the body, thus requiring emergency treatment at a hospital.

People with diabetes are also more likely to develop tuberculosis as compared to the general population. Treatment schedule for tuberculosis may need to be more intense in people with diabetes. It is important to remember that some medicines recommended for treatment of tuberculosis make the action of diabetes medicines such as sulphonylurea inactive.

● **Infections of the digestive system:** Fungal infections, especially in the angle of the mouth and throat are very common in people with diabetes.

● **Infections of the bones and soft tissues:** Diabetes can lead to a condition called *acute dermal gangrene* in which there is death of the tissue below the skin upto the muscles but not affecting the muscles. The skin too may remain normal in the initial stages of this infection, thus making early diagnosis difficult. Acute dermal gangrene is more common among people who do not have good control over diabetes. Treatment of acute dermal gangrene includes intravenous injections of antibiotics. Surgery is often necessary to clean the dead tissues.

● **Rare infections and fever:** People with diabetes are more likely to develop some rare infections. Sometimes, these infections may not result in typical symptoms. Fever, the cause of which cannot be easily detected, is often the only symptom.

Fever results in dilatation of the blood vessels of the skin in order to control body temperature. The body heat is lost through these dilated blood vessels and the fever therefore comes down. This is why many diabetic people who have high levels of ketones because of infections may not have any fever. Since high ketone levels can be dangerous, it is important to consult your doctor even for minor illnesses.

How does traveling affect blood sugar levels?

Traveling may adversely affect blood sugar control because of changes in the diet, exercise routine and physical

activity. You can however maintain good control over your diabetes by taking simple measures that are listed below.

● **Adequate stock of medicines:** Take medicines that can last you for the entire trip as it may be difficult to purchase medicines in newer places.

● **Glucose monitor:** It is desirable that you measure blood sugar levels more frequently while on travel.

● **Diabetic card:** Always carry a diabetic card that lists not only your name and address but also details about your diabetes such as your medications, their dose, etc.

● **Foot care:** You are likely to neglect your feet more while traveling. It is desirable that you check your feet everyday and avoid walking in new footwear while on travel.

● **Time zone:** If you are planning a trip across time zones, take snacks and meals while on the flight as per your schedule at the departure point. Resume normal dose of medicines or insulin from the time you arrive at your destination.

How does diabetes affect sexual function in men?

Sexual problems affect up to thirty-five percent men with diabetes and about fifty-five percent diabetic men above sixty years. The main problem is inability to achieve or sustain an erection sufficient for sexual intercourse. Milder forms of sexual problems may affect up to seventy-five percent men with diabetes.

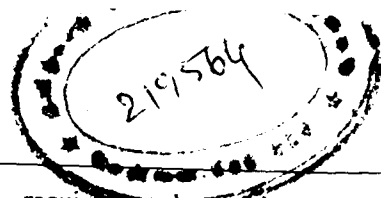
Poor control of diabetes can cause a general feeling of being unwell, which is often accompanied by loss of interest in sexual activities. Fungal infection of the tip of the penis is common among men who do not have good control over their diabetes. This infection may cause discomfort and pain and therefore reduced interest in sexual activities. Anxiety with or without depression is often associated with diabetes. Many people worry excessively about its consequences, treatment problems and complications. Excessive worry about impotence as a complication of diabetes frequently leads to reduced sexual desire.

People with diabetes are more likely to have diseases of the blood vessels such as deposition of fats in the walls of the arteries. When abnormal mass of fat deposits on the blood vessels of the penis, it can lead to inadequate erection. Smaller blood vessels of the penis are also likely to be narrowed or blocked, thereby affecting normal blood supply necessary for erection of the penis.

Poor erection can also be because of damage to the nerves of the penis. Several medicines used for treatment of diabetes and other associated problems such as high blood pressure may also adversely affect sexual function in males.

How are sexual problems due to diabetes managed?

Sexual problems due to diabetes can be managed effectively only if you are able to talk to your doctor freely and frankly, preferably in a relaxed environment. Your doctor will ask you several questions to identify the exact problem.



These questions will be related to the following conditions:

- **Reduced or lack of interest in sex:** This condition is often due to anxiety and/or depression. Reassurance and counselling are often adequate. In case of severe anxiety and or loss of interest due to other conditions such as reduced functions of the sexual organs, your doctor will recommend appropriate treatment.
- **Failure of erection:** The management will depend on whether you have complete or partial failure in erection.
- **Premature ejaculation:** This is a condition where ejaculation occurs before sexual satisfaction.
- **Failure of ejaculation:** This is the condition where orgasm can occur without discharge as the semen is ejaculated back in the bladder.
- **Pain in the penis or other abnormalities:** Infection is the most common cause of discomfort or pain.

After discussing your problems, your doctor will be able to detect if the problem is because of psychological reasons or because of disease process in the sexual organs. The symptoms of sexual problems because of psychological causes begin suddenly, may not be present always and spontaneous erections may occur in sleep or while waking up.

In case of sexual problems due to disease process in the sexual organs, the symptoms appear gradually, the problems are present all the time and there is no erection. Depending upon the exact cause of the problem your doctor will recommend a suitable treatment. Some treatment options for inadequate erection include improved control of diabetes, reduce intake of alcohol, withdrawal of medicines that may be causing the problem and treatment of problems of the endocrine glands, if present. Rarely, medicines or surgery to either correct abnormality in the structure of the penis or blood supply may be necessary.

How does diabetes affect sexual function in women?

Irregular menstruation and a condition called *polycystic ovarian syndrome* are more common among women with diabetes as compared to those without it. Polycystic ovarian syndrome is an abnormal condition which there is (a) no ovulation (the process through which an ovum or egg is produced in the ovary), (b) no menstruation, (c) excessive body hair like in a man and (d) inability to conceive. It is associated with insulin resistance, obesity and glucose intolerance. In about forty percent women who are dependent on insulin for control of diabetes, the insulin

requirements change during menstruation. These changes are believed to be due to changes in the hormones in the body and in the dietary intake.

Weight loss in people with polycystic ovarian syndrome not only improves insulin resistance and glucose tolerance but also reduces production of hormones that cause excessive hair, and can restore ovulation and therefore fertility.

Infections of the vagina are very common among women with diabetes, especially fungal infections. Severe infections may be irritating and painful and therefore interfere with sexual activity. Treatment includes good control over blood sugar levels and medicines such as local creams, pessaries (medicines that are placed inside the vagina), etc. to control the infections.

Can a woman with diabetes have children?

Yes. Most women with diabetes can have children safely but it is important to plan pregnancy. This is because pregnancy may be dangerous in some women with diabetes, especially those who have complications. Also, poor control of diabetes can adversely affect the unborn child. Pregnancy is not recommended for women with diabetes if they have advanced stages of kidney diseases, severe heart disease and severe high blood pressure. The damage to the *retina* in the eye, and therefore loss of vision, is likely to progress more rapidly among pregnant women with diabetes as compared to other women. Most complications of diabetes during pregnancy can be avoided by maintaining good control over blood sugar levels.

Several oral contraceptive medicines are not recommended for women with diabetes and they should therefore be taken only after consulting with your doctor.

How do smoking and alcohol affect diabetes?

Smoking increases the risk of major diseases such as heart diseases and strokes because of damage to the arteries. These can also be the consequence of diabetes. Thus, smoking and diabetes together increase the risk of several major diseases.

Alcohol may delay or adversely affect recovery from low blood sugar by affecting the storage of glycogen in the liver and the release of glucose. Severe low blood sugar because of alcohol intoxication can lead to brain damage and death. Also, excessive alcohol intake can worsen high blood pressure, high cholesterol levels and nerve damage.

In the next issue: Kidney stones

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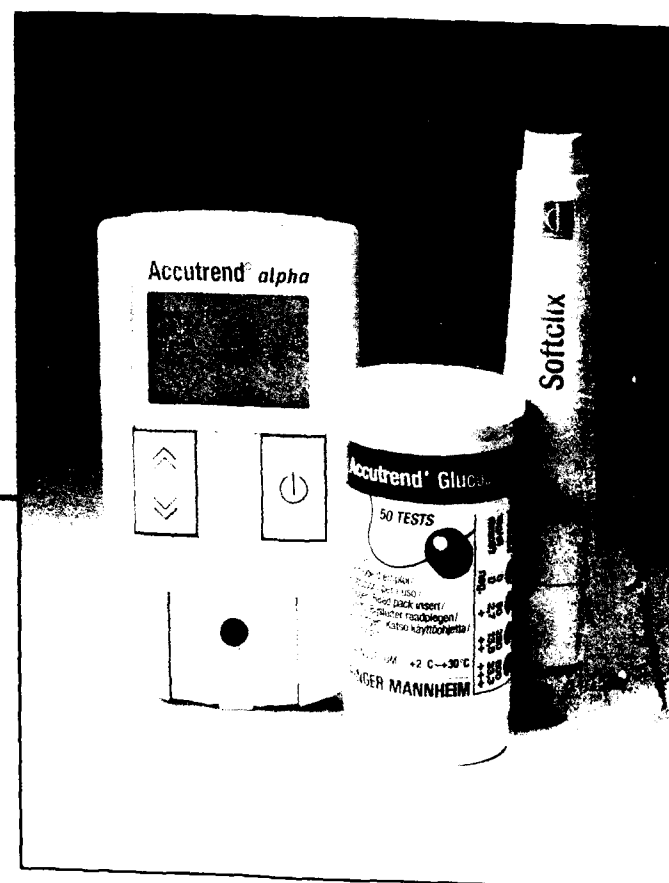


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