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Course Name
Stress Management
By
Prof Rajlakshmi Guha
Centre for Education Technology
IIT Kharagpur

Lecture 09: Health Risk Associated with Chronic Stress

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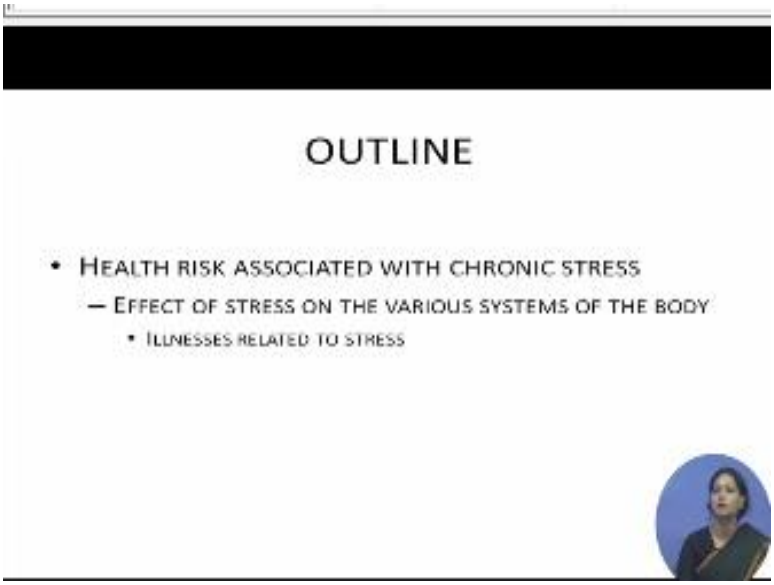

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Hello everybody welcome to the fourth module on stress psychophysiology. In today's session we shall discuss the health risk associated with stress and we shall see for the effect of stresses on the various systems of the body and how illness takes over when there is chronic stress or in fact also in acute stress. To start off with we must understand how stress affects the human body, so stress is commonly assumed to play a role in the etiology exacerbation and maintenance of several health problems. So what exactly do we mean by exacerbation?

Exacerbation means that it enhances or it aggravates the conditions that are present in a in an illness when there is stress several times the illness factors are enhanced or aggravated due to the stressful condition being present. Now chronic stress may cause disease either because of the changes in your in the body or because of overeating smoking and other bad habits that people use to cope with the stress we have spoken about the maladaptive behavior patterns earlier and how they affect stress in an individual but this was what was what is very important and we must remember this.

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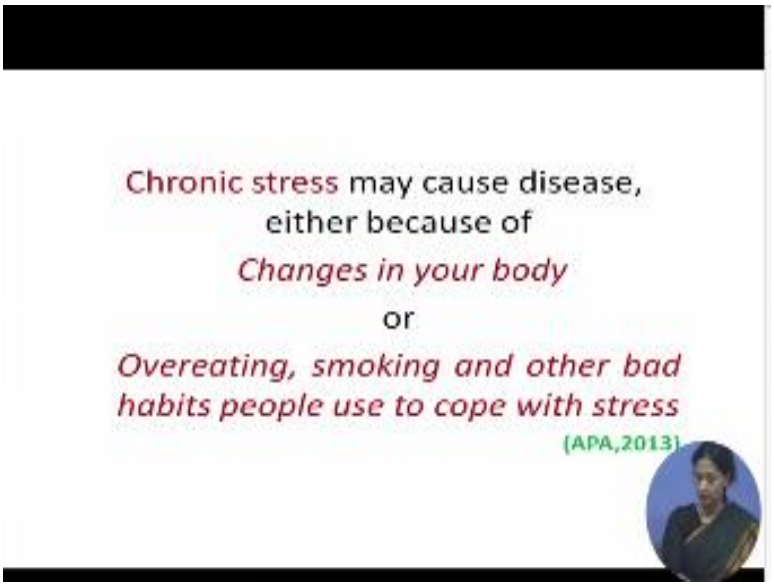

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Now in today's session we shall understand the various systems of the body and how they respond to stress in relation to it we shall study the diseases that are related to stress, that is that are caused by stress or that are aggravated by stress so we start off with the musculoskeletal system. Hereafter we will go to the cardio vascular system, the endocrine system, the gastrointestinal system etc. So to start off with the musculoskeletal system, muscle tension and eventually muscle atrophy due to this you of the body all promote chronic stress related musculoskeletal conditions.

So what exactly do we mean by this? That whenever there is a muscle tension or you know even when the body is not exercising when the blood flow is not going to each muscle group then all these aggravate the musculoskeletal illness conditions, so this are these are generally also exacerbated during chronic stressful conditions. So an example would be painful conditions so, many people suffer from chronic painful conditions secondary to musculoskeletal disorders, so if I have had an injury where I have cramped my calf muscles this may induce pain.

Now what determines whether or not an injured person goes onto suffer from that pain and how they will respond to injury depends on the way the person is reacting to the painful situation.

Say, if an individual is suffering from chronic pain because of some injury and he is not taking any doing any movement to actually reduce to increase the blood flow in the muscle group the pain will also increase so or rather it will take time for the person to heal. Now individuals fearful of pain and re-injury seeking only a physical cause and cure for the injury generally have a worse recovery than individuals who maintain a certain level of moderate physician supervised activity.

So as I was saying right now that if I am fearful of a cramp or getting an a further injury to my leg and I do not move that muscle group then the probability of that pain remaining for a longer time is higher as but if I continue with some physiotherapy is exercises or continue with some exercises that my orthopedist has suggested. Now relaxation techniques have been shown to effectively reduce muscle tension decrease the incidence of certain stress-related disorders such as headache and increase the sense of well-being.

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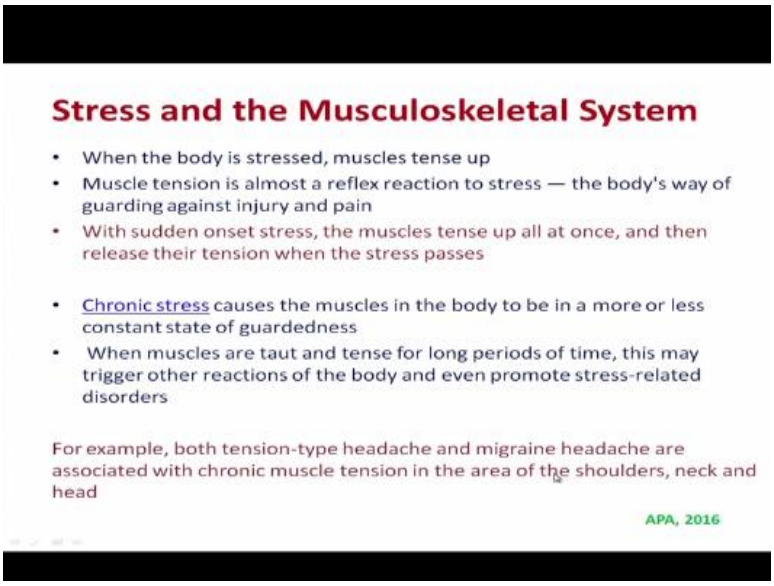

You will get into these musculoskeletal disorders like headache, so what exactly happens in a stressful situation to the muscle groups. So, when the body tenses up we know that the muscles tense up as well so rather when there is a tense stressful situation the muscles tense up. Imagine

yourself watching a cricket match and there are just three balls and ten runs that need to be made and India is batting how would you respond? Many of us in such a situation would sit with our fists tightly close together and our shoulders tightened head more towards the front so, these are actually indicators of clenching our teeth and our jaws are almost stiff, so these are indicative of muscle tension building up within the body due to a stressful situation.

So what happens is with the sudden onset of stress the muscles tense up all at once and then they release the attention when the stress passes. So imagine yourself that it is an India- Pakistan match and a Pakistan player is bowling and you are sitting like this as if you are actually facing the wall then after the ball is over there is a sense of relief but it doesn't last for long because again there is the next ball coming. Now in chronic stress imagine that you are sitting like this for days on at end what would happen?

In chronic stress the muscles in the body to be seem to be more, less in a constant state of garden so, this state is continuing for a longer time in the previous sessions I was talking about the about you or say an individual actually waiting for the results throughout the day and at the end of the day feeling very exhausted, even though there hasn't been any physical activity so just drawing from that example what actually happens in the situation is that the individual is the muscles are all tightened up and we are actually anticipating apprehending the stress to get relieved once the results are out but say in a condition, where the results are not out on that day what happens is the individuals the muscle groups stay tightened and then the next day again it's in that same tightened state.

So what is happening the muscles are getting exhausted and it will also promote stress-related disorders so in chronic stress think about an individual undergoing these, this sort of stressful situation for long periods of time what would happen? He would definitely be a victim of musculoskeletal disorders that stress-related disorders like migraine and tension headache or maybe have an aggravation or exacerbation of spondylosis symptoms because of the tightness of the shoulders and back muscles, especially in cervical spondylosis.

Now getting to the headaches, we have discussed about the tension headaches and migraine headaches a little difficult but coming back to it once again, migraine has headaches result because of a constriction and dilation of the carried arteries of one side of the head, now the carotid, carotid arteries are the arteries that are the major blood vessels in the neck that supply blood to the brain neck and face, so it is actually traveling from here and these are predominantly thought on the cause of migraine, focuses on emotional stress and tension. People often have migraines during times of increased emotional or physical stress.

Now we must remember that migraine need not necessarily have been created because of stress, so migraine could be because of a constriction and dilation of the carotid artery, specifically as a physiological problem but what happens during chronic stress is,. because of that, because of the vessel dilation and the vasoconstriction of the muscles, muscle groups and also the artery resulting in the constriction and dilation of the carotid artery what happens is the there is an exacerbation of the symptoms of migraine plus we often see that migraine increases when there is more of emotional stress.

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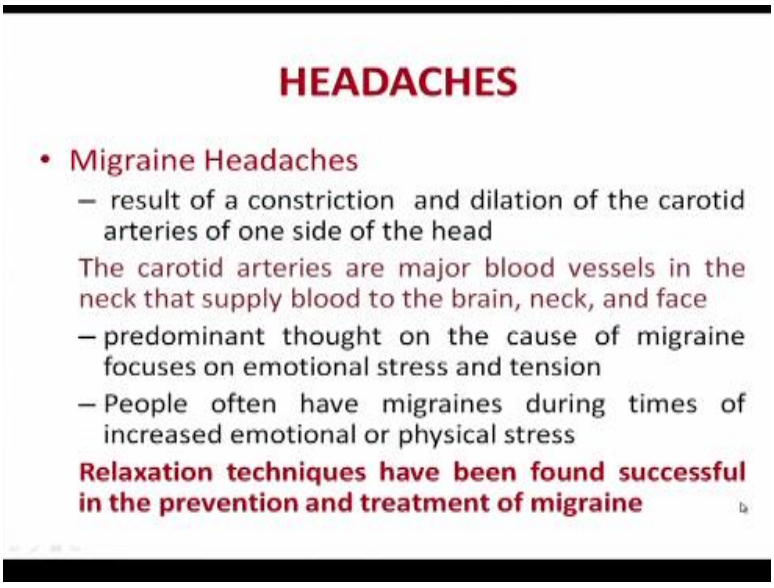

Though it also increases when there is a lot of loud noise or environmental conditions that are adverse to the human to help. Now again you know it has been seen that relaxation techniques have been found successful in the prevention and treatment of migraine, of course there are severe migraine needs to be treated pharmacotherapy killing therapeutically as well. Now again just again once slightly mentioning about the type of headache there is a severe pain on one side of the head that travels on one side to the other side, it could start at any part of the head but it moves up and it is more oppressing and it also in migraine we also see symptoms of nausea involved with the headache and there is a very high sensitivity to light and sound or temperature.

Now these think about these as stressors so we spoken about the external stressors external causes of stress so, environmental conditions and here you see that loud sound loud high temperature or in fact even very bright lights may actually act as a stressor to exacerbate the symptoms. Now coming to tension headaches we know that this is a dull pain a tightness or pressure around the forehead of your nail head and neck so it's like a tight band wound around the neck but definitely the pain is much lesser as compared to a degree but this tension headache is very, very related to stress and it is actually caused by muscle tension accompanying stress.

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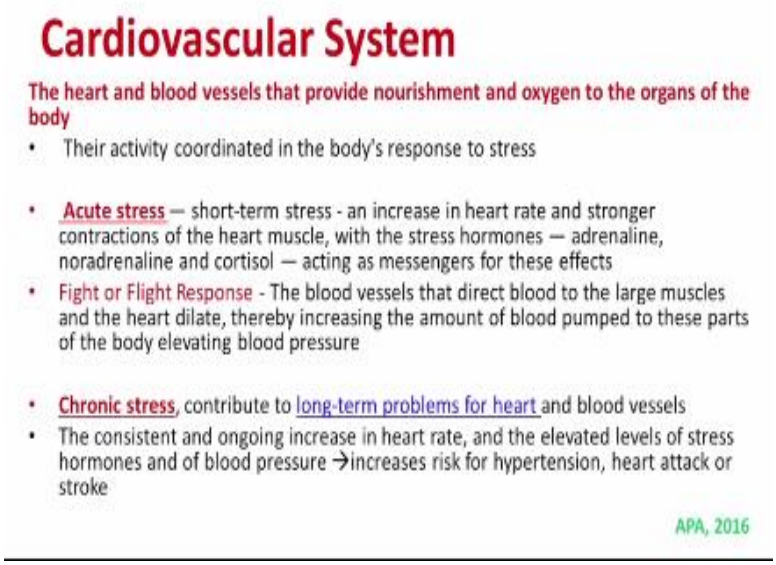

Again relaxation techniques have been found very successful with tension headaches, now coming to the cardiovascular system, what is the work of the cardiovascular system? The heart and blood vessels work together in providing nourishment and oxygen to the organs of the body where activated activity is coordinated in the body's response to stress. So what happens in acute stress or in short term stress for example, again what is short term stress is, a stress which is sudden like you have to jam the car brakes because of somebody coming in front of you on the road, you are jumping from the road to the curb because it is a rushing car moving by what do these immediate conditions situations need, require?

They actually required your immediate response so here acute stress in is a fight-or-flight response so, what happens in such a situation to the cardiovascular system there is an increase in heart rate and stronger contractions of the heart muscles with the release of stress hormones like adrenaline that epinephrine non epinephrine and cortisol and the fight-or-flight response is started or initiated here the blood vessels then carry blood to the larger muscles and the hearts dilate so here the heart is pumping more blood for the blood to be supplied to the organs that need to act, so if I have to jump from the road to the curb the leg muscles need more blood, so the heart is pumping faster so that that blood moves to these organs.

Now this is very efficient way that the cardiovascular system actually deals with stress with a stressful situation, now that is done for survival what happens in chronic stress we've talked about it earlier also that the here the heart is pumping blood in an increased rate and the elevated there is an elevated level of stress hormones and of course increase in blood pressure so, what is happening there are long-term problems of heart and problems for the heart and the blood vessels so what happens because of this so in chronic stress if the heart continues to pump like this for a longer period and the blood is gushing to the different organs, what will happen, then there are high risk for hypertension heart attack or stroke.

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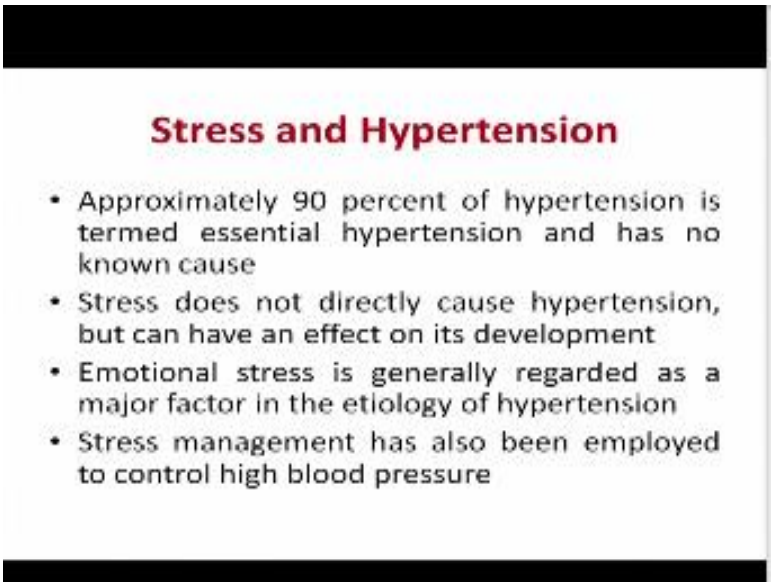

So it has been seen that approximately ninety percent of hypertension is termed essential hypertension and has no known cause. Stress we must remember does not either directly cause hypertension but can have an effect on its development, emotional stress is generally regarded as a major factor in the etiology of hypertension and stress management has also been employed to control high blood pressure, along with the medications, so what is high blood pressure? It is a diagnosis of hypertension may wear when one or both the readings of that are systolic or the diastolic are high and all.

So it could be that the systolic pressure is around 140million millimeter mercury and or diastolic is over 90 millimeter in mercury so, in both these cases it would be considered so, if a pressure reads about 140 x 90 then that would be considered high blood pressure. Now going to what is normal blood pressure so, normal blood pressures would be below120 systolic and below 80 dystonic diastolic so when we say that a blood pressure is reading of about 120 x 80 that is actually meaning 120 x 80millimeters in mercury, then it is considered normal blood pressure.

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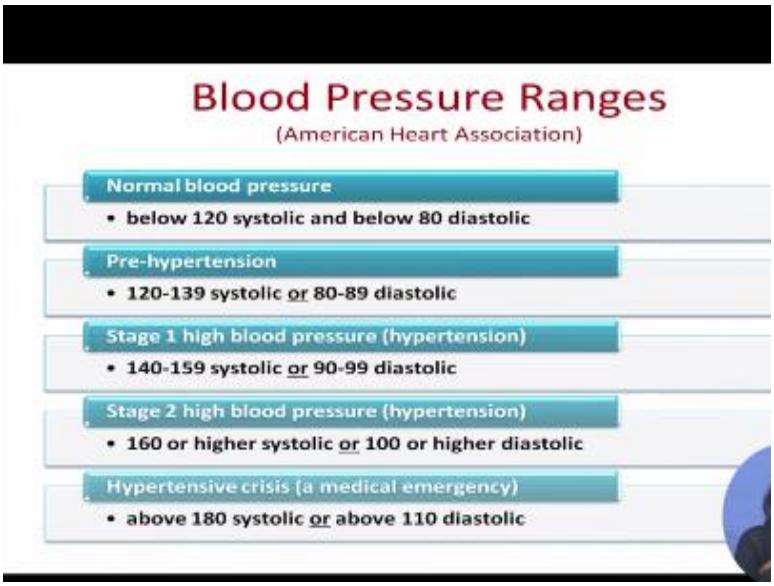

If for pre hypertension the blood pressure range is either between 120 and by 130 to 139in systolic and eighty or 89 in diastolic so individuals in the pre hypertension range should be a little cautious so if you've ever checked your blood pressure or if you know of anybody who is in the pre hypertension range you must ask them to change lifestyles a little so that will help them to reduce their blood pressure to normal. Now stage one hypertension or high blood pressure would actually indicate between a systolic rate between 140 to 150 nine and a diastolic weight between 90 to 99 while, stage two would be 160 or higher and diastolic the 100 or higher so something which actually reads 160 by 100 is actually stage two hypertension and in a hypertensive crisis or a medical emergency the systolic is above 180 and many times the diastolic is also above 110.

So these we must be a little cautious specifically for the pre hypertensive range because a pre hypertensive range could be actually a control meant several times the endocrinologist might not start or the cardiologists might not start medicine, but rely more on stress management techniques lifestyle changes to actually deal with the three hypertension or the increased blood pressure. Now what actually happens in hypertension? So due to stress there is an increase in gluco corticoids which increases the blood sugar level and which again increases a triglyceride

and the high LDL cholesterol so that is low density lipoprotein cholesterol or the bad cholesterol and likewise there are repeated hikes in blood pressure and also the stimulation during a stressful situation we have understood the role of HPA axis which we studied in the previous module.

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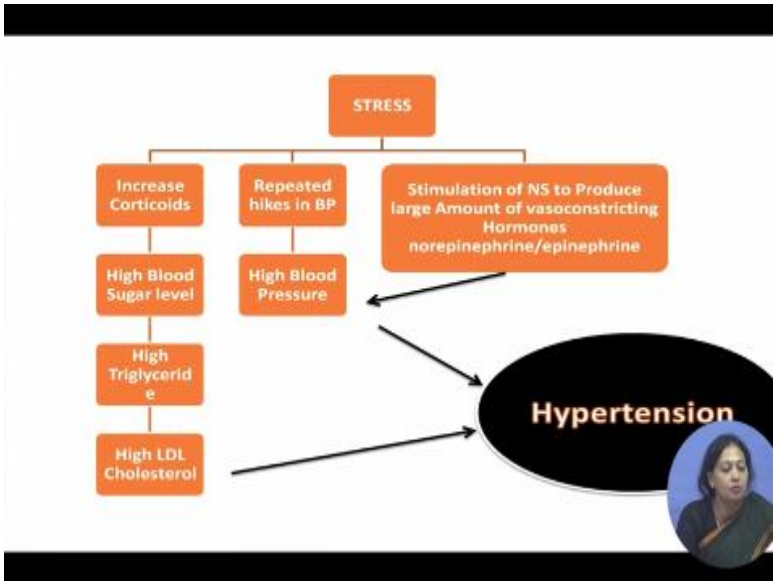

So the stimulation of the nervous system produces several vasoconstrictor hormones or in this case non epinephrine and epinephrine which actually increases the blood pressure, now all these you must remember that if I actually cover this up all these actually help for the body to respond to an immediate stressful situation but what happens is what we are discussing is actually chronic stress where there is a deregulations of the body secretions in this case the hormones okay, and neurotransmitters what actually happens is that is not being used apply the body in chronic stress.

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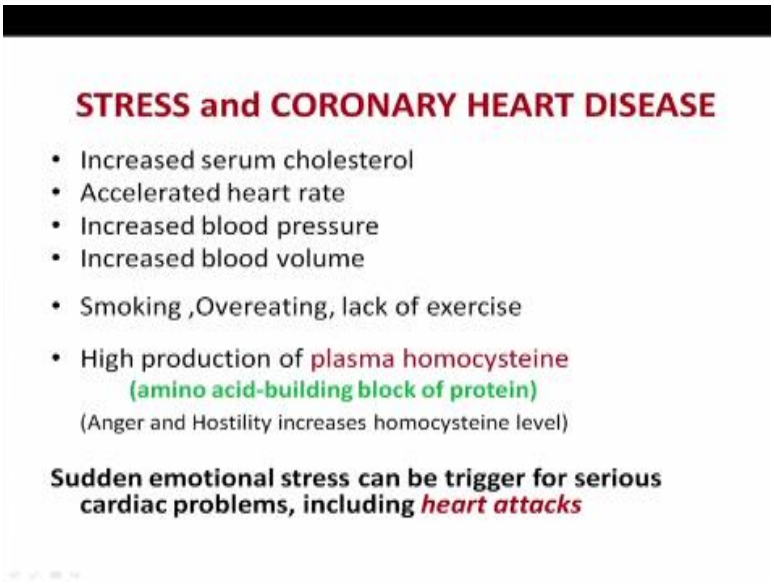

So the fatigue sets in we spoke about adrenal fatigue in the previous section so fatigue sets in and then thereby we have several other illness conditions. In this case hypertension is a result of chronic stress or is exacerbated by chronic stress and that brings us to coronary heart disease now all these other if you see coronary heart disease shows increased serum cholesterol so in this case actually LDL or low density lipoprotein or the bad cholesterol accelerated heart rate increased blood pressure, increased blood volume. Now if you see this we are actually talking of these and this and this high triglyceride and high cholesterol levels they are also not only related to hypertension, but these three are related to coronary heart disease.

Now what causes on what exacerbates the symptoms of coronary heart disease smoking, overeating and lack of exercise. Now high production of also plasma homocysteine or this is actually an amino acid that is a link block of protein, this is increased during stress what happens is anger and hostility during increases during a stressful situation and these increase the homocysteine level so sudden several times sudden emotional stress can be the trigger for serious cardiac problems including heart attacks. Now it is not like it's shown in the movie several times many Indian movies will show that there is a sudden stressful condition and that is bringing on

the heart attack in an elderly family member not usually is it like this but definitely aggravated stressful conditions and in fact even increased acute stress may trigger a half.

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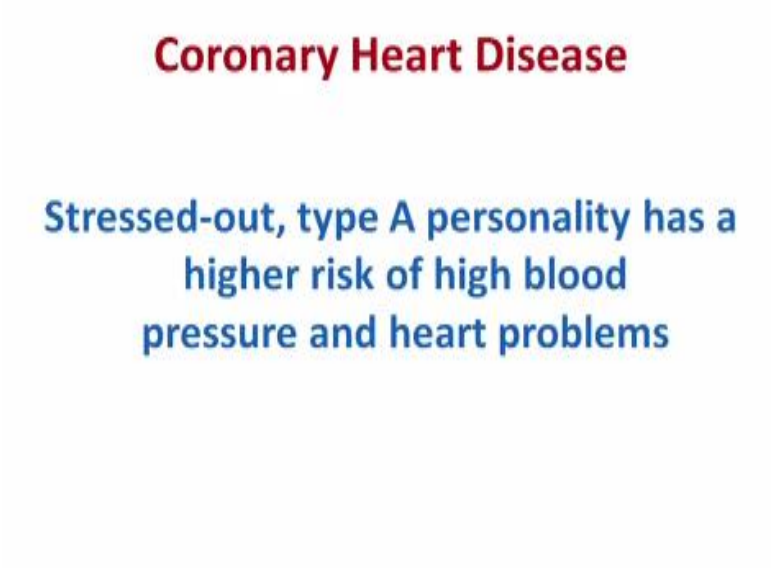

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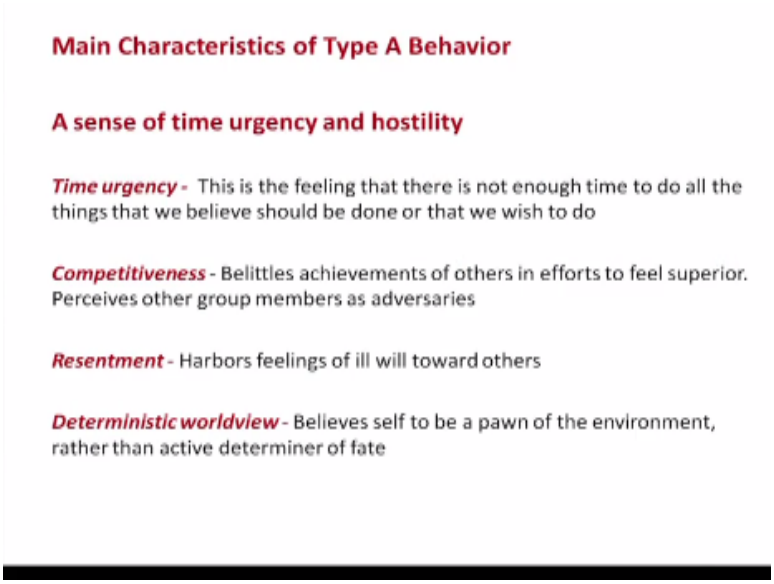

Now it is as we have mentioned this earlier when we were talking about personality and stress and it is seen that stressed out type-a personality has a higher risk of high blood pressure and heart problems and just to refresh your memory once we will see what type a personality is like the type a personality has a sense of time and sense of time urgency and hostility.

So they feel that there is very less time to finish the work there is excessive competitiveness to complete the work and do it better than others and belittle achievement of others, resentment is very often present in type-a personalities because of competitiveness and for somebody else going ahead of that individual very often there is a deterministic world view of I know what's right and it was also believed that I the individual is a pawn of the environment and not is not an active determiner of conditions.

So there is a sense of lack of control of condition so it's more like fate giving and giving things to me. So there is a short-term perspective so, focus on social interaction social relationships is not much as it is to reaching goals, so it is very target oriented there's a severe high level of impatience and of course the good things about a type-a personality is perfectionism punctuality and critical attitude. Now these if you see may help a person to go ahead with life so, actually

help person be successful because of the focus in work because of the punctuality and perfectionism over critical attitude, but think about the individual what the individual is going through?

So it causes excessive stress to the individual to always compete against himself and also against with others to reach a goal and again then the goal does not end there it starts to another set of rules so, imagine how the body how the cardiovascular system is responding to the stressful situations in such a case.

Now coming to stroke, stroke is a lack of oxygen in the brain resulting from a blockage or rupture of one of the arteries suppliant depending on the exact location of the brain, brain tissue dying from this lack of oxygen and the amount of time the oxygen was denied paralysis or speech impairment or several other cognitive impairments may occur.

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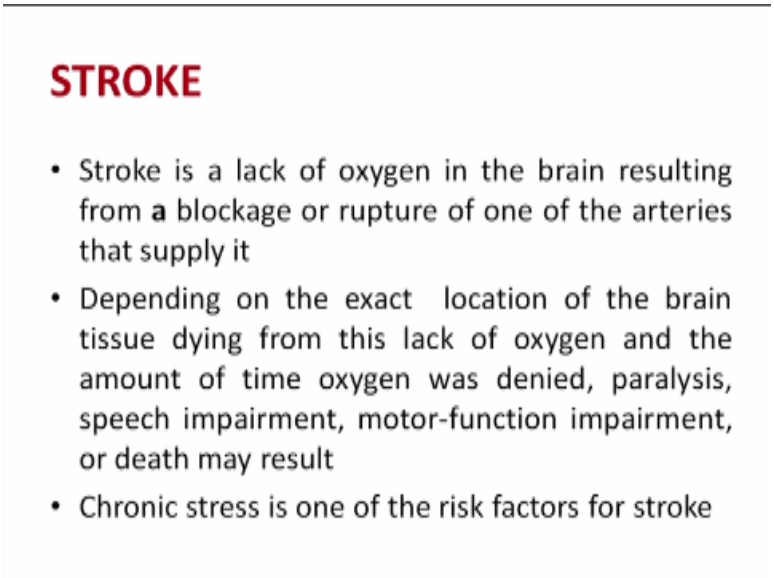

Now chronic stress is one of the risk factors of stroke so very often people who have had who had her stroke are told the family members are told not to give that individual more tension not to keep him happy and keep him away far from stressful situations. Now please remember this

that we are talking of several diseases but that does not mean that stress causes diseases, most often than not they exacerbate the symptoms of the disease. So please do not get very anxious do not get stress out about the situation that well there are so many diseases I may have if I am having stress.

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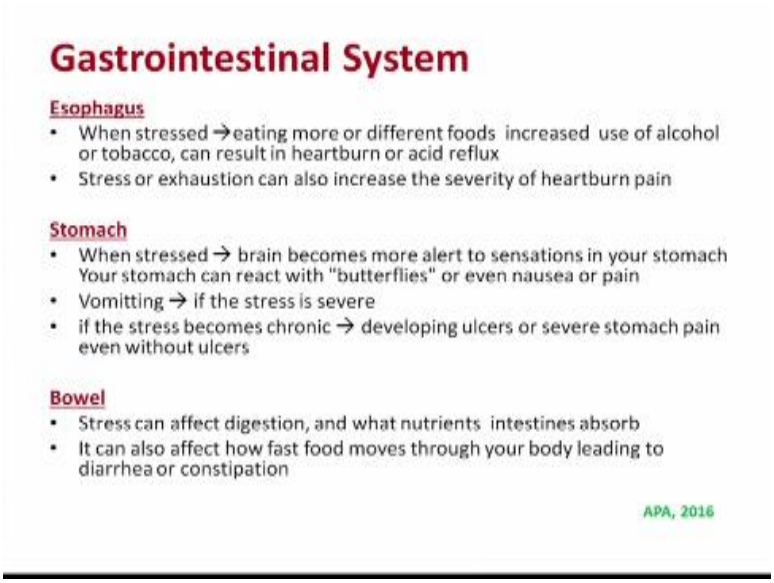

We are just talking of the several systems and how stress affects them so this brings us to the gastrointestinal system and what happens to the esophagus when stressed so when eating more or different fruits many times, we rush through it or where there is when we are taking in more of alcohol or tobacco it may result in a reflux or heart burn, stress or exhaustion can also increase the severity of the heartburn pain and many often stressful individuals think that they are actually undergoing a heart attack which is not so.

Stomach so when stress the brain becomes more alert to sensations of the stomach and the stomach may have butterflies or even nausea or pain several times the vomiting there is vomiting and, if there is increased vomiting that also vomiting if there is increased stress vomiting may also increase stress becomes chronic ulcers may develop we spoke about this earlier so, what happens during a stressful situation is the digestive system is not functioning because it is a

parasympathetic activity and there is a largest the secretion of the acids, actually cause perforations of the stomach walls.

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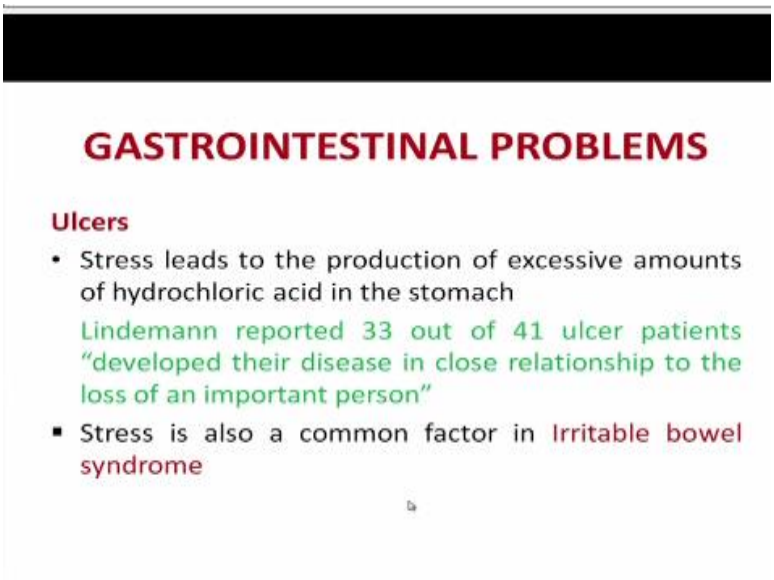

So these are the causes of ulcers so these ulcers, peptic ulcers are very very highly related to a stress, stressful situation and how we actually perceive stress. The bowels: stress can affect digestion and what nutrients the intestines absorb and it can also affect how fast food moves through the body so several times it will lead to constipation or diarrhea. We spoke about ulcers and one more important factor being IBS or irritable bowel syndrome. In irritable bowel syndrome is very, very related to stress chronic stress and also the personality characteristics of the individual.

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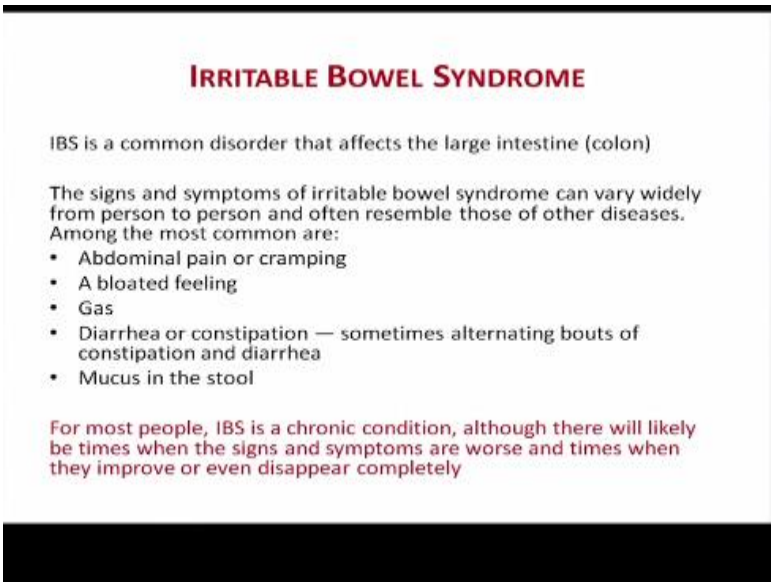

So stressful individuals very often suffer from abdominal pain or cramps bloated feeling gas, it's a very common problem amongst Indians and many times you will often hear that any problem during a stressful situation is attributed to gas building up in the body. So diarrhea or constipation and mucus in the stool so most for most people IBS is a chronic condition although there will be likely times when the signs and symptoms are worse and times when they improve or even disappear completely.

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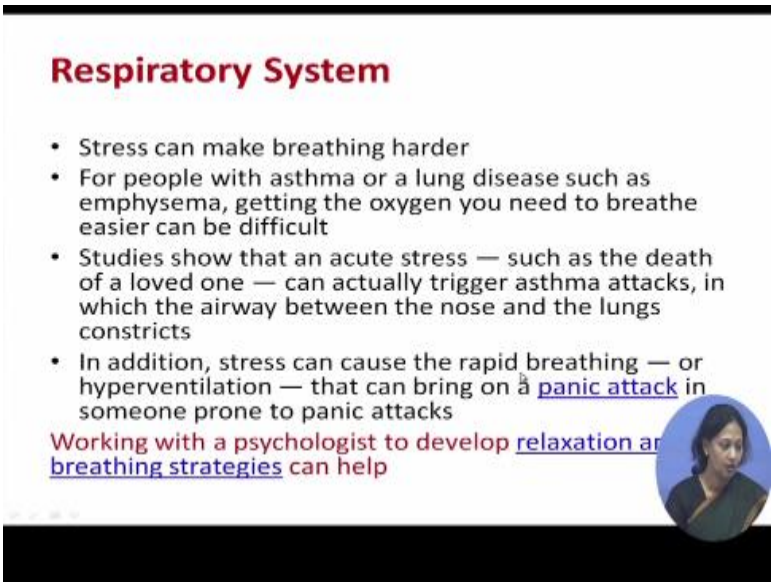

A respiratory system, in the respiratory system what happens is say with people with asthma or a lung disease the breathing becomes harder during a stressful situation so, the getting the oxygen you need to breathe that becomes harder and that can actually trigger more asthma attacks, wherein what happens during the asthma attacks is there is the airway between the nose and the lungs actually constricts and that brings about an excessive anxiety over not being able to breathe that is as abates symptoms of the attack further.

In addition several times due to stress there may be hyperventilation and hyperventilation, hyperventilation is something at well you are breathing in less amount of oxygen and breathing out more amount that can bring about a panic attack. We will talk about panic attacks in the next session that brings us to the endocrine system where we see that the how the endocrine system responds to the stress hormones during the HPA axis the inner stressful situation that may often lead to type 2 diabetes.

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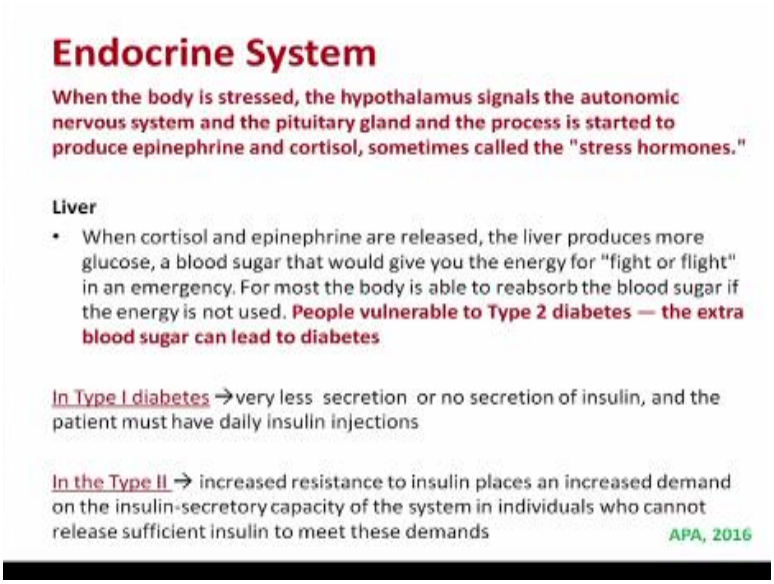

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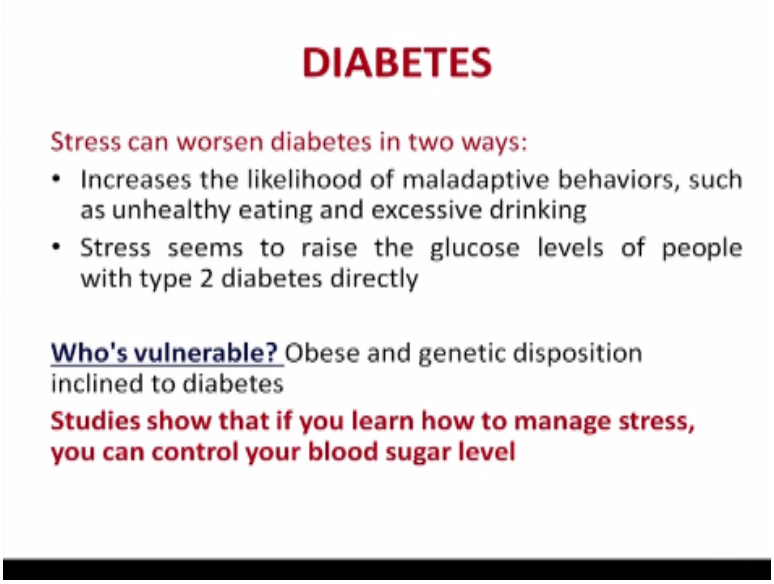

So what stress can worsen diabetes you must remember that diabetes is not caused by stress, but there is an increased likelihood of an increase of type 2 diabetes which is related to stress. Now who is vulnerable to diabetes? People who are people in a stressful situation people who are obese and have a genetic disposition to diabetes very often I have the probability of actually getting diabetes mellitus to type 2 and studies have shown that if you learn how to manage stress then you can also control your blood sugar level.

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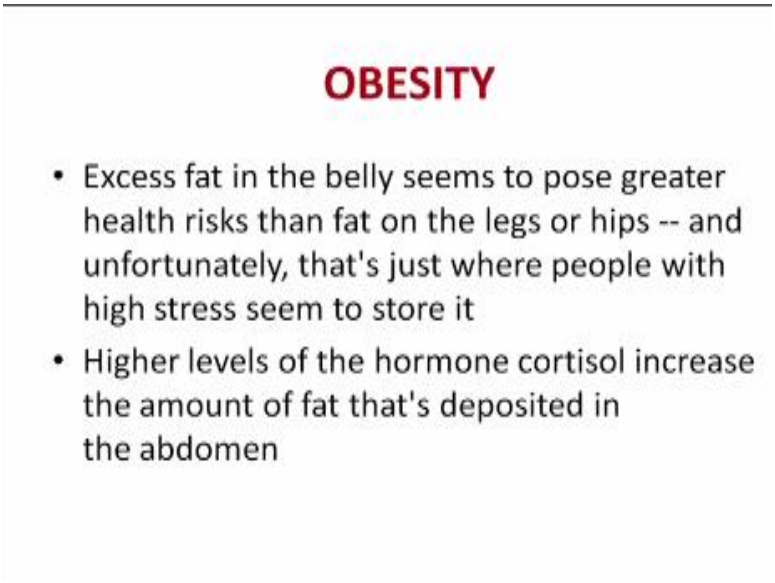

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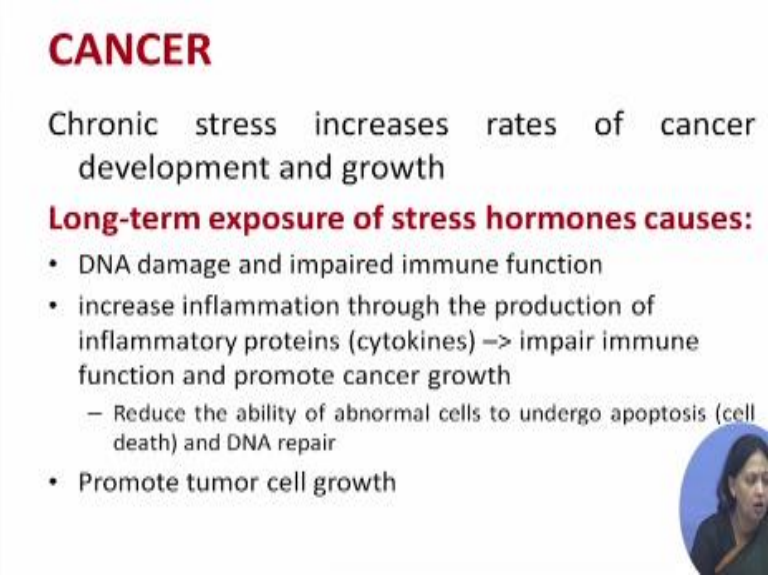

Obesity is also another problem that is related to stressful conditions several people often over eat when they are anxious and also the higher levels of hormone cortisol increase the amount of fact that is deposited in the abdomen and that seems to build on tires around the abdomen and increases obesity. Cancer is again another illness that is related to stressful conditions or it is aggravated during stress this is the one of the reasons being that the there is DNA damage and impaired immune or function immune function and there is an increased inflammation through the production of inflammatory proteins, that actually impairs immune for immune function and promotes cancer group.

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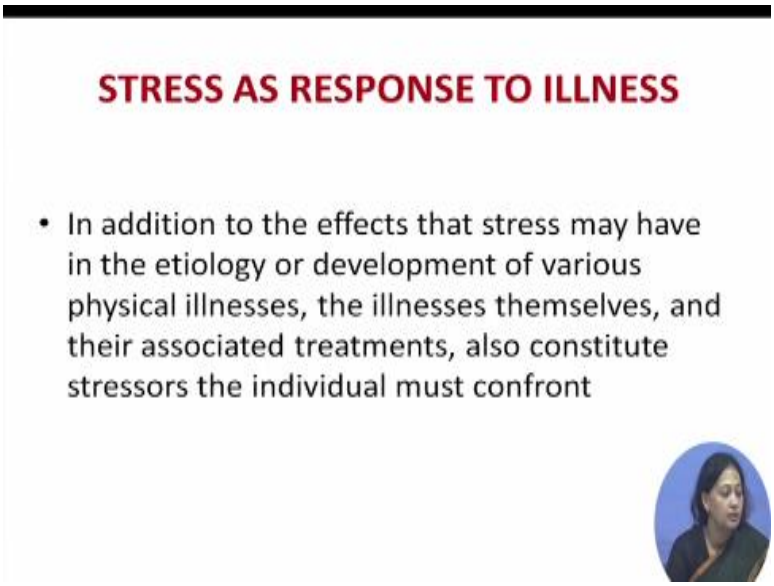

Also when the immune function is despaired impaired then it promotes tumor cell growth. Now coming to stress as a response to illness, several times it is seen that the effects that stress may have in the etiology or development of various physical illnesses, the illnesses themselves and their associated treatments also constitute as stressors.

So think about an individual who is suffering from cancer or is suffering from an autoimmune disorder like AIDS, what happens is the stressful condition or the illness itself may be a stressor for that individual and that may further aggravate the symptoms of the illness of the disease.

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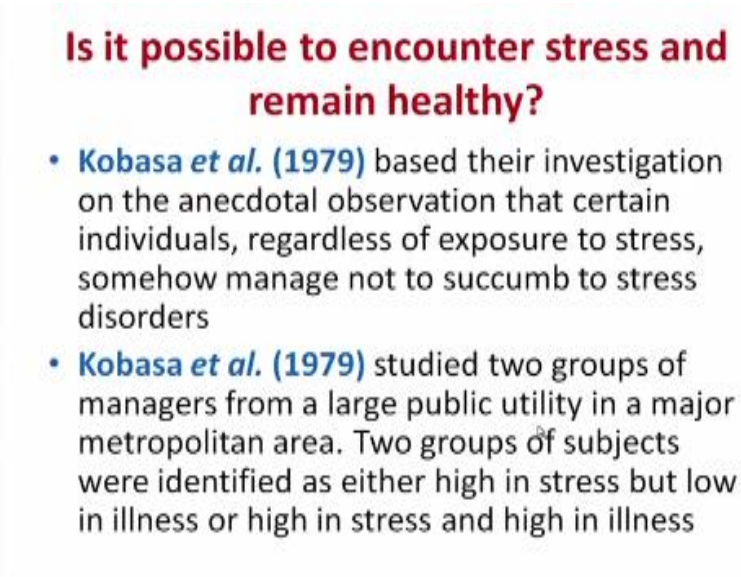

So stressors so can we actually is it possible to encounter stress and remain healthy definitely it is a study done by kobasa, had actually mentioned this earlier in one of the sessions kobasa and his colleagues in 1979 based their investigation on anecdotal observation, that certain individuals regardless to exposure to stress somehow managed not to succumb to stress disorders. How his he took actually managers and separated them into two groups who were identified as either high in stress but low in illness or high in stress and high in illness.

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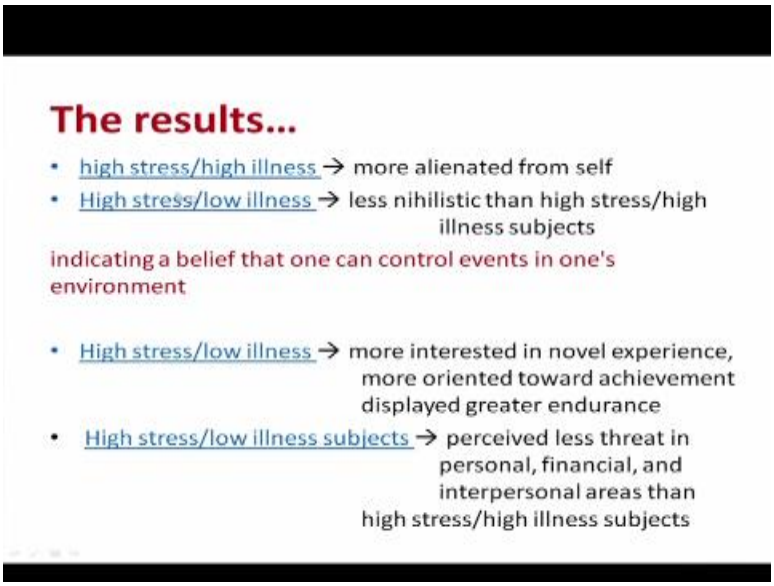

So it was seen that individuals who were high in highly stressed and high illness were more alienated from self and who are high in stress and low and illness were less nihilistic, so they do not think that everything is going to hand and they were not so hopeless about the world so there were more optimistic and positive so indicating this indicated a belief that one can control events in one's environment. So individuals who actually thought that the fate is not directing them towards certain ends but they can control their movements, their world actually do better.

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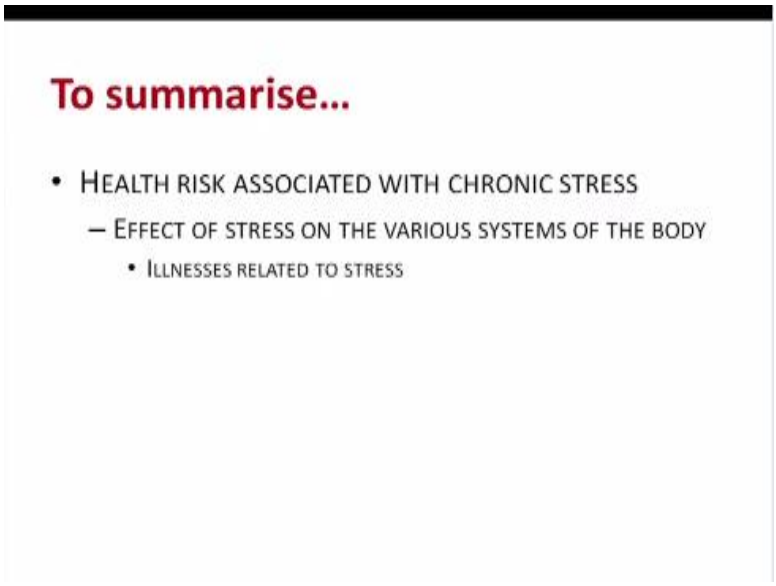

With individuals who had high stress and low illness they were and more interested in novel experience more oriented towards achievement displayed greater endurance and with high stress and low illness subjects it was seen, that they perceived less threat in personal financial and interpersonal areas than high stress high illness subjects. So we can actually see that the way the individual perceives a stressful situation also is attributes to the amount of illness that he succumbs to summarize today now we have discussed about different health base factors with a chronic stress and effect of stress on the various systems of the body and how these illnesses are related to stress. Thank you.