

How does chronic stress affect the body?

[Health & Medicine](#), [Stress](#)



Description of problem

Stress happens when an “ environmental, social, behavioural factor or combination of factors capable of inducing responses that... may be harmful to physical, mental, and/or emotional health by destabilising the neural, psychological, and/or endocrine equilibrium of the body. When the human body is exposed to stress, psychological, neurological, metabolic, and hormonal reactions are induced.” [Oxford University Press A Dictionary of Public Health, Ed. John M. Last © 2007]. It is when an individual’s needs surpass their coping ability. This gets worse when something poses as a danger. In evolutionary terms, the stress response is essential for fight or flight. This is when unnecessary bodily systems shut down in order to provide the most energy to the places that are needed to fight to run away such as the muscles. The stress response involves acute stress (triggered by sudden stressors) and chronic stress (an accumulation of stressors). Stress is a physiological response to what is known as a stressor (a stimulus).

Stress can be explained by the transactional model of stress.

This model that stress only depends on the individual’s perception of demands from themselves and their environment. Primary and secondary appraisal is used to describe this. There are two different types of personalities that affect this appraisal: Type A and Type B. [Nelson Thomas AQA Psychology A, James Bailey, Rosie McGinley, Julia Willerton and Jane Willson © 2008] A type A personality is someone who is very impatient, competitive and ambitious. These tend to have negative views on life and always think they can do better in their achievements. On the other hand,

Type B personalities are very laidback, easy going and relaxed in stressful situations. They usually have positive views on life and try to enjoy life to the full. [http://en.wikipedia.org/wiki/Type_A_and_Type_B_personality_theory#Type_A]

Primary appraisal is when the person looks at the situation and decides whether it is a threat or not. (Type A personalities would most likely see it as a threat whereas Type B would see it as a small hurdle) The secondary appraisal is when the person decides whether they are able to cope with the stressor or not. (Type A personalities would most likely say they are not able to cope, whereas Type B personalities would) If the primary appraisal outweighs the secondary appraisal, a state of stress will occur. This is an appropriate method as thoughts and feelings of an individual directly decide what effect happens on the body.

The body's response to stress happens in the nervous system. The autonomic nervous system (ANS) is a part of the peripheral nervous system. It is extremely important in maintaining homeostasis as the nerve impulses transmitted by neurons. There are two separate divisions of the ANS:

Sympathetic branch = this controls the arousal determined by stress. It can lead to a faster heart rate and an increase in the individual's blood pressure.

Parasympathetic branch = this carries out the opposite task to the sympathetic branch. It creates a state of physiological calm in the body.

<http://www.genericlook.com/anatomy/Autonomic-Nervous-System/>

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These two work together to create a state of homeostasis. This is appropriate as there are two different systems for opposite responses so that they can be activated when needed and deactivated when not needed. In stress, the hypothalamus (part of the diencephalon in the forebrain which controls processes such as the HPA and SAM) will trigger the sympathetic branch.

SAM stands for the Sympathetic Adrenal Medullary pathway. When the sympathetic branch is activated by the hypothalamus neurons, it causes the adrenal medulla to release hormones such as adrenaline and noradrenaline into the body's bloodstream. This affects the cardiac muscle. It constricts the blood vessels which in turn raises the blood pressure. This means that a higher concentration of oxygen is pumped around the body in order to prepare for extreme physical activity. This can be known as fight or flight; an evolutionary response that helps an individual's bodily system either have more strength to prepare for impact on whatever attacks them or to have the energy to run away from the predator. This process is used in short term stress. This is appropriate for short term stress as the SAM can easily be deactivated and the concentration of these hormones can be decreased rapidly. It does not cause harm to the body which is what should happen if something is short term.

HPA stands for Hypothalamic Pituitary Adrenocortical axis. The pituitary gland once activated by the hypothalamus, will release a hormone known as ACTH. This travels to the adrenal cortex and causes it to release a corticosteroid e. g. cortisol. This can have an impact on the immune system. This process is used in long term stress.

It is the HPA that is most harmful to the body. Long periods of this stress or chronic stress, can wear out the individuals defence mechanism and hinder its ability to keep circulating the necessary hormones around the body in the bloodstream.

<http://www.montana.edu/wwwai/imsd/alcohol/Vanessa/vwhpa.htm>

Increased cardiac activity such as heart rate and blood pressure can cause damage to the endothelial layer of the blood vessels. Blood levels of glucose and free fatty acids stay high and can lead to atherosclerosis. This is when a cholesterol plaque begins to form on the inner lining of the vessels. The white blood cells and platelets that attempt to heal the damage actually end up forming an atheroma. If this completely blocks an artery it can cause a myocardial infarction (a heart attack).

It has been proven that stress affects the immune system. It causes a deficiency in its effectiveness and so the individual may be more prone to illness and disease. Stress is a biological problem because it is having an enormous effect on people in every day life. The body is not evolved for such long periods of stress and therefore biologists need to find a solution for it as soon as possible.

Main solution

The main solution to this problem is the use of drugs. These are used to combat the feelings and emotions an individual feels when put under stress. An example is Benzodiazepines. Some of these are anti-anxiety pills and others are sleeping pills. They act in the brain to slow down the activity of

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the central nervous system (CNS). These drugs enhance the activity of the body's own anxiety-releasing drug GABA (a natural anxiety-reducing drug) causing relaxation and reducing serotonin activity (serotonin is a neurotransmitter that has an arousing effect) and thus reducing anxiety. This inhibits the release of noradrenaline.

[Lippincott Williams & Wilkins Drug Therapy in Nursing, Diane S. Aschenbrenner, Samantha J. Venable © 2008]

The above table shows the chemicals and their necessary concentrations that combat the effects of chronic stress.

<http://www.flyfishingdevon.co.uk/salmon/year2/psy221anxiety/psy221anxiety.htm>

This diagram shows the effectiveness of benzodiazepines. As you can see, within the first four weeks it instantly gives a reduction in the feeling of stress compared with another drug buspirone. The drawback is shown at the right-hand side of the diagram: The withdrawal period increases stress for a short period of time before finally reaching the end of its cycle with a decrease in the feeling of anxiety.

http://www.flyfishingdevon.co.uk/salmon/year2/psy221anxiety/psy221anxiety.htm#BDP_GABA_modulin

This is appropriate for almost anyone as they are very effective in combating the effects of chronic stress (as shown in the diagram "Effect of clorazepate (a benzodiazepine) & buspirone on anxiety during treatment and

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withdrawal”). They are also easy to use and easy to access from a GP. However, they are only appropriate for times when the stressor is not consistent. For example, if the stressor (like exams) were only there for a certain amount of time, a patient could take the drugs and when the exams were over, they could stop taking the drugs and not resort back to being stressed. If it was caused by stress of a new promotion at work, the patient could not take the drugs for an unlimited time as the stressor would not go away and therefore the patient might start to depend on them.

Implications of main solution

Economic = Drugs to combat the effects of stress and anxiety can be very expensive. Prolonged use of drugs such as benzodiazepines and beta blockers make the expense rapidly add up. Extensive use may set you back a large amount of your income. Because of this, it may be a good idea to try another form of combating stress prior to resorting to drugs. If accessed free from the NHS, this uses their money which is not good for society as a whole as it uses the government’s money and may be at the expense of quality NHS services for others. There is an advantage of this implication as the money is being spent for a good use that will help change someone’s stress level, but GP’s will have to be careful that they prescribe the drugs for the right patients and not unnecessarily prescribe it as this is a waste of money.

Social = It is very easy to get addicted to the anti-anxiety drugs. They are not seen as being in the same category as street drugs such as heroin and cocaine, and therefore the individual may fail to see the drug as a possible threat for addiction. This may mean that if the individual views taking the

drugs as necessary, they fail to control their use. They could rely heavily on them and not be able to stop taking them when the stress effects disappear. They tend to have a tranquilising effect and this state encourages individuals to realise that they cannot be sentenced to stress after taking the drugs. It is very hard, once addicted, to wean yourself off them. Withdrawal symptoms are likely to be present. Even low-dose benzodiazepines (which are relatively safe in comparison with other anti-anxiety drugs such as beta-blockers) can lead to withdrawal symptoms, known as benzodiazepines withdrawal syndrome. This includes insomnia, muscle spasms, blurred vision, chest pain, fatigue, paranoia, nausea and OCD (obsessive compulsive disorder). This is why those who prescribe them limit their use to just two weeks as they do not want to patient to reach this level.

Benefits and risks to humans

The drugs act extremely quickly and can save lives in extreme cases of hypertension caused by stress. They are very effective and tests have proven that the drugs work. Outcomes are used as proof for this. They are very easy to use and do not take much effort from the user. It doesn't take any time, whereas professional help may take months or even years. The user does not need to motivate them to change their perception. They can still think the way they choose to but will be relieved from the effects of stress. Other solutions may require the individual to work hard at changing their life.

However, the drugs may cause paradoxical symptoms [FolensThe Complete Companion: Psychology AS, Mike Cardwell and Cara Flanagan © 2008] like

an increase in mood swings such as aggressiveness or cognitive side effects such as long term memory impairment. There can also be fatigue and a feeling of sedation from the tranquiliser effect. The drugs can lead to a state of physiological dependence or addiction. This presents withdrawal symptoms on the individual and the feeling that they cannot stop their usage. This can be extremely dangerous if ignored.

<http://prescriptionworld.org/wp-content/uploads/2010/11/1290556839-66.gif>

The diagram above shows the comparison of harm gained from taking benzodiazepines in comparison with other drugs such as heroin and solvents. It is a class C drug with is harmful but not life threatening. However, benzodiazepines are positioned 1.7 out of 3 on the mean harm rating scale. This compared with 1.1 of ecstasy (a class A drug) just shows us how harmful they can be to health.

Drugs will only treat the symptoms of stress and anxiety rather than the actual causes. This could mean that as soon as the course of drugs is finished, the stress could reappear just as bad as it was previously. This means it is only a temporary solution because as soon as the treatment is over the effectiveness stops. Psychological help combined with the drugs may be the best option as the drugs give instant help and the psychological methods may aid in long term recovery.

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Alternative solution 1

Another way to combat stress could be with help from a psychologist to alter your personality to more of a Type B. This, in turn, aids perception of being able to cope with the stress.

MethodDescription

Active copingTaking direct action to deal with a problem

Seeking instrumental supportTalking to others about the problem, looking for practical advice and support

Seeking emotional supportDiscussing feelings about a problem with friends andfamily

Focus on and venting of emotionsBecoming upset and expressing feelings when distressed

HumourLaughing and making fun of the situation.

[Nelson ThomasAQA Psychology A, James Bailey, Rosie McGinley, Julia Willerton and Jane Willson © 2008]

The table above shows a series of methods introduced by a psychologist to reduce the effects of stress. A psychologist may highlight the difference between personality types. Type A personalities will use avoidant coping (cope with the stress by ignoring it and hoping it will go away and are in denial of it as a problem and therefore use no methods to deal with it) and emotion focused coping (cope with the stress by trying to get rid of the emotions), whereas Type B personalities will use approach coping (cope with stress by tackling it head on to reduce it more it develops into a worse problem) and problem focused coping (cope with stress by trying to reduce

the problem in their lives that is causing the stress to prevent any stress appearing from it).

Another method that is used is stress inoculation training. It alters our image of the things that cause us stress. It involves three stages:

Conceptualisation phase: the individual is educated from a psychologist to view stressors as not a threat, but rather a challenge that can easily be overcome. This changes the person's concept of stress.

Skills acquisition phase: specialist skills are taught and adapted to each client's individual situation. For example, a businessman who is struggling to meet deadlines may be taught time management skills, whereas a new mother who is struggling with knowing how to manage a newborn child may receive advice on social support systems.

Application phase: The individuals are given opportunities to be in real-life situations and apply their newfound knowledge. The psychologist will place the client in increasingly stressful situations until they feel they can apply their skills to anything. [Folens The Complete Companion: Psychology AS, Mike Cardwell and Cara Flanagan © 2008]

This method is appropriate for individuals who have long-term stressors and need to learn to perceive those stressors in certain ways and they will never go away. It is unsuitable, however, if the individual is not motivated as it requires a lot of determination for the procedure to work.

Alternative solution 2

This is relieving stress by physical activity. Chronic stress may cause an increased level of glucose and a higher concentration of free fatty acids in

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the bloodstream. This can cause atherosclerosis. Regular cardiovascular exercise will decrease heart rate and also blood pressure. This prevents any chance of an atheroma being formed. Even though the stress will still occur, the lower cardiac rates mean that the impact of stress will not be as harmful as it will already be lower than it should be before it affects the body.

Exercise has mental and psychological effects such as boosted self esteem and happiness. Therefore, it will reduce the chances of clinical states such as depression happening. The positive moods that take place indirectly from exercising will help in coping with stress.

This may be more appropriate for individuals under stress as it is self inflicted and doesn't cost anything. This means it has no economical implications. It may also have positive social implications as exercise is sociable, which could in turn reduce stress effects.

Bibliography

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Bias = the author is a Professor of Epidemiology and Community Medicine from the University of Ottawa. As he is a professor at a top university in America, he is likely to know the true facts about matters relating to health. He should not be biased.

Reliability = the same information is found when I cross-referenced with a stress website [http://stress.about.com/od/understandingstress/u/effects_of_stress.htm] because I found similar information in another source, I can state that the information from this dictionary is consistent and therefore reliable.

Accuracy/Validity = It has been peer reviewed by Dowdy's: " This book covers a unique balance of the most significant terms and phrases as well as specialized vocabulary related to the issues and trends in the multidisciplinary nature of public health. Recommended...for largeacademiclibraries." The fact that it is recommended for public use implies that it is a very accurate source with little error.

http://en.wikipedia.org/wiki/Type_A_and_Type_B_personality_theory#Type_A Accessed 24th February 2011

Bias = It is unknown who the author of this text is as it can be edited by anyone who wants to make a change to the webpage. They may not have any link with the subject matter in hand. As the webpage I talking about personality types, it may be biased if the writer wants to try and fit themselves in one of the categories as they are writing.

Reliability = Similar information was found when I cross referenced from an article in the Guardian [Sarah Wilson Type A and B Personalities 7th March 2009], however, a newspaper article may not be fully correct either which tells me that although the ideas are consistent in both texts, they may not be 100% reliable.

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