

EARLY DETECTION OF LIFESTYLE DISEASE

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ABSTRACT

Shift work is unavoidable and roughly 15-20% of workers are estimated to work on shift schedules worldwide. On 2007, the International Agency for Research on Cancer (IARC) panel concluded that shift work that involves circadian disruption is probably carcinogenic in humans. The risk has become a growing concern of public health. Shift work could not be exterminated though, there are possible protective measures; such as a nap system during night work to modulate burden of night work, and breast cancer screening program among female shift workers for early detection of the disease. This report reviews current evidence on that risk and points out contentions for the risk communication.

Keywords: Healthcare, lifestyle disease, data mining, disease diagnosis

1. Introduction

Lifestyle diseases have risk factors that are comparable to prolonged exposure to three lifestyle behaviours - smoking, unhealthy diet and physical inactivity - and that lead to the development of chronic diseases such as heart diseases, diabetes, stroke, obesity, metabolic syndrome, and some types of cancer. Medical informatics is altering the present scenario of medical science industry. Every individual has its own way of living that he is patent in copying with their physical, psychosomatic, societal and monetary environments on a regular basis. With new innovations every day in a medical sector accompanied with the advancements, doctors are able to diagnose and cure the problem effectively. A disease [diagnostic system](#) in healthcare application must be trained through existing healthcare data. The data for training diagnostic system can be generated through different modes like screening, physical and clinical diagnosis. Lifestyle reflects a person's attitude, behaviour, eating habits, social, economic and moral values. It is a reflection of the person that they perceive and want to be perceived about themselves by society. The lifestyle of a person is very much affected by the genes, culture, society and the region in which he lives and grows. In general, there are two major pillars of lifestyle which are as follows Eating habits (intake of dietary, sugary products, alcohol consumption, smoking etc.) and Social/Economic behaviour (family background, social environment, economic conditions, employment, working conditions etc.). A vigorous or morbid lifestyle will most likely be diffused across generations in a society. Case study shows that a child is 27% likely to adopt his/her parent's lifestyle.

2. Techniques

The bad lifestyle (Sedentary, [laziness](#), alcohol, tobacco, smoking, [drug and narcotic overdose](#), oil, sugary products) of a person may leads to several human disorders (Cardiovascular, [diabetes](#), oral, ophthalmology, digestive) also known as lifestyle diseases. In adults, generally, the social and economic behaviour are responsible for commonly found lifestyle based diseases. The horrific lifestyle of an individual have significant role in [oral diseases](#) and thus an everlasting impact on ones life. Some of the major longevity diseases are given below:

• Cardiovascular	• Temporomandibular disorder
• Diabetes	• Ophthalmology
• Oral Cancer	• Glaucoma
• Gum disease	• Diabetic retinopathy
• Tingling	• Cataract
• Trauma	• Digestive System
• Bad breath	• Stomach cancer
• Stroke	• Autism

2.1 Data mining techniques

The concept of data mining has been originated from three different techniques viz. Statistics, Artificial Intelligence and Machine Learning. Several [heuristics](#) have been projected to perk up the competence of data mining process. Classification is a dominant [data mining technique](#). In general, classification is categorized as single or multi class. In single class, there is only one class label that has to be recognized. The elements that belong to the class are known as normal and rest of the elements are categorized as anomalies. The working principle of classification procedures is based upon training and [testing data sets](#).

2.2 Datasets used in disease diagnosis

A disease [diagnostic system](#) in healthcare application must be trained through existing healthcare data. The data for training diagnostic system can be generated through different modes like screening, physical and clinical diagnosis. This data can be represented in the form of text, numeric, sound, images and signals. For disease diagnostic system, initially, the data is required to train the system. The training data can be collected from hospitals, clinics, research centers and online repositories. It is difficult to collect data from hospitals and clinics. However, one can easily obtain required [data set](#) from online repositories. UCI (UC Irvine) is an imperative online repository that contains variety of data sets related to different domains. Some of the important multivariate and [Time-series](#) data related to lifestyle based human disorders are available on UCI repository.

2.3 Diabetes diagnosis using classification approaches

Diabetes is one of a silent killer disease. Some of contributing factors behind diabetes are lack of physical activities, sedentary problems and obesity. Billions of people across the world are affected by this so called modern society disease. An improper treatment of diabetes may further leads to lots of other physical problems and even death in some cases. In general, diabetes are divided into three categories viz. Type 1, Type 2 and [Gestational diabetes](#). Number of researchers has tried to develop prediction model to deal with this life threatening disease.

2.4 Diagnosis of heart problems using data mining approaches

Cardiovascular disease is a most precarious disease. There is a variety of circumstance that influences the heart of a person. As per WHO record, more than ten million casualties occur due to the heart related problems. Indian are significantly affected by this disease. The problem related to blood vessels, [coronary artery](#), abnormal heart rhythm and stroke are dominated heart related diseases. Data mining method or techniques has been used to predict the risk of cardiovascular disease so that one can detect it on early stage and have adequate treatment.

2.5 Role of data mining in examining other diseases

Beside diabetes and cardiovascular disease, there exist number of other problems that affects the life and system of a person. The remaining part of this sub-section depicts the role of data mining in diseases other than diabetes and cardiovascular.

3. Prevention of lifestyle Diseases

Prevention are activities that aim to lessen the disease or disorder affecting people. And these lifestyle diseases are really affecting the people and we need ways to prevent this disease. There are many things to blame like hectic schedule, overwork, smoking, obesity, sleepless nights etc. and honestly, keeping today's generation in mind some of these cannot be shaken away but as they say "Prevention is better than cure", we need to find preventions ways and these prevention methods are really basic and easy to follow in our daily life.

3.1 Right Decisions

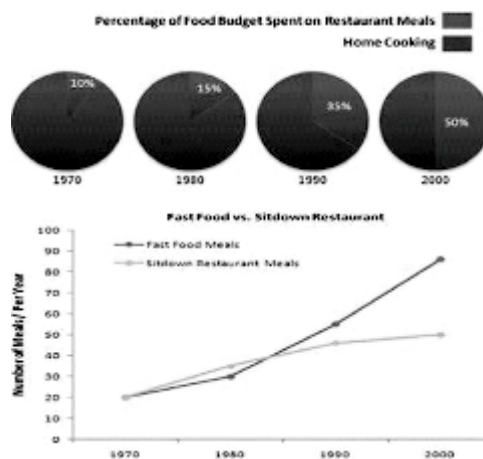
Lifestyle diseases could be prevented in early stages of life if parents set their child on correct path and urge them to make good and rational decisions regarding their lifestyle. The decisions we made in our childhood are the building blocks of our lifestyle. Those decisions will decide how one's future will lead. And if we choose true path for us then it will lead us to a secure and healthy future self.

3.2 Dietary Habits

People usually tend to suppress their sad and depressed feeling by eating. Eating is a way out for some people, it works but is also a very unhealthy option. Fast foods are the main reason for high cholesterol, hypertension and stroke and the chances of all this happening could be reduced if we control our dietary habits. And this could be done by

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- including dry fruits like almond and raisins in our diet
- cutting down on fatty foods
- avoid sodium-based diets
- adding fiber rich foods help



3.3 Maintain Weight

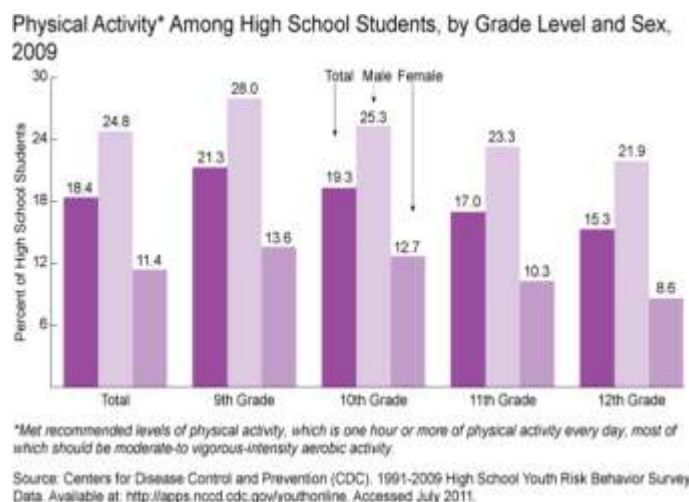
Almost every lifestyle disease can be linked with weight and obesity. Body fat gives birth to many diseases like stroke, heart failure, depression, and inferiority complex etc., so maintain weight is one of the best way to prevent from lifestyle diseases. Not only this but weight loss promotes a healthy and energetic lifestyle over the lifetime. It increases our mental and physical abilities and also engage in proper flow of bodily fluids and hormones throughout our body.

3.4 Quit smoking and drug use

Smoking the worst habit, one could have, it is the main and work-wide known reason for cancer, so quit smoking. And similarly quit drinking alcohol and any other drugs. They harm our body in ways one can't imagine. This habit is the main reason for the lifestyle diseases and it should be prevented altogether. One will feel much relaxed free of depression and insomnia after quitting it.

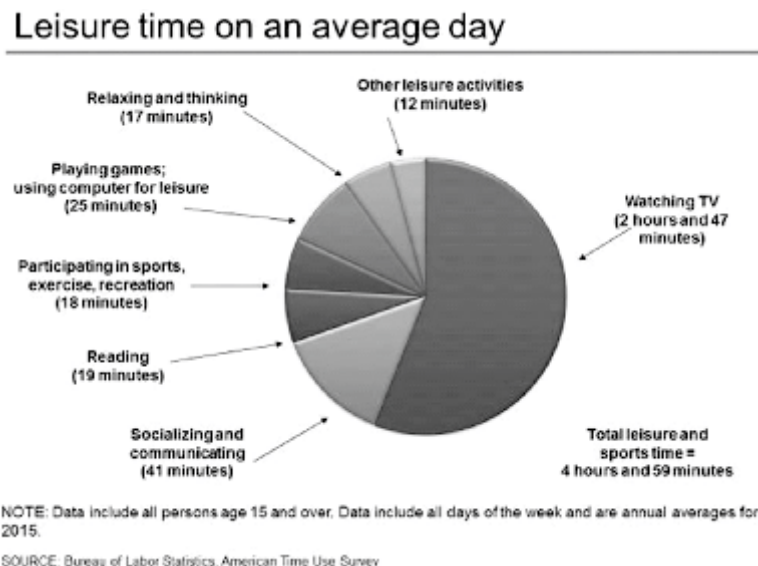
3.5 Workout and physical activities

With a proper diet it is mandatory to regularly do exercise and have a proper workout for the body to work perfectly. Regular exercise strengthens our immune system and prevents us from chronic and lifestyle diseases. It not only helps you burn calories but also improves your strength, stamina and endurance. So engaging in workout is the best option to prevent yourself from various life-threatening diseases. So do gym, cycling, running, swimming or anything else but engage yourself in a physical activity.



3.6 Take proper rest

Taking proper rest periodically and having a good 6-8 hours' sleep is mandatory and helps in preventing diseases like depression, anxiety, insomnia, etc. The quality of sleep directly affects the quality of one's waking life. It increases our mental health, productivity, emotional balance, creativity and physical vitality. It makes you feel refreshed and makes you ready to take on various hurdles and problems of daily life without any pressure on one's mind.



3.7 Regular check-ups

Last but not least, periodic check-ups are mandatory and a good way to prevent these lifestyle diseases. We have to take good care of our body- it is the place we love in. and periodic check- ups gives us a detailed report of our body's condition and our current health status. Moreover, it also gives us a heads up if there is any problem or sign of any disorder in our body, and with that we can take proper measures and have a proper diagnosis.

It is our body that we have to take care of, and we can help our body by taking correct measures to prevent lifestyle diseases but bringing above listed points in action.

4. Advantages And Need For Early Detection Of Lifestyle Diseases

The lifestyle diseases not only are a burden on one's family, his/her health but a whole level of another burden on the economy of nation. By choosing a healthy lifestyle one does not only help him, his family, his peers but the entire nation as he becomes productive, a contributor of the welfare and economy of the country. Some simple changes in the lifestyle contribute drastically.

The cost of healthcare continues to vastly outpace inflation in most major economies, and research shows that soaring medical expenses are largely driven by claims related to lifestyle choices, such as smoking, a lack of exercise and a poor diet.

Our modern lifestyles have an impact on our health – we're more stressed, we have easy access to sugars and fats, many of us smoke cigarettes or drink alcohol, and many of us don't exercise as part of our daily routines.

All of this contributes to an increased risk to our health, taking the form of very specific lifestyle diseases – specifically heart disease, stroke, diabetes, obesity, metabolic syndrome, chronic obstructive pulmonary disease, and some types of cancer.

Unsurprisingly there is more focus on the human costs of lifestyle diseases than the economic and financial impact, but according to studies by the World Health Organization (WHO), the negative burden of chronic illnesses can be highly significant.

Research has shown that economies with better health conditions enjoy a positive and direct impact on economic growth, largely through increased worker productivity. This is without considering the decreased cost of healthcare and precautionary measures

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The prevalence of subsequent lifestyle diseases in South Africa have become so overwhelming that local hospitals are too overburdened and under-resourced to cope and the poor education and lack of understanding of many patients has made preventive measures difficult.

Even medical scheme members who are most seriously at risk do not even consider the harm they are doing to themselves, and are probably unaware that their bad habits are not only costing them more in their health insurance but that it also contributes to a greater chance of lifestyle conditions.

5. Future Scope In Detection Techniques Of Lifestyle Diseases

The emerging wireless sensor technology offers the ability to continuously acquire, process and transmit the data required signals to a control station. This ability can be used for the real-time monitoring of cardiovascular patients, which will reduce the effects of heart diseases. Wireless sensor nodes have limited energy and memory.



This limitation can be minimized by integration of other wireless networking technologies in the current wireless sensor network such as smart watches and fitness trackers. Apple has already added a feature to perform an ECG test in its latest smart watch.

The most effective way to reduce the cancer deaths is to detect and prevent cancer diseases early. Imaging techniques such as mammography and CT scan play an important role in cancer detection and tracking.



As technology improves and scientists learn more about the development of cancer, screening tests are being developed to detect and diagnosis earlier and smaller cancers, even the cancers that may never be life threatening.

Smoking and alcohol abuse could lead to numerous diseases which are a threat to the health. Prevention of diseases associated with them is a necessary to live a healthy life. Medical tests that detects these habits should be made a compulsion for every citizen.

Smart watch or smart band technology can be an accurate, non-intrusive means for monitoring smoking behavior of a person. The use of sensors such as accelerometer combined with machine learning algorithms for passive detection of smoking sessions may enrich the environmental assessment protocols and smoking cessation intervention studies, which are often based on self-reported behaviors and may not facilitate targeted data collection and communication related to smoking events.

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In the future, your car might decide if you're capable of driving, or drunk, out of your mind and unable to drive. In future vehicles, there would be an alcohol detection technology. If the technology determines that you have been drinking, it may decide not to start the car at all. The program built into the car can detect in two ways whether the person behind the wheel is drunk beyond the legal limits. One is an alcohol tester, which is attached to the steering wheel and analyzes the breath of the driver. The other is a sensor on the ignition button, which similarly detects BAC levels using infrared light to sense the finger. In both cases, the engines of the vehicle are switched off when the driver is alcoholic.

If the abuse is detected then the patient should be made to get rid of it through awareness about its disadvantages and effects or even by visiting rehabilitation centers if it's too much of overdose.

Lack of physical activity and unhealthy diet also fall in the category of lifestyle diseases. Technology has been used to promote physical activity and change training behaviour. Pedometers, heart rate monitors and accelerometers have been used as a motivational tool for years. Newer technologies and approaches used to promote physical activity include geographic information systems (GIS), global positioning systems (GPS), interactive video games, and compelling technologies.

Awareness about importance of a good diet and regular physical activity should be spread amongst the citizens and the government should monitor the schools, colleges and even office workspaces and ensure that the people are being involved in physical tasks and getting proper time for meals. Free camps to teach activities such as meditation and yoga should also be conducted in these places.

In addition, effective public health measures would promote physical activity and improve health around the world. The challenge of promoting physical activity is as much the responsibility of governments as it is of people. However, individual action for physical activity is influenced by the environment, sports and leisure facilities and national policies. It requires coordination between many sectors such as health, sports, education and cultural policy, media and information, transport, urban planning, local government, and financial and economic planning. To this end, the World Health Organization (WHO) supports its member states with a nationwide, evidence-based support for the health, social and economic benefits of healthy lifestyles.

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