Biofeedback Based Correlation of Diabetic Subjects with TTH & CAD: A Statistical Digital Approach on Experimental Results

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Abstract:

Digital technology is modernizing healthcare. Large volumes of data refer to Big Data by digitising health information that can quickly be processed by machines. Digital Healthcare analysis is the ability to diagnose and suggest ways to reduce costs, provide quality patient care & outcomes, available 24/7, reach to patients located in vast distant geographical areas, and avert preventable diseases. Artificial intelligence also referred as AI, is an autonomous real time machine system in comparison to natural information analyzed by humans. Diabetes is a serious, under-reported, life-threatening disease, affecting millions of people of all ages, and researchers have identified it to be a major public health problem that is approaching epidemic proportions globally. The purpose of this study is to investigate diabetes analysis from CAD and other diseases using the latest advanced digital technologies to analyze information extracted from IoT and Big Data and Stress Correlation (TTH) on human health.

Keywords: *Machine Vision, Medical Imaging, Big Data, Internet of things (IoT), Artificial Intelligence (AI), Machine Learning (ML), Machine Intelligence in Healthcare, Diabetes, Types of Diabetes, Stress, Tension Type Headache(TTH).*

INTRODUCTION

Machine Vision

Machine Vision is the in which computer has the ability to display and use one or more video cameras, analog-to-digital (ADC), and digital signal processing (DSP). The obtained data is controlled by computer or robot. The scene of a machine is similar in complexity to speech recognition. Each visual sensitivity and resolution system has two important features.

- Sensitivity is the ability of a device to detect weaknesses in weak light or invisible wavelengths.
- Resolution is how much the device can differ between objects. In general, resolution tends to limit the field of view. The sensitivity depends on the transparency. All other factors remain constant, reducing sharpness sensitivity and reducing sensitivity resolution.

The human eye is sensitive to electromagnetic radiation in the 390-770 nm range. Video cameras are sensitive to a wide range of wavelengths. Some of the vision systems in this device work with infrared wavelengths, ultraviolet light or x-rays.

The sight requires a computer with an advanced processor. In detail, high-resolution cameras require large amounts of random access memory (RAM) and AI programming. Equipment venues are used in various medical and industrial applications.

Here's an example:
- Electronic component analysis
- Identify signature
- optical character recognition
- Handwriting recognition
- Finding Object
- pattern recognition
- Content inspection
- make money
- Medical image analysis

The term device often refers to industrial computer programs, but computer terms are often used to describe digital computers, data processing and any kind of technology for which some of them are recorded.

Components of Machine Vision System are different but in most cases there are many factors. These elements are as follows:

- Digital or analog camera to capture images
- Instruments for digitizing images like camera interfaces
- Processor

  When these three components are connected to the device, it is known as a smart camera. The car's visual system can be obtained from smart cameras equipped with the following add-ons.
- Input / output hardware
- Lens
- Light sources such as LED lights and halogen bulbs
- Image processing program
- Sensors to detect and access images
- Parts category

General Application
- Product inspection
- Visual inventory control and management of barcode reading, counting, interface store etc.
- The food and beverage industry uses automotive vision systems to monitor quality.
  In the medical field, machine vision systems are used in medical imaging and inspection methods.

Medical Imaging

Medical imaging refers to those techniques and processes that are used to treat images of different parts of the human body for diagnostic purposes and for the treatment of digital health. The term medical imaging includes various radiography methods.
- X-ray
- Fluorescence microscope
- Magnetic Resonance Imaging (MRI)
- Medical ultrasound or ultrasound
- Endoscopy
- Elastography
- Tactical imaging
- Thermograph

Medical photography and applied imaging techniques for positron emission tomography (PET)

Medical imaging involves measurement and recording techniques that not only generate images, but also data that is often displayed in charts and maps.

This includes electroencephalograms (EEGs), magnetoencephalography (MEGs), electrocardiograms (EKGs).

Medical Imaging Usage in Digital Health

Medical imaging is important for all medical settings and all levels of medicine. Medical imaging enables physicians to make more accurate diagnoses and appropriate treatment decisions. Without medical imaging, both diagnosis and treatment in digital health can't be very accurate at all levels.

Biomedical Image and Analysis

Biomedical imaging measures the human body at various scales (microscope, macroscope, etc.) (Martin et al., 2018). They are measured by various imaging methods (e.g. CT scanners, ultrasound devices etc) and physical properties of the human body (wireless density, x-ray turbidity etc). These images are interpreted by specialists (such as radiologists) to perform clinical work (such as diagnosis) and have a major impact on physician decisions.
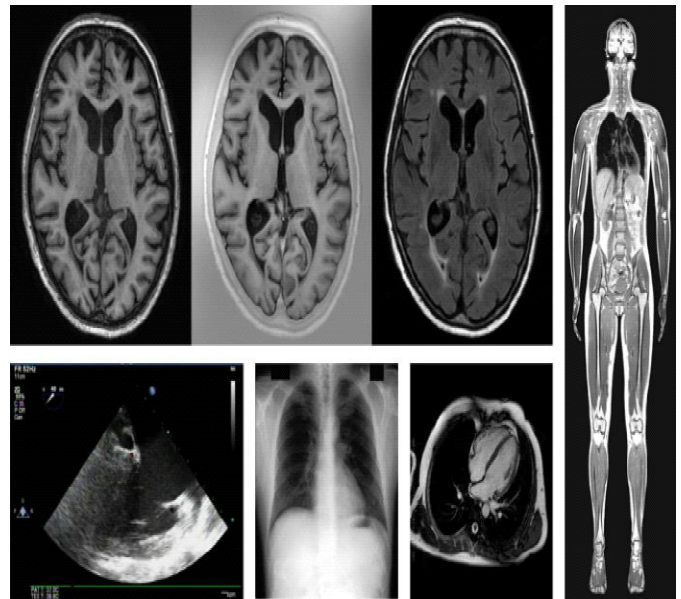

Figure1. Medical imaging example (upper left to lower right): MRI multiple brain distribution: T1 weight, reverse T1 recovery and FLAIR T2 channel; MRI total wrist; flat heart ultrasound; X-ray chest; MRI heart MRI(Martin et al., 2018)

Biomedical images are usually 3D images, sometimes with additional dimensions (4D) and / or multiple channels (4-5D) (e.g. multi-dimensional MR images). As a clinical protocol for stratification of image acquisition methods (e.g., patients on the back not bent), changes in biomedical images are very different from normal images (e.g., photographs). In the analysis, we intend to identify nuances (eg, some small areas show abnormal findings).

Big Data and IoT

As the name implies, Big data represents large amounts of data. But that's not all. In addition to quantity, IBM data scientists have recognized large data to show diversity, speed and accuracy.

Big data is the result of a variety of resources, including social media, transactions, organizational content, sensors, and mobile devices. I immediately point out that a large amount of data is being collected. Every 60 seconds, a 72-hour video is uploaded to YouTube, 216,000 posts are sent, and 204 million emails are sent. With confidence, the collected data should be in good time constantly updated in real time. Large-scale data analysis is of great value to companies and individuals that use it. (McAfee et al., 2012; Tsai et al., 2013)

On the other hand, the Internet of Things (IoT) transforms "things" into smart objects every day. Transport container with sensors that interconnect with the refrigerator, watch, thermostat, car, internet for data collection and transmission. This information, when combined with information from other sources and other large data above, can be large data(Murdoch et al., 2013; Tenhunen et al., 2015).

Artificial Intelligence (AI) and Machine Learning (ML)

Artificial Intelligence: The term AI includes two words: "Artificial" and "Intelligent." Artificial means human-made things and abnormalities, and intelligence means the ability to understand and think. There is a misconception that artificial intelligence is a system, but this is not a system.

AI runs on the system. AI has many definitions, but the definitions are as follows. So this is the intelligence that we want to add to them all the capabilities of the device, including humans(Gabbeet al., 2018;Chaturvedi et al., 2012).

MachineLearning: A learning device that can be learned without the device with its own explicit program. It is an AI application that allows the system to automatically learn and improve the experience. You can now combine the application inputs and outputs to create an application. A simple definition of machine learning is that "machine learning" learns from E's experience. If class work learners measured by P are improved by experience, then T classes and performance measures P.

Use of Machine Intelligence in Digital Healthcare
Here are the top 10 applications of machine learning in healthcare

- Learning care in the healthcare is one of the things that is seen in the gradual acceptance of the healthcare industry. Google has recently launched a machine learning algorithm to detect cancerous tumors in mammography, and Stanford researchers have used deep learning to identify skin cancer. The Learning Machine (ML) currently has various responsibilities in health management. ML helps healthcare analyze and analyze thousands of different data points, providing timely risk assessment, accurate resource allocation, and other applications.

- With the increasing use of autonomous learning in healthcare, it will be possible to support millions of patients in the future without data, analysis and innovation coming together. Soon it will spread to find ML-based programs that contain real-time patient data from multiple medical systems in multiple countries, which will increase the effectiveness of new treatment options. It was not available before(Kasper et al., 2015).

- Disease Identification and Diagnosis: One of the major ML programs in healthcare is diagnosing and diagnosing diseases that are otherwise difficult to diagnose. It can include anything from cancers that are difficult to obtain in the early stages and difficult to become other genetic conditions.

- Drug Discovery and Production: One of the clinical applications of machine learning is the early detection of drugs. It also includes R & D technologies such as next-generation sequencing and medical accuracy to help find alternatives to the treatment of multifactorial diseases.

- Currently, machine learning techniques include unmatched learning that can identify data patterns without prediction.

- Imaging medical detection: Machine learning and deep learning are both responsible for a groundbreaking technology called computer vision. The findings were approved by Microsoft for the Inner Eye initiative, which works with image recognition tools for image analysis. As car learning becomes more familiar and its explanatory ability increases, it is expected that more sources of diverse medical images that are part of this AI based diagnostic process will be seen.

- There are many lesions, cancers, etc that can't be simplified using complex equations. ML-based algorithms are used in various instances in the hand, making it easy to find and find variables. The most common applications of ML in medical image analysis is to classify objects such as lesions into categories such as normal or abnormal, lesions or non-lesions(Tenhunenet al., 2015).

Use of Digital Healthcare to Diagnose and Cure Diseases Using Big Data and IoT
The main problem is that all patients, especially in remote areas, can't receive medical treatment or

treatment in critical situations. It has had unpleasant consequences for people with regard to hospital and doctor services. Today, these problems are mostly solved by using new technologies that use IoT devices to monitor healthcare.

- Health Tracking: Massive Data and Analytics beyond the Internet (IoT) is a revolution that can track user statistics and information. In addition to helpless feet that can help the patient sleep, heart rate, exercise, gait etc, there are new medical innovations that can control the patient's blood pressure, pulse oximeter, glucose monitor etc.
- Cost savings: Large amounts of data are the best way to save the cost of hospitals that are more or less of this book. Predictive analytics helps solve this problem by helping to predict admission rates and assigning employees. This reduces hospital investment and actually helps maximize the investment potential. The insurance industry can prevent patients from being hospitalized by securing hygienic trackers in wearables. (Plant et al., 2018; Felmanet al., 2016)
- Higher Risk Support: If all hospital records are digitized, this is complete information that you can understand about many patient patterns. Return these patients to the hospital to identify their chronic problems. Such understanding will help to provide better care for such professionals and insights to rectify corrective actions to reduce their frequent visits. This is a great way to maintain a list of at-risk patients and provide them with professional care.

Diabetes and it's Types

Diabetes (DM) has been identified as a series of pancreas due to insulin cleansing and / or abnormal exercise. Due to insulin deficiency, blood sugar levels increase and hyperglycemia is caused by carbohydrate, fat and protein. DM, who has affected over 200 one million people worldwide. The possibility of diabetes is expected to increase in the following few years. DM can be split into many different characters. Yet, according to the disease(Brazier et al., 2018).

There are two main types of clinics, type-1 diabetes (T1D) and type-2 diabetes (T-2D). The most common form of T2D diabetes is considered 95% of all diabetes patients, mainly due to insulin resistance T2D, lifestyle factors, physical activity, dietary habits and congenital heart disease (Rastogiet al., 2018). Due to the devastation of the T1D effective system, it is visible from planarians, pancreases beta cells intestlezes. T1D affects about 10% of diabetes patients worldwide, 10% of which eventually develop Idiopathic diabetes.

Gestational diabetes, endocrine disorders, type-2 diabetes mellitus, neuritis, mitochondria, and pregnancy are based on the specifications of other types of DM and the onset of insulin hygiene.

Complications

The long-term complications of diabetes gradually increase. The more diabetes, less glycemic control, the risk of more complications, the complications of diabetes are also safe. Potential complications are:

- Cardiovascular Disease: Diabetes increases the risk of cardiovascular attacks such as chest pain (angina), heart attack, stroke and arterial stenosis (atherosclerosis), such as coronary artery disease.If you have diabetes, you may experience heart disease or stroke.
- Neuropathy (extra sugar content): This can strengthen the walls of small blood vessels (capillaries) especially on the leg.
- There is a risk of burning, numbness, burning or pain. It usually starts with your finger and spreads slowly. If left untreated, you can lose all your organs.
- Damage to the gastrointestinal tract can cause nausea, vomiting, diarrhea or constipation. For men, this can lead to erectile dysfunction.
- Kidney disease (nephropathy): There are millions of brightly colored mass (glomeruli) in the kidney, which filter the blood. Diabetes can damage this delicate filtration system. Serious injury can lead to kidney failure or irreversible kidney disease, which may require dialysis or kidney transplantation.
- Eye damage (retinopathy): Diabetes damage the retinal blood vessels (diabetic retinopathy) and cause blindness. Disease increases the risk of developing physical conditions such as cataracts and glaucoma. Because untreated residues are reduced and vaccinated, rarely the treatment of serious infections occurs. After all, these are infectious breaks.
- Skin condition: Due to skin problems including bacterial and fungal infections, diabetes can occur.
- Deafness: Deafness in people with diabetes is more common.
- Alzheimer's disease: Type 2 diabetes can increase the risk of dementia such as Alzheimer's disease. Your blood glucose control is weak, it seems more dangerous. Although there are many ways in which these anomalies can be related, there is no evidence to show them.
- Depression: Symptoms of depression are common among people with type 1 and 2 diabetes. Depression can affect diabetes management (Masiset al., 2019).

- Pregnancy diabetes complications: Most women suffering from gestational diabetes have a healthy baby. However, losing control or decreasing blood sugar can be a problem for you and your baby.
- The complications of the child can be due to pregnancy associated with diabetes.
- Hypertrophy: excessive glucose can pass through the placenta. This will make your child very big Very large babies may need to be born (Vyas et al., 2018).
- Hypoglycemia: Children with gestational diabetes can develop glucose (hypoglycemia) after birth due to high insulin production. Fast feeding and sometimes intravenous glucose solutions can restore blood sugar level of the normal child.
- Type 2 diabetes: The mother of gestational diabetes is at risk of obesity and type 2 diabetes.
- Gestational diabetes can cause the death of the child before and after birth.

Diabetes and Headache

Not everyone diabetic will experience a headache. Those who have recently been diagnosed with diabetes tend to have headaches because they are still trying to control their blood sugar and use a diet.

For people with diabetes, headaches are usually due to changes in blood sugar levels.

A headache can indicate that your blood sugar is high, and your doctor calls it hyperglycemia. Instead, blood sugar levels may be very low, a doctor called it hypoglycemia. Changes in blood sugar levels are more likely to cause headaches for diabetics. (Cancer Research U.K., 2019; Abdelhamidet al., 2014)

Obesity

Obesity is a medical condition that affects health if an individual increases body fat or overweight. Doctors usually indicate that obese people are obese.

Body Mass Index (BMI) is a device used by physicians to assess whether a person is eligible for weight, age, or height. The combination of average and weight is between 25 and 29.9, and BMI indicates that the person is overweight. More than 30 BMIs indicate that a person may be suffering from obesity.

Eating too much or exercising these foods can increase weight and cause obesity.People who use a diet that uses primarily whole grains, water fruit & vegetables, are also at risk of being overweight.
However, while maintaining a healthy weight, they are exposed to more diverse diets. Fresh foods and beans contain fiber, which can make others feel better and promote healthy digestion (Saini et al., 2018).

Coronary Artery Disease (CAD)

If coronary artery disease is too limited, cardiovascular disease (CHD) or coronary artery disease will progress. Coronary arteries are blood vessels that carry oxygen and blood to the heart.

CHD produces cholesterol in the arterial wall. These plaques cause arterial stenosis and reduce blood flow to the heart. Thrombosis can sometimes disrupt the bloodstream and cause serious health problems.CHD can cause angina. This is a type of chest pain associated with heart disease. Angina can cause the following feelings across the chest:
- Squeeze
- Pressure
- Weight
- Tightening
- Burn
- Painful (Yadavet al., 2018).

Treatment

There is no cure for CHD. However, there are ways in which one can manage the situation. Treatment includes changing your lifestyle, including quitting smoking, eating a healthy diet, and regular exercise.
However, there are people who need to receive medicine and treatment.
- Medicine: Doctor talks about medicine. There are various drugs for the treatment of cardiovascular disease.
- The following are the drugs that people can use to reduce the risk and impact of CHD:
- Beta-blockers: Physicians may prescribe beta-blockers to lower blood pressure &heart rate, especially for people who have had a previous heart attack. Sprays, Nitroglycerin Patches or pills: This increases arteries, increases blood pressure in the heart, and relieves chest pain.

TTH (Tension Type Headache)

TTH stands for tension-type headache. It is a condition of the body in which one experiences ache/ pain like a physical weight or a tight band around your head. It can generally last for some days or can even continue long. TTH is different from migraine as it can be affected due to everyday activities, which is not in the case of TTH.
Tension-type headache arises due to
- ❖ Constant stress
- ❖ Incomplete sleep
- ❖ Anxiety
- ❖ Depression
- ❖ Emotional Disturbance

More than half of the world experiences TTH in one form or the other. It has been called by different names over the years for example tension headache, muscle contraction, etc.(Cassel, R. N., 1997)

It is not accompanied by nausea or vomiting and is also not affected by physical factors. Thus one will continue to do his daily task without even knowing if he is suffering from such headache or not. It also does not have any visual disturbances. The pain in TTH spreads all over the head, unlike migraine which pains only on a particular side of your head.Symptomsof TTH include:

- ❖ The feeling of pressure across the forehead
- ❖ Aching head all over the area
- ❖ Tenderness of head and neck muscles etc.(Cassel, R. N., 1997)

TTH can be divided into two main types: Chronic and Episodic

Episodic Tension Headaches

They can last from 30 minutes to about a week. It can also vary from 15 days in a month to about 3 months. It can also become chronic. One can have migraines if episodic headaches occur frequently.

Chronic Tension Headaches

If the headache lasts for 15-20 days out of a month continuing for about 3 months it becomes chronic. It occurs early in the morning and its symptoms include poor appetite, restlessness, lack of concentration and depression.

TTH varies in intensity, duration, and location.Use of alcohol, stress, caffeine, cold, dental problem, eye strain, excessive smoking, tiredness, etc. are the triggers of tension headaches. However one must remember they are not a brain disease.An individual may suffer from this TTH in any age group however they are normal in adult age and older teens. It generally runs in families and is common in women.Earlier reports which show the occurrence of tension-type headaches are given below:

Biofeedback Therapy

Biofeedback Therapy is the process of collecting knowledge about the different psychological functions using some specific instruments. The major objective is to control and manipulate these functions. Some of these controllable functions or processes are important body functions like skin conductance, brainwaves, heart rate, pain perception, and muscle tone. It may also be used to rectify psychological changes related to altering emotions, thoughts, and human behaviour. This therapy is useful for treating migraines and headaches.(Chauhan, S. et al., 2018d)

Biofeedback Application In Headache

Biofeedback is a technique where our body is been carried out by an electrical sensor to monitors. It monitors the activities that are not able to recognize by our physical body.

Biofeedback takes many measurements, like the important human body parameters heart rate, blood pressure, brain waves, skin temperature, anxiety, breathing rate, etc. This helps us recognized that what inner problem our body is facing and we are not able to cure that in time.

By this treatment, we are able to cure our headache and other problem like anxiety, high blood pressure, etc.But in today world TTH i.e. tension-type headache is the main problem that every single person in the present generation is facing day by day. So it is a simple technique to cure headache. By doing many physical activities instead of eating medicines that can affect our body biofeedback technique in which a person is not being affected by another problem.

LITERATURE REVIEW

According to researchers, Sugar intake may increase in an hour at night from being monitored over a digital device such as a smart phone or a tablet (Singhal et al., 2019). The research teams at the University of Strasbourg and the University of Amsterdam examined the effects of light blue (light emitted by the device) and its effect on blood sugar regulation. Artificial light is already High risk of developing type 2 diabetes other health conditions, but it is expected to occur because it disrupts the daily functioning of the body.

The researchers at the University of Strasbourg and the University of Amsterdam in their study found that, measuring the food intake and glucose tolerance the following day, by be exposing male rats to water-blue light for one hour at night. The mice specimen used in this experimental study were monitored daily, meaning that they were awake during the day and slept at night

As a result, the following day, the animals were given the choice of a balanced diet (rodent food), water, pork and water. The researchers have found that blue light is an hour even enough to eat more sugar at night. Because the retina is sensitive to the neglected light of the device and sends information to the part of the brain that controls appetite, researchers explained that this may have a relationship to the study. Their findings suggests that people who use digital devices such as smart phones, tablets and laptops at night are susceptible to sweet snacks.

AnayanciMasís-Vargas (Singh et al., 2019) reported that restricting the time spent in front of the screen at night has been the best way to protect yourself from the harmful effects of blue light, and the author suggests that touching the equipment at night, if necessary may be lead to other impacts. They used night time programs and device features that recommend orange and blue screens, or the use of commercially available clear blue filters. The findings were presented to the Respiratory Society in the Netherlands (SSIB). British studies have shown new findings for cancer patients which suggests that people with obesity, hypertension & CAD are more likely to smoke, than those who currently having two smoke in the United Kingdom. Charitable agencies and government organisations will use the findings to better understand and deal with obesity among young people (Chaturvedi et al., 2017).

According to researchers, about a third of adults in the United Kingdom are obese, Smoking is still the leading

cause of cancer prevention in the country, and the risk of illness is more than obesity.Analysis of cancer research in the United Kingdom has shown that overweight and obesity are the main causes of four different types of cancer In the United Kingdom, more weight than smoking causes about 1,900 cases of colon cancer. The same pattern of anxiety is related to kidney cancer (1,400 times in a year in the UK), ovary (460) and liver (180).

This week's Cancer research in the UK was conducted to raise awareness about the link between obesity and cancer. Excessive fat cells in the body can cause further division, which can lead to damage and send signals over time, which can increase the risk of cancer. This campaign shows smoking and obesity that it helps people develop healthy habits rather than dealing with tobacco. Because of the decline in smoking rates and the rise in obesity, they clearly have threat that these children can't be our generations, but when the government establishes politics, and when it is in the sand, the nation's health is in crisis.

Mitchell (Chaturvediet al., 2013) head of the UK said, cancer research I have a record that leads to "I found.
We need to get rid of childhood obesity, and now interfere with the elimination of the epidemic. They still have an opportunity to save lives. Scientists already recognize obesity as having 13 different types of cancer, but the mechanisms are not well understood. Therefore, the fact that excess fat can lead to cancer needs to be further examined. The charity is trying to reduce government ambition by 2030, halve childhood obesity and reduce climbers at 9 pm to create unwanted advertisements on television and the Internet. Restrict promotional offers for unhealthy and easy-to-drink food.

Linda Bald said, there is no specific drug to reduce CAD, hypertension & obesity, a UK cancer prevention expert, "but smoking has been sharply reduced year by year due to advertising and environmental bans. Because it is necessary to work on smoking with a high smoking rate, it is suitable for obesity now.Our world does not facilitate health, so we need government action to resolve it, but replace unwanted food for healthier choices or reduce the risk of cancer it's all that helps.

In the United Kingdom, there are approximately 13.4 million obese non-smokers (BMI 30+), 630,000 overweight smokers, and 1.5 million smokers and obese adults.Obesity is higher than the number of people who smoke 2: 1. In the United Kingdom, there are about 14.9 million obese adults, and about 29 percent of the adult population in the United Kingdom has cancer information.

The Cancer Research team combines the adult population estimated,(2017) (18+) from the National Bureau of Statistics with adult data from the occurrence of obesity in the 2017 Health Survey, (2017), Health Survey survey (16+) Estimate this estimate by: Wales National Survey,(2017) and Northern Ireland Health Assessment,(2017) Brown, Lamb gay, (2018) etc.: Percentage of cancers associated with dangerous risk factors in the United Kingdom, Wales, Scotland, Northern Ireland and the UK,(2015) (25 BMI of over 30 + body and overweight defined as fat)

Health studies show two years of new data from Duke to reduce the risk of fatal diseases such as diabetes and heart disease, and recovery is always seen.The random findings of adults who are currently gaining weight with healthy weight or consuming only about at 300 calories a day(Saxena et al., 2018), the level of markers such as good cholesterol, blood pressure, glucose etc. will be greatly improved. Adults under the age of 50 were on the 11th July list of Lennesty's diabetes and endocrinology.

The test, which is part of a continuing project with the National Institutes of Health called CALERIE, highlights the hypothesis of the researchers. It is a mere weight loss leading to this improvement, but it is part of a complex metabolic change. Eat fewer calories than consumed calories.

William E. Crouss, (2014) author of this study, said, "He is Duke's cardiologist and medical professor." We collect blood, muscles, and other specimens from these participants, and we keep saying that this metabolic signal or magic molecule may be. There is something about calorie restriction; some of the mechanisms we do not yet understand show the results of these improvements.According to him, during the in the first month of study, participants ate three meals a day and reduced their daily calorie intake to help train their new diet.

Kloes said. "People can do this fairly comfortably by reducing their volume so that they will see little advice from anywhere, or perhaps to drink after dinner." This is what we used in this study It has been suggested that as many changes as can be made in this country, the burden of diabetes and heart disease can be reduced. "Various food programs, including cultural environment and other requirements, participants participated in the group and personal counseling session for the first six months of study. In addition, members of Control Group continued their regular diet and every six months the researchers visited.

They got results, Participants were asked to maintain their calorie intake for more than 25 years. Their ability is diverse, and the average calorie deficiency for all participants is around 12%. However, they were able to lose 10% of the weight, 71% of which were fat. There are many advances in markers that measure the risk of developing metabolic disorders. There are many advances in markers that measure the risk of developing metabolic disorders. Two years later, participants also showed a decrease in biomarker which shows the old swelling. It is also associated with heart disease, cancer and cognitive decline.

Kraus said. "People can easily ease their little discretion here and there, or perhaps reduce their quantity, like snacking after dinner". Can reduce the burden of diabetes and heart disease, which we have in this country ".This study was conducted by the National Institute for Aging, Institute of Gastrointestinal Allergy (NIH Assistance U01AG022132, U01AG020478, U01AG020487, and U01AG020480) and the NIH Comprehensive Clinical Research Center. (Saxena et al., 2018)

RESEARCH METHODOLOGY

OUR EXPERIMENTAL RESULTS, INTERPRETATION & DISCUSSION

Experimental Setup
The Subjects chosen under investigation were suffering from Diabetes as informed by their Health Insurance Providers without disclosing any Personal Information (PI) or Sensitive Personal Information (SPI) by Law. To identify each case uniquely, sample ids like S1, S2 etc. has been allotted to the subjects. We have collected this big data and studied the people; we have studied their tension level and helped them to cure it. In this chapter, we did our best to analyses the Diabetes with CAD and other Diseases. Sample Data from lab tests and medical reports has been collected for the following characteristics:
- Gender
- Age
- Diabetes Type
- Subject on Insulin
- Subject having Obesity
- Subject having CAD
- Subject having HTN
- Subject suffering from TTH / Migraine.

Our area of interest is on TTH/ Migraine parameter. The study focuses on finding the role of diabetes in causing TTH and what are the peculiar probabilities/ pattern which do/can lead subject to TTH.

We are interested to check the pattern and behavior of data trend of subjects suffering with CAD (Coronary Artery Disease).To find the pattern and relationship on different parameters; we first, analyzed the collected sample data. The Tableau software was used for the analysis.

About the Study and Analysis
In the present Analysis, we have collected the possible sample of thirty random Indian subjects and they were deeply scrutinized under various medical parameters. These subjects were suffering from diabetes and their various other symptoms were recorded. It was checked whether there is possibility of other diseases with diabetes. Patients with Diabetes Type-I and II were investigated and those who were and who were not consuming Insulin also participated in study.

The results show the correlation of different other diseases like obesity, hypertension, CAD etc. with TTH and its direct prediction of happening these issues in future course of life. The Age and gender parameters were also taken care of and detained analysis was executed in reflection to it.
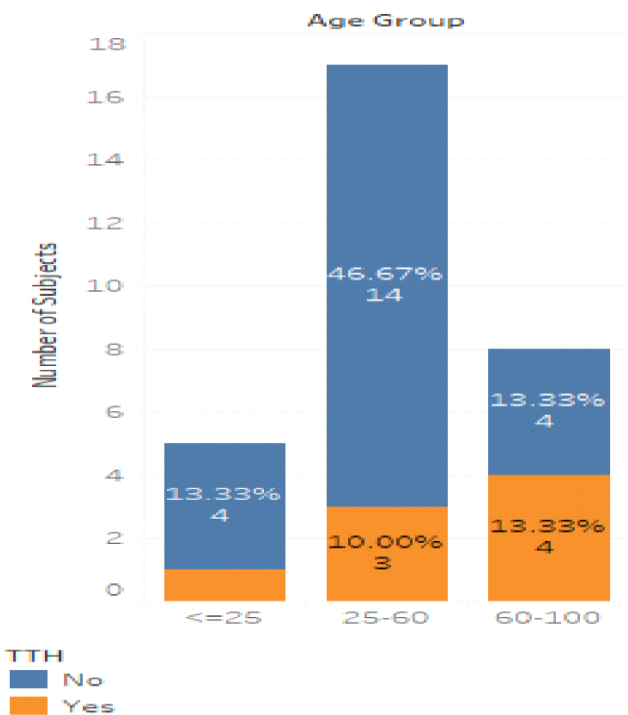
RESULT and DISCUSSION

Figure2. TTH-CAD distribution among subjects as per age groups

The overall age group with number of subject having TTH and CAD or not is plotted in below grouped stacked column chart. It can be observed that very few

cases are observed for TTH for the males below 60 but the number increased dramatically as age goes beyond 60. This signifies old age men are having highest probability among all segregation having TTH and CAD. It also shows a direct correlation of TTH and CAD as per increasing age group. (shown in Figure 3)
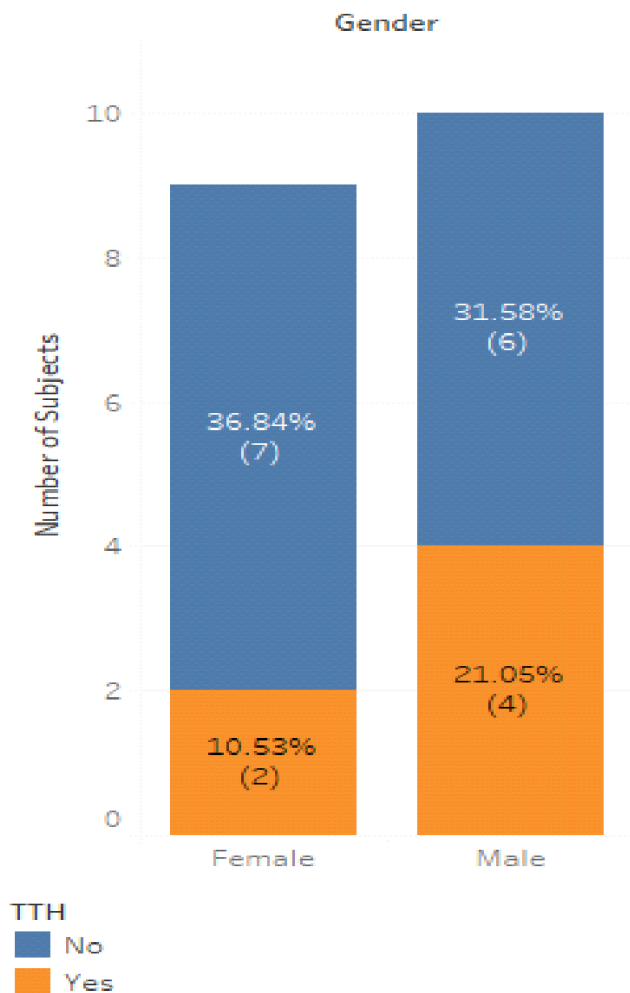
than females. On detailed look into the data and subjected to discussion it has been found that sampled males are working at office environment while females are less working so there is possibility of work stress which is causing more frequent headache. (shown in Figure 4)
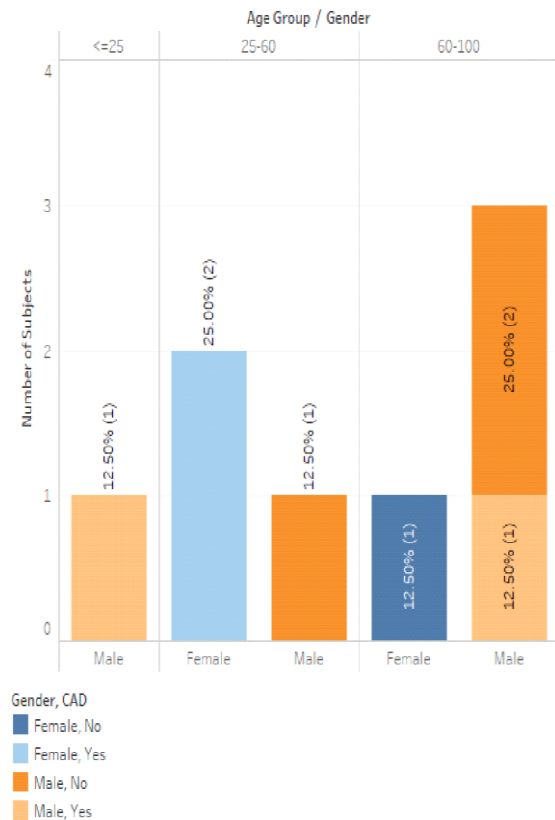

Figure4. TTH-CAD distribution among subjects as per age groups in terms of presence of CAD in different genders

Figure3. TTH-CAD distribution among subjects as per gender groups

In the collected sample, total 31.58% subjects are reported of having TTH and CAD. This number becomes significant as it is saying that out 4 diabetic patients 1 is suffering from TTH-CAD. Diabetic patients are generally reported of having TTH due to stress and mental demotivation caused due to problems like Diabetes.

On analyzing this ratio distribution within the gender, it has been found that males are more prone to TTH and consequently to CAD than as compared to females. Around 10.9% more males are reported having TTH

The overall age group with gender and number of subject having TTH and CAD or not is plotted in below grouped stacked column chart. It can be observed that very few cases are observed for TTH for the males below 60 but the number increased dramatically as age goes beyond 60. This signifies old age men are having highest probability among all segregation having TTH.

Also, for females increasing trends of TTH can be observed upto age of 60 beyond that case of TTH and CAD decreases. This is in line with the overall pattern of diabetic subject variation with age group. (shown in Figure 5).In order to visualize this pattern keenly, above graph is plotted only for TTH with CAD subjects and below graph is obtained:

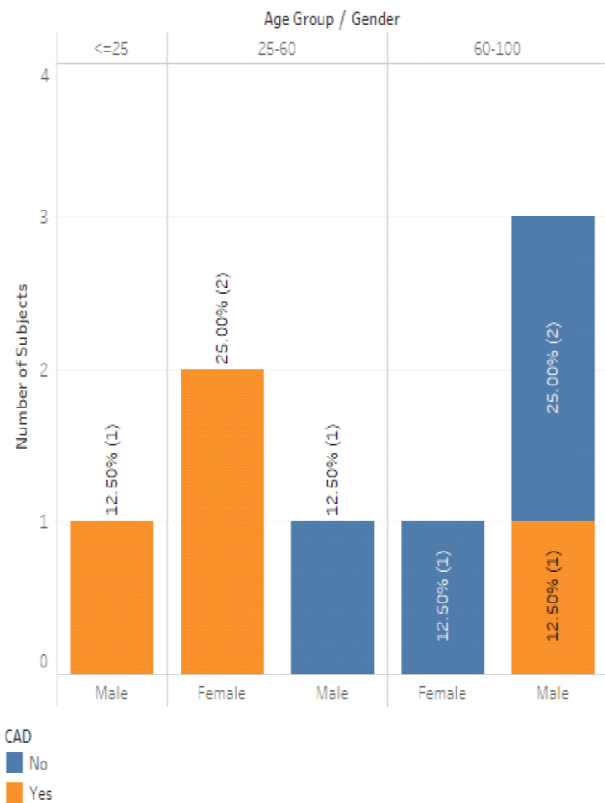Age Group, Gender & Diabetes Type-TTH Distribution (2)

Figure5. TTH-CAD distribution among subjects as per age groups in terms of presence of CAD

In conclusion, it can be said that TTH-CAD cases increasing with age in case of males and not following the pattern of Diabetes variation with age while in case of female TTH-CAD pattern variation is same as diabetes i.e., increasing trend up to age of 60 then decreasing. (shown in Figure 6)

(shown in Figure 7)In order to gain more in-sight and to know the role of diabetic type in causing the TTH-CAD, a stacked bar relationship of diabetes type and TTH is plotted and it has been observed that Type-I diabetic is almost no contribution in TTH and CAD. In other words subject suffering from Type-I is reported very less about TTH and CAD too. It can be justified as Type-I subjects are of younger age groups so they are able to cope up with tense situation or it might be the case they do not have such a significant level of tension with coronary disease that can cause the TTH and CAD(As per Table 1). But the number increases significantly for type-II diabetes patient. The summary data of various are as:

Table1. The summary data for the Diseases TTH & CAD as per Type I& II Diabetes

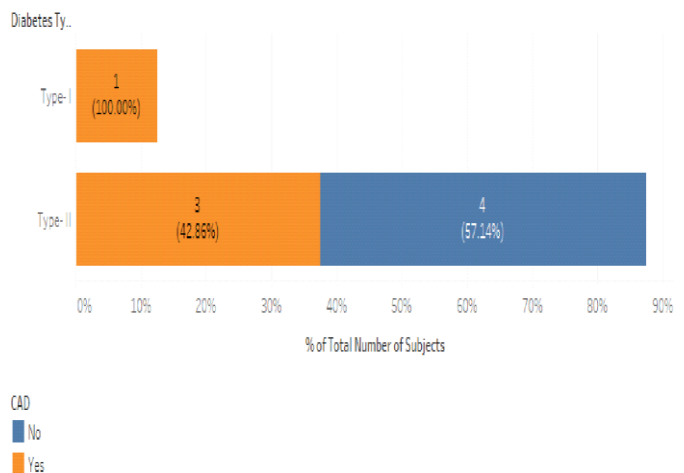| Diabetes Type	TTH	% of Total Number of Subjects	% of Total Number of Subjects within each diabetic type	Number of Subjects
Type- I	Yes	12.5%	100%	1
Type- I	No	0%	0%	0
Type- II	Yes	37.5	42.85%	3
Type- II	No	50%	57.15%	4

Figure6. TTH-CAD distribution w.r.t. presence of diabetes type-I and II among subjects

TTH Cannot Be
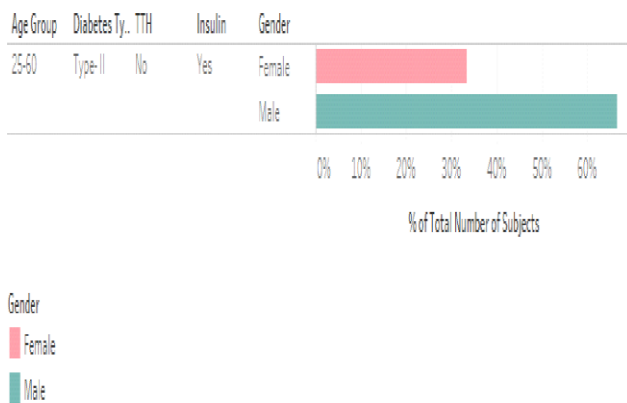
TTH Can Not Be IF

Figure7. Correlation of diabetes with TTH and possibility of CAD, HTN, obesity etc. diseases with insulin Consumption

In surge of finding the different co-existence of illness causing TTH or not, it has been seen the person who is on insulin and having Coronary Arteriosclerosis Disease (CAD)but No Hyper Blood Pressure (HTN) are safe from TTH. In the samples subjects are found to be of 25-60 age group from both the genders who falls under these parameters. In such combination male dominance can be easily seen. 2/3 of the population is male of this combination. (shown in Figure 8)

Such subjects are found to be sufferer of Type-II diabetes so they are insulin consumers. Subjects do not of issues related with digestion systems as they were reported to have no obesity problems. So, it can be concluded if patients are not having problems related with blood pressure then even of having CAD then also they cannot have TTH. This signifies that subjects if control on their hyper tensions and blood pressure then can save themselves from TTH even having cardiac illness. When drill down in detail in the data it has been found ratio of female has been less in such categories because problem of depression is not reported in females. While male patients are equally distributed among between depression and not depression. So we can say such category subjects are equally divided in three groups: female, Male having depression and Male not having depression. In the sample collected it has been seen female are having negligible depression that can be one of the major reason of overall TTH is lesser in female as compare to males.
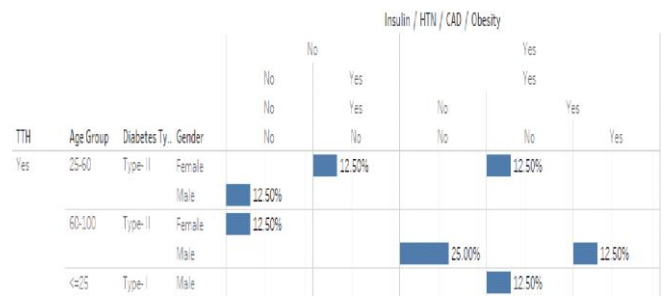

Figure8. Summary chart of analytical data for correlation of diabetes with TTH and possibility of CAD, HTN, obesity etc. diseases with insulin Consumption

When analyzing the sample having TTH, an interesting result can be seen that the ratio of old age male having TTH is maximum that can be easily seen in Age group gender distribution study but this graph shows they are insulin consumer and they are having hyper blood pressure. So, it can be concluded clearly that if old age male is having hypertension and sufferer of type-II diabetes then he must be having TTH. On deeper look it shows that there is 1:3 ratio is further found for such males having CAD and not having CAD and same ratio is found for obesity as well. (shown in Figure 9)

Overall if TTH subjects are generally having HTN. 6 out of 8 Subjects which are reported of having TTH are having HTN as well i.e. 75% of the TTH subjects. These numbers clearly signifies HTN has a relation with the TTH. If a subject is having Diabetes and HTN then one day or the other there are very high chances of occurring TTH as well and probability further gets increased if subject is male.

NOVELTY IN THE PRESENTED WORK

The Internet can communicate, interact and identify anytime, anywhere to make life more difficult and easy.This is one of the existing trends and innovations in recent technological advances.

IoT-based solutions are experiencing explosive growth in a variety of areas, including healthcare systems, using cloud computing, connectivity, and large amounts of data. In the healthcare sector, for example, IoT monitors IoT functionality for stunning and sustained heart rate monitors (HR), recording HR data from Pulse-Glasses embedded in Android smartphones seamlessly stored in the cloud.

Mass data analysis in healthcare: Today, there are a large number of disparate resources such as social networks, the Internet, and healthcare systems. The use of several technology trends, such as the expansion of smart devices, is the Internet. Of things and the spread of cloud computing.

In general, healthcare systems provide specialized data that is difficult to store, process, and interpret .

These data are structured, semi-structured and Unstructured(Rachel et al., 2018), it is impossible to manage it with traditional database management.

As a result, the use of large amounts of data in health systems is highly required. Good data can be used to improve medical quality with past medical data, and can now improve medical quality (Plant et al., 2016).

There are many machine learning techniques used to analyze sensor data in health systems. These technologies help improve the work of healthcare workers, monitor healthcare and make the system more accurate.

The aim of our research is to prevent and treat diabetes and improve the lives of all people with diabetes. By improving the classification method.

Given the availability of the above information, more attention is being paid to the healthcare industry and more research is being done to target data to improve healthcare.Health data is becoming increasingly complex with medical staff, medical records, medical records, clinical records, medical imaging, cyber physical systems, medical internet related issues, genetic data and systems. Significant increase in support clinical and clinical decisions.

New types of data from sources such as social networking services and genomic data are used to build personalized personal care systems. Therefore, different types of health data from different sources, fields, and technologies, the nature of their disorder is a proper analysis. All analytical research needs to overcome these obstacles to mining data and generate meaningful insights to save lives.(Felman et al., 2018; Min et al., 2018)

FUTURE RESEARCH DIRECTIONS ALONG WITH POSSIBLELIMITATIONS

We have found from our sample analysis our sample is not susceptible to sex. It can be used to analyze large sample samples in the future. We can easily find changes in TTH with changes in other diseases in a subject separate from the diseases mentioned, such as obesity, cancer and heart attack, etc (Yadav, V. et al., 2018). Using Tableau S / W for large collections. This type of TTH and both types of diabetes depend on a variety of factors such as age, gender, type of diabetes, insulin issue, obesity, subject to CAN and subject from TTH / migraine, etc. (Cancer research, U.K., 2019; Vyas et al., 2018; Tsai et al., 2013).

Because the sample size is smaller than the conclusion, it should study larger samples for patients with type 1

diabetes living in different areas.With the help of technology, it is necessary to create a system for the creation and analysis of large-scale diabetes data and to predict the potential risks based on it. Predictive analysis is a process that incorporates various data mining techniques, machine learning algorithms, and statistics that integrate current and historical data sets to gain insights and predict future risks.

Do not miss symptoms that may be due to low or high blood sugar, hypoglycemia or lack of knowledge about dehydration. When checking your blood sugar level, make sure that your blood sugar level is set to glucose if your symptoms do not match your reading system or if you suspect that your reading is incorrect.This study is not intended for pregnant women, dialysis patients, or cancer patients.

SOLUTIONS AND RECOMMENDATION

The researchers sought to include information such as age, gender, insulin factors, and relationships with diabetic patients. Issues for diabetes required further details under this title to provide health insurers further disclosure about personal information (PI) or sensitive personal information (SPI) which are subject to the framework for legal health legislations. Finally, TTH-CAD cases can vary with age in men, and the lack of patterns of diabetes changes with age, but noting sharp distinction for changes in TTH-CAD patterns in women are similar to diabetes, i.e. the rate of increase to 60 years of age and subsequent decline rates in specific gender patterns were notably reported. This data has highlighted the need for the researchers to focus on such issues based on gender differentiations that can unravel important and unique information on how diabetes can impact different people based on gender. Hence in our study we draw attention to such issues to investigate deeper on data based on different gender patterns.

It can be observed that very few cases are observed for TTH for the males below 60 but the number get increased dramatically as age goes beyond 60. This signifies old age men are having highest probability among all segregation having TTH and CAD. It also shows a direct correlation of TTH and CAD as per increasing age group.

The overall age group with gender and number of subject having TTH and CAD or not is plotted in the grouped stacked columnar chart. It can be observed that very few cases are observed for TTH for the males below 60 but the number get increased dramatically as age goes beyond 60. This signifies old age men are having highest probability among all segregation having TTH(Gulati et al., 2018).

Also, for females increasing trends of TTH can be observed up to age of 60 beyond that case of TTH and

CAD decreases. This is in line with the overall pattern of diabetic subject variation with age group.It can be justified as Type-I subjects are of younger age groups so they are able to cope up with tense situation or it might be the case they do not have such significant level of tension with coronary disease that can cause the TTH and CAD. But the number increases significantly for type-II diabetes patient.

In the samples subjects are found to be of 25-60 age groups from both genders who falls under these parameters. In such combination male dominance can be easily seen. 2/3 of the population is male of this combination.When analyzing the sample having TTH, an interesting result can be seen that the ratio of old age male having TTH is maximum that can be easily seen in Age group gender distribution study but this graph shows they are insulin consumer and they are having hyper blood pressure. So, it can be concluded clearly that if old age male is having hypertension and sufferer of type-II diabetes then he must be having TTH. On deeper look it shows that there is 1:3 ratio is further found for such males having CAD and not having CAD and same ratio is found for obesity as well.

Design goals include comprehensive health analysis of the entire patient ecosystem. Not only can this system provide careful and timely care, a diagnostic recommendation that works for the same thing, it can also predict possible medical illnesses.

CONCLUSION

In the present Analysis, we have collected the possible sample of thirty random Indian subjects and they were deeply scrutinized under various medical parameters. These subjects were suffering from diabetes and their various other symptoms were recorded. It was checked whether there is possibility of other diseases with diabetes. Patients with Diabetes Type-I and II were investigated and those who were and who were not consuming Insulin also participated in study. The results shows the correlation of different other diseases like obesity, hypertension, CAD etc. with TTH and its direct prediction of happening these issues in future course of life. The Age and gender parameters were also taken care of and detained analysis was executed in reflection to it. In the collected sample, total 31.58% subjects are reported of having TTH and CAD (Yadav et al., 2018). This number becomes significant as it is saying that out 4 diabetic patient 1 is suffering from TTH-CAD (Mcafee et al., 2012) and (Abdelhamid et al. 2014; Brazier et al., 2018). Diabetic patients are generally reported of having TTH due to stress and mental demotivation caused due to problems like Diabetes (Cancer Research U.K., 2019; Rastogi et al., 2918).

On analyzing this ratio distribution within the gender, it has been found that males are more prone to TTH and consequently to CAD than as compare to females. Around 10.9% more males are reported having TTH than females. On detailed look into the data and subjected to discussion it has been found that sampled males are working at office environment while females are less working so there is possibility of work stress which is causing more frequent headache.

In conclusion, it can be said that TTH-CAD cases increasing with age in case of males and not following the pattern of Diabetes variation with age while in case of female TTH-CAD pattern variation is same as diabetes i.e increasing trend up to age of 60 then decreasing.

In order to gain more in-sight and to know the role of diabetic type in causing the TTH-CAD, a stacked bar relationship of diabetes type and TTH is plotted and it has been observed that Type-I diabetic is almost no contribution in TTH and CAD. In other words subject suffering from Type-I is reported very less about TTH and CAD too. In surge of finding the different co-existence of illness causing TTH or not, it has been seen the person who is on insulin and having Coronary Arteriosclerosis Disease (CAD)but No Hyper Blood Pressure (HTN) are safe from TTH. (Saxena et al., 2018; Chaturvedi et al., 2012)

Overall if TTH subjects are generally having HTN. 6 out of 8 Subjects which are reported of having TTH are having HTN as well i.e. 75% of the TTH subjects. These numbers clearly signifies HTN has a relation with the TTH. If a subject is having Diabetes and HTN then one day or the other there are very high chances of occurring TTH as well and probability further gets increased if subject is male.

This research provides updates on new Machine learning algorithms, optimization algorithms, and intelligent health applications. Discuss important issues such as privacy, pre-surveys, real projects, and links between data analysis and healthcare staff. These issues are essential for healthcare development, otherwise it is difficult to release machine learning algorithms and optimize in actual operation.

As a result, humans are expected to increasingly receive health care plans in the coming decades. To protect future patient health and access to future health services, it is necessary to ensure that health services are economically sustainable and sustainable. (Singhal et al., 2019)

Evidence was found for accelerating research efforts aimed at developing artificial intelligence tools to

prevent and prevent complications associated with diabetes. Our findings suggest that artificial intelligence technology is constantly being established as being suitable for use in clinical practice as well as diabetes management itself. As a result, these methods are powerful tools for improving the quality of life of patients.

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REFERENCE

[1] AbdelhmidSalihM. S.,& Abraham, A., (2014). "Novel Ensemble Decision Support and Health Care Monitoring System,"*International Journal of Computer Information Systems and Industrial ManagementApplications,*pp 41–52, 2014.

[2] Agrawal, A., Rastogi, R., Chaturvedi, D.K., Sharma, S., &Bansal, A., (2018). "Audio Visual EMG & GSR Biofeedbac Analysis for Effect of Spiritual Techniques on Human Behavior and Psychic Challenges," *Proceedings of the 12th INDIACom;* 2018, ISSN 0973–7529 and ISBN 978-93-80544-14-4, pp 252-258.

[3] American Diabetes Association, (2018). "Dietary supplements," http://www.diabetes.org/living-with-

a. diabetes/treatment-and-care/medication/other-treatments/herbs-supplements-and-alternative-

b. medicines/talking-to-your-health-care-provider.html.

[4] American Diabetes Association.,(2011). "Standards of medical care in diabetes," *Diabetes Care.,* (34:S11) pp61. https://doi.org/10.2337/dc11-S011.

[5] Brazier,Y., (2018). "What is obesity and what causes it?," *Medical News Today,*https://www.medicalnewstoday.com/articles/323551.php, 2nd Nov. 2018.

[6] Cancer Research UK.,(2019), July 2. "Obese people outnumber smokers two to one," *Science Daily.* www.sciencedaily.com/releases/2019/07/190702211335.htm.

[7] Chauhan, S., Rastogi, R., Chaturvedi, D.K., Arora, N., &Trivedi, P., (2017). "Framework for Use of Machine Intelligence on Clinical Psychology to study the effects of Spiritual tools on Human Behavior and Psychic Challenges",

Proceedings of NSC-2017(National system conference), DEI, Agra, Dec. 1-3, 2017.

[8] Chaturvedi D.K, (2012). "Human Rights and Consciousness," *International Seminar on Prominence of Human Rights in the Criminal Justice System (ISPUR 2012),Proceedings of Organized Ambedkar Chair, Dept. of Contemporary Social Studies & Law, Dr. B.R. Ambedkar University, Agra,* 30-31 March 2012, pp 33.

[9] Cunningham, FG.,(2014). "Diabetes mellitus. In: Williams Obstetrics,"*24th ed. New York, N.Y.: The McGraw-Hill Companies;*http://accessmedicine.mhmedical.com.

[10] Duke University Medical Center, (2019), July 11. "Even in svelte adults, cutting about 300 calories daily protects the heart", *Researchers seeking a signal in metabolism or a 'magic molecule' to explain this. Science Daily.*www.sciencedaily.com/releases/2019/07/190711183758.htm.

[11] Felman, A.,(2018). "An overview of insulin,"*Medical News Today,*https://www.medicalnewstoday.com/articles/323760.php.

[12] Gabbe, SG.,(2018). "Diabetes mellitus complicating normal pregnancy." In: Obstetrics: Normal and Problem Pregnancy', *7th ed. Philadelphia, Pa.: Saunders Elsevier;* 2018. https://www.clinicalkey.com.

[13] Gulati, M., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N.,&Singhal, P., (2018). "Statistical Resultant Analysis of Spiritual & Psychosomatic Stress Survey on Various Human Personality Indicators," *in The International Conference proceedings of ICCI 2018.*

[14] Gulati, M.,Rastogi, R., Chaturvedi, D. K.,Sharma, P.,Yadav, V.,Chauhan, S.,Gupta, M., &Singhal, P., (2019). "Statistical Resultant Analysis of Psychosomatic Surveyon Various Human Personality Indicators: Statistical Survey to Map Stress and Mental Health," *Chapter22 of Handbook of Researchon Learning in the Age of Transhumanism,* ISSN: 2326-8905|EISSN: 2326-8913, pp.363-383, Hershey,PA: IGI Global, doi:10.4018/978-1-5225-8431-5.ch022.

[15] Gupta, M.,Rastogi, R., Chaturvedi, D.K.,Satya, S., Arora, Verma, H., Singhal, P., &Singh, A., (2019).

[16] "Comparative Study of Trends Observed During Different Medications by Subjects under EMG & GSR Biofeedback," *ICSMSIC-2019, ABESEC, Ghaziabad. 8-9 March 2019. IJITEE,* (8:6S), pp. 748-756.

[17] https://www.ijitee.org/download/volume-8-issue-6S/.

[18] Kasper, DL.,(2015). "Diabetes mellitus: Diagnosis, classification and pathophysiology,"*Harrison's Principles of Internal Medicine. 19th ed. New York,* N.Y.: McGraw-Hill Education; 2015. http://accessmedicine.mhmedical.com.

[19] Kuo, T., Sahama, A., W. Kushniruk, E., Borycki, M., &Grunwell,D. K., (2014). "Health big data analytics: Current perspectives, challenges and potential solutions,"*Int. J. Big Data Intell.,* (1:2), pp

a.   114–126.www.techrepublic.com/article/understanding-the-differences-between-ai-machine-learning-and-deep-learning.

[20] Martin, R., Ira Ktena, S. &Pawlowski, N. (2018). "An Introduction to Biomedical Image Analysis with Tensor Flow and DLT," *Imperial College London* (29:1), Jul 3, 2018, pp 82-85.

[21] Marrie, RA., Patel, R., Figley, CR., Kornelsen, J., Bolton, JM., Graff, L., Mazerolle, EL., Marriott, JJ., Bernstein, CN.,&Fisk, JD., (2019). "Diabetes and anxiety adversely affect cognition in multiple sclerosis," *Multiple Sclerosis and Related Disorder satellites,* (27:1), pp 164-170, Jan. 2019.

[22] MasísVargas, A., (2019). "Society for the Study of Ingestive Behavior. Blue light at night increases the consumption of sweets in rats," *Science Daily.*

[23] MasísVargas, A., (2019). "One hour of device screentime at night could lead to increased sugar consumption," *At the Society for the Study of IngestiveBehavior (SSIB) in the Netherlands.*

[24] McAfee, A., Brynjolfsson, E., Davenport TH., Patil, DJ.,& Barton,D. (2012). "Big data: the management

[25] revolution," *Harvard Bus Rev* (90:10), pp 60 - 68.Minn, R., &Morrow, ES. (2018). "Natural medicines in the clinical management of diabetes,"*Natural Medicines.*https://naturalmedicines.therapeuticresearch.com. Accessed March 6, 2018. Mayo Clinic.

[26] Murdoch, T. B., &Detsky, A. S., (2013). "The inevitable application of big data to health care,"*Journal of the American Medical Association,* (13), pp 1351–1352.

[27] Nall, R. (2018), November 8. "An overview of diabetes types and treatments," *Medical News Today,*https://www.medicalnewstoday.com/articles/323627.php.

[28] Nordqvist, C., (2019). "What to know about coronary heart disease," *Medical News Today*, https://www.medicalnewstoday.com/articles/184130.php.

[29] Panch, T., Szolovits, P., &Atun, R., (2018). "Artificial intelligence, machine learning and health systems", *J*

[30] *Glob Health,* 2018 Dec; 8(2): 020303. Published online 2018 Oct 21. doi: 10.7189/jogh.08.020303.

[31] Plant,L., Noriega,B., Sonti, A., Constant, N.,&Mankodiya, K., (2016). "Smart E-textile gloves for quantified measurements in movement disorders,"*In Proceedings of the IEEE MIT Undergraduate Research Technology Conference (URTC),*pp 1–4.

[32] Rastogi, R., Chaturvedi, D.K., Arora, N., Trivedi, P.,& Mishra, V., (2017). "Swarm Intelligent Optimized Method of Development of Noble Life in the perspective of Indian Scientific Philosophy and Psychology," *Proceedings of NSC-2017(National system conference), DEI Agra,* Dec. 1-3, 2017.

[33] Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., Yadav, V., Chauhan, S., &Sharma, P., 28 Oct. (2018). "SF-36 Scores Analysis for EMG and GSR Therapy on Audio, Visual and Audio Visual Modes for Chronic

[34] TTH," *in the proceedings of the ICCIDA-2018 on 27 and 28th October 2018, CCIS Series, Springer, Gandhi Institute for Technology*, Khordha, Bhubaneswar, Odisha, India.

[35] Saini, H., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., Verma, H.,&Mehlyan, K., (2018). "Comparative Efficacy Analysis of Electromyography and Galvanic Skin Resistance Biofeedback on Audio Mode for

[36] Chronic TTH on Various Indicators," *in the proceedings of ICCIIoT- 2018,* 14-15 December 2018 at NIT Agartala, Tripura, ELSEVIER-SSRN Digital Library (ISSN 1556-5068).

[37] Saini H.,Rastogi R., Chaturvedi D.K., Satya S., N.,Gupta M., &Verma H., (2019). "An Optimized Biofeedback EMG and GSR Biofeedback Therapy for Chronic TTH on SF-36 Scores of Different MMBD Modes on Various Medical Symptoms," ISBN:978-981-13-8929-0, *Chapter 8 of HybridMachine Intelligence or Medical Image Analysis, Studies Comp.Intelligence,* (841:1), Springer Nature Singapore, PteLtd.. doi.org/10.1007/978-981-13-8930-6_8.

[38] Saxena, M., Kumar, B., &Matharu, S.,(2018). "Impact of Yagya on Particulate Matters", *Interdisciplinary Journal of Yagya Research* (1:1), pp 01-08.

[39] Saxena, M., Sengupta, B. & Pandya, P.,(2008). "Controlling the Microflora in Outdoor Environment:

a. Effect of Yagya," *Indian Journal of Air Pollution Control (8:2), pp 30 – 36.*

[40] Saxena, M., Sharma, M., Sain, M.K.,Bohra G.,&Sinha, R.,(2018). "Yagya reduced level of indoor Electro-Magnetic Radiations (EMR)", *Interdisciplinary Journal of Yagya Research (1:2), pp 231-239.*

[41] Sharma, A., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., Trivedi, P., Singh, A., &Singh, A., (2019).

[42] "Intelligent Analysis for Personality Detection on Various Indicators by Clinical Reliable Psychological TTH and Stress Surveys," *in the proceedings of CIPR 2019 at Indian Institute of Engineering Science and Technology, Shibpur* on 19th-20th January 2019, Springer-AISC Series.

[43] Sharma, P., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., Yadav, V.,& Chauhan, S., (2018). "Analytical Comparison of Efficacy for Electromyography and Galvanic Skin Resistance Biofeedback on Audio-Visual Mode for Chronic TTH on Various Attributes," *in the proceedings of the ICCIDA-2018 on 27 and 28th October 2018, CCIS Series, Springer, Gandhi Institute for Technology,*Khordha, Bhubaneswar, Odisha, India.

[44] Singh A., Rastogi R.,Chaturvedi D.K.,Satya S.,Arora N.,Sharma A.,& Singh A., (2019). "Intelligent Personality Analysis on Indicators in IoT-MMBD Enabled Environment," *Chapter 7 of Multimedia Big DataComputing for IoT Applications: Concepts,Paradigms, and Solutions,* Springer Nature Singapore., pp.185-215, doi.org/10.1007/978-981-13-8759-3_7.

[45] Singh, P., Rastogi, R., Chaturvedi, D.K., Arora, N., Trivedi, P., &Vyas, P., (2018). "Study on Efficacy of

[46] Electromyography and Electroencephalography Biofeedback with Mindful Meditation on Mental health of Youths," *Proceedings of the 12th INDIACom;* 2018 ISSN 0973–7529 and ISBN 978-93-80544-14-4, pp 84-89.

[47] Singh, V., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., Sirohi, H., Singh, M., &Verma, P., (2018).

[48] "WhichOne is Best: Electromyography Biofeedback Efficacy Analysis on Audio, Visual and Audio-VisualModes for Chronic TTH on Different Characteristics," *in the proceedings of ICCIIoT- 2018, 14-15December 2018 at NIT Agartala, Tripura,* ELSEVIER- SSRN Digital Library (ISSN 1556-5068).

[49] Singhal, P., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., Gupta, M., Singhal, P.,& Gulati, M., (2019).

[50] "Statistical Analysis of Exponential and Polynomial Models of EMG & GSR Biofeedback for Correlation between Subjects Medications Movement & Medication Scores," *ICSMSIC-2019, ABESEC,Ghaziabad, 8-9 March 2019, IJITEE,* (8:6S), pp. 625-635.

[51] https://www.ijitee.org/download/volume-8-issue-6S/.Tenhunen, H., (2015). "Smart e-health gateway: bringing intelligence to Internet-of-Things-based ubiquitous

[52] healthcare systems,"*In Proceedings of the Annual IEEE Consumer Communications and Networking Conference. NV,* USA: IEEE, January 2015.

[53] Tsai, H. C.,Cohly, H.&Chaturvedi D.K.,(2013). "Towards the Consciousness of the Mind, Towards a Science of Consciousness," *Dayalbagh Conference Proceeding,* Agra, India (1:1) pp 20-29.

[54] Vyas, P., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., &Singh, P., (2018). "Statistical Analysis for ffect

[55] ofPositive Thinking on Stress Management and Creative Problem Solving for Adolescents," *Proceedings of the 12th INDIACom;* 2018 ISSN 0973–7529 and ISBN 978-93-80544-14-4, pp 245-251.

[56] Yadav, V., Rastogi, R., Chaturvedi, D.K., Satya, S., Arora, N., &Bansal, I., (2018). "Intelligent Analysis for Detection of Complex Human Personality by Clinical Reliable Psychological Surveys on Various Indicators," *in the national Conference on 3rd MDNCPDR-2018 at DEI, Agra* On 06-07 September, 2018.

[57] Yadav, V., Rastogi, R., Chaturvedi,D.K.,Satya, S.,Arora, N.,Gupta, M., Chauhan, S.,&Sharma, P., (2019).

[58] Book chapter titled as "ChronicTTH Analysis by EMG & GSR Biofeedback on Various Modes and Various Medical Symptoms UsingIoT," Paperback ISBN: 9780128181461, *Advances in ubiquitous sensing applications for healthcare,Book-Big Data Analytics for Intelligent Healthcare Management.*

[59] Yadav, V., Rastogi, R., Chaturvedi, D.K.,Satya, S., Arora, N., Yadav, V., Sharma, P.,& Chauhan, S., (2018).

[60] "Statistical Analysis of EMG & GSR Biofeedback Efficacy on Different Modes for Chronic TTH on Various Indicators," *Int. J. Advanced Intelligence Paradigms,* (13:1), pp. 251-275. DOI: 10.1504/IJAIP.2019.10021825.