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POPULATION BASED DEMOGRAPHIC & HEMATOLOGICAL ANALYSIS WITH SPECIAL REFERENCES TO THE WORKERS OF MATS UNIVERSITY OF CHHATTISGARH

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ABSTRACT

A Population study is a study of a group of individuals taken from the general population who share a common characteristic, such as age, sex, or health condition. This group may be studied for different reasons, such as their response to a drug or risk of getting a disease. My topic is to study the diseases found on the persons those who are directly or indirectly associated with the Vehicles and the surroundings of urban as well as rural areas of Raipur. I have selected this topic because many days I have study that there are various types of diseases are having in the Transport Vehicle Drivers and many people are suffering from various types of diseases. In the absence of information in rural areas, the man is getting infected with various types of diseases. All the people are distressed because of some of their health problems and the knowing the cause of the problem is compelled to lead life in suffering. Due to not getting proper guidance, he is circling hospital and finally death is embracing. Most of the population of village is facing various diseases; the reason is that there is an absence of irrationality in the life of living there, which is making that disease even more lethal. It is imperative to reach the health mission run by the government in every home of the village. Transport Vehicle Drivers have to be aware of diseases and this is Possible only if there are periodical health camps and awareness. Campaigns time to time and should give information about various diseases. Through which he can learn about the diseases found around him and he can take appropriate treatment onetime. I researched that in my University- MATS University, there are four major diseases we screened. People here are living in trouble due to lack of proper treatment and guidance about it. Along with this, the number of patients such as typhoid, malaria, gout, blood pressure, cancer etc is increasing.

KEYWORDS: *Workers, Demography, Sample, Hematological Analysis, Observation, Hypothesis.*

INTRODUCTION

A study of a group of individuals taken from the general population who share a common characteristic, such as age, sex, or health condition. This group may be studied for different reasons, such as their response to a drug or risk of getting a disease. In the various fields of healthcare, a population study is a study of a group of individuals taken from the general population who share a common characteristic, such as age, sex, or health condition. This group may be studied for different reasons, such as their response to a drug or risk of getting a disease. The odds ratio (OR) is used in case-control studies to estimate the strength of the association between exposure and outcome. Note that it is not possible to estimate the incidence of disease from a case control study unless the study is population based and all cases in a defined population are obtained. Demography helps us understand the processes that influence the size, growth, characteristics, and distribution of human population. By analyzing birth rates, death rates, immigration patterns and actuarial tables of life expectancy, we hope to explain past trends and accurately predict the future.

Diabetes Mellitus

Diabetes mellitus (DM), commonly referred to as diabetes, is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. If left untreated, diabetes can cause many complications.[2] Acute complications can include diabetic ketoacidosis, hyperosmolar hyperglycemic state, or death. Serious long-term complications include cardiovascular disease, stroke, chronic kidney disease, foot ulcers, and damage to the eyes. Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced. There are three main types of diabetes mellitus:

- Type 1 DM results from the pancreas's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus"

(IDDM) or "juvenile diabetes". The cause is unknown.

- Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as "non insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The most common cause is excessive body weight and insufficient exercise.
- Gestational diabetes is the third main form, and occurs when pregnant women without a previous history of diabetes develop high blood sugar levels.[1]

Prevention and treatment involve maintaining a healthy diet, regular physical exercise, a normal body weight, and avoiding use of tobacco. Control of blood pressure and maintaining proper foot care are important for people with the disease. Type 1 DM must be managed with insulin injections. Type 2 DM may be treated with medications with or without insulin. Insulin and some oral medications can cause low blood sugar. Weight loss surgery in those with obesity is sometimes an effective measure in those with type 2 DM. Gestational diabetes usually resolves after the birth of the baby.

As of 2015, an estimated 415 million people had diabetes worldwide, with type 2 DM making up about 90% of the cases. This represents 8.3% of the adult population,[14] with equal rates in both women and men. As of 2014, trends suggested the rate would continue to rise. Diabetes at least doubles a person's risk of early death. From 2012 to 2015, approximately 1.5 to 5.0 million deaths each year resulted from diabetes. The global economic cost of diabetes in 2014 was estimated to be US$612 billion.

Signs and Symptoms

The classic symptoms of untreated diabetes are weight loss, polyuria (increased urination), polydipsia (increased thirst), and polyphagia (increased hunger). Symptoms may develop rapidly (weeks or months) in type 1 DM, while they usually develop much more slowly and may be subtle or absent in type 2 DM.[2]

Figure showing the Overview of the most significant symptoms of diabetes.

Several other signs and symptoms can mark the onset of diabetes although they are not specific to the disease. In addition to the known ones above, they include blurry vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes.

Sickle-Cell Disease (SCD)

Sickle Cell Cisease (SCD) is a group of blood disorders typically inherited from a person's parents. The most common type is known as Sickle Cell Anaemia (SCA). It results in an abnormality in the oxygen-carrying protein Haemoglobin (Haemoglobin S) found in red blood cells. This leads to a rigid, sickle-like shape under certain circumstances. Problems in sickle cell disease typically begin around 5 to 6 months of age. A number of health problems may develop, such as attacks of pain ("sickle-cell crisis"), anemia, swelling in the hands and feet, bacterial infections, and stroke. Long term pain may develop as people get older. The average life expectancy in the developed world is 40 to 60 years.[3]

Sickle-cell disease occurs when a person inherits two abnormal copies of the haemoglobin gene, one from each parent. This gene occurs in chromosome 11. Several subtypes exist, depending on the exact mutation in each haemoglobin gene. An attack can be set off by temperature changes, stress, dehydration, and high altitude. A person with a single abnormal copy does not usually have symptoms and is said to have sickle-cell trait. Such people are also referred to as carriers. Diagnosis is by a blood test and some countries test all babies at birth for the disease. Diagnosis is also possible during pregnancy.[4]

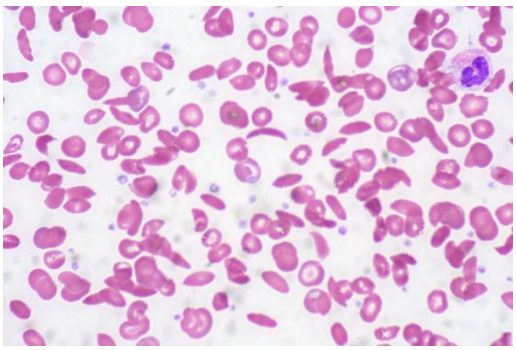

Figure Showing the Blood Smear of SCA Patients.

The care of people with sickle-cell disease may include infection prevention with vaccination and antibiotics, high fluid intake, folic acid supplementation, and pain medication. Other measures may include blood transfusion, and the medication Hydroxycarbamide (Hydroxyurea). A small percentage of people can be cured by a transplant of bone marrow cells.[5]

As of 2015, about 4.4 million people have sickle-cell disease while an additional 43 million have sickle-cell trait. About 80% of sickle-cell disease cases are believed to occur in sub-Saharan Africa. It also occurs relatively frequently in parts of India, the Arabian peninsula, and among people of African origin living in other parts of the world. In 2015, it resulted in about 114,800 deaths. The condition was first described in the medical literature by the American physician James B. Herrick in 1910. In 1949 the genetic transmission was determined by E. A. Beet and J. V. Neel. In 1954 the protective effect against malaria of sickle-cell trait was described.

Signs and Symptoms

Signs of sickle cell disease usually begin in early childhood. The severity of symptoms can vary from person to person. Sickle-cell disease may lead to various acute and chronic complications, several of which have a high mortality rate.

Sickle-Cell Crisis

The terms "sickle-cell crisis" or "sickling crisis" may be used to describe several independent acute conditions occurring in patients with SCD. SCD results in anaemia and crises that could be of many types including the vaso-occlusive crisis, aplastic crisis, sequestration crisis, haemolytic crisis, and others. Most episodes of sickle-cell crises last between five and seven days. "Although infection, dehydration, and acidosis (all of which favor sickling) can act as triggers, in most instances, no predisposing cause is identified.[5-8]

Vaso-Occlusive Crisis

The vaso-occlusive crisis is caused by sickle-shaped red blood cells that obstruct capillaries and restrict blood flow to an organ resulting in ischaemia, pain, necrosis, and often organ damage. The frequency, severity, and duration of these crises vary considerably. Painful crises are treated with hydration, analgesics, and blood transfusion; pain management requires opioid administration at regular intervals until the crisis has settled. For milder crises, a subgroup of patients manages on nonsteroidal anti-inflammatory drugs (NSAIDs) such as diclofenac or naproxen. For more severe crises, most patients require inpatient management for intravenous opioids; patient-controlled analgesia devices are commonly used in this setting. Vaso-occlusive crisis involving organs such as the penis or lungs are considered an emergency and treated with red-blood cell transfusions. Incentive spirometry, a technique to encourage deep breathing to minimise the development of atelectasis, is recommended.

Splenic Sequestration Crisis

Because of its narrow vessels and function in clearing defective red blood cells, the spleen is frequently affected. It is usually infarcted before the end of childhood in individuals suffering from sickle-cell anaemia. This spleen damage increases the risk of infection from encapsulated organisms; preventive antibiotics and vaccinations are recommended for those lacking proper spleen function. Spleenic sequestration crises are acute, painful enlargements of the spleen, caused by intrasplenic trapping of red cells and resulting in a precipitous fall in haemoglobin levels with the potential for hypovolemic shock. Sequestration crises are considered an emergency. If not treated, patients may die within 1–2 hours due to circulatory failure. Management is supportive, sometimes with blood transfusion. These crises are transient; they continue for 3–4 hours and may last for one day.[9]

Arthritis

Arthritis is a term often used to mean any disorder that affects joints. Symptoms generally include joint pain and stiffness. Other symptoms may include redness, warmth, swelling, and decreased range of motion of the affected joints. In some types other organs are also affected. Onset can be gradual or sudden. There are over 100 types of arthritis. The most common forms are osteoarthritis (degenerative joint disease) and rheumatoid arthritis. Osteoarthritis usually occurs with age and affects the fingers, knees, and hips. Rheumatoid arthritis is an autoimmune disorder that often affects the hands and feet. Other types include gout, lupus, fibromyalgia, and septic arthritis. They are all types of rheumatic disease. Treatment may include resting the joint and alternating between applying ice and heat. Weight loss and exercise may also be useful. Pain medications such as ibuprofen and paracetamol (acetaminophen) may be used. In some a joint replacement may be useful. Osteoarthritis affects more than 3.8% of people while rheumatoid arthritis affects about 0.24% of people. Gout affects about 1–2% of the Western population at some point in their lives. In Australia about 15% of people are affected, while in the United States more than 20% have a type of arthritis. Overall the disease becomes more common with age. Arthritis is a common reason that people miss work and can result in a decreased quality of life. The term is derived from *arthr-* (meaning joint) and *-itis* (meaning inflammation).[10]

Cancer

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. These contrast with benign tumors, which do not spread to other parts of the body. Possible signs and symptoms include a lump, abnormal bleeding, prolonged cough, unexplained weight loss and a change in bowel movements. While these symptoms may indicate cancer, they may have other causes. Over 100 types of cancers affect humans.

Tobacco use is the cause of about 22% of cancer deaths. Another 10% are due to obesity, poor diet, lack of physical activity and excessive drinking of alcohol. Other factors include certain infections, exposure to ionizing radiation and environmental pollutants. In the developing world, 15% of cancers are due to infections such as *Helicobacter pylori*, hepatitis B, hepatitis C,

Human Papillomavirus infection, Epstein–Barr virus and human immunodeficiency virus (HIV). These factors act, at least partly, by changing the genes of a cell. Typically, many genetic changes are required before cancer develops. Approximately 5–10% of cancers are due to inherited genetic defects from a person's parents. Cancer can be detected by certain signs and symptoms or screening tests. It is then typically further investigated by medical imaging and confirmed by biopsy.[11]

Many cancers can be prevented by not smoking, maintaining a healthy weight, not drinking too much alcohol, eating plenty of vegetables, fruits and whole grains, vaccination against certain infectious diseases, not eating too much processed and red meat and avoiding too much sunlight exposure. Early detection through screening is useful for cervical and colorectal cancer. The benefits of screening in breast cancer are controversial. Cancer is often treated with some combination of radiation therapy, surgery, chemotherapy and targeted therapy. Pain and symptom management are an important part of care. Palliative care is particularly important in people with advanced disease. The chance of survival depends on the type of cancer and extent of disease at the start of treatment. In children under 15 at diagnosis, the five-year survival rate in the developed world is on average 80%. For cancer in the United States, the average five-year survival rate is 66%.

In 2015, about 90.5 million people had cancer. About 14.1 million new cases occur a year (not including skin cancer other than melanoma). It caused about 8.8 million deaths (15.7% of deaths). The most common types of cancer in males are lung cancer, prostate cancer, colorectal cancer and stomach cancer. In females, the most common types are breast cancer, colorectal cancer, lung cancer and cervical cancer. If skin cancer other than melanoma were included in total new cancer cases each year, it would account for around 40% of cases. In children, acute lymphoblastic leukemia and brain tumors are most common, except in Africa where non-Hodgkin lymphoma occurs more often. In 2012, about 165,000 children under 15 years of age were diagnosed with cancer. The risk of cancer increases significantly with age, and many cancers occur more commonly in developed countries. Rates are increasing as more people live to an old age and as lifestyle changes occur in the developing world. The financial costs of cancer were estimated at $1.16 trillion USD per year as of 2010.[12]

Abortion

Abortion is the ending of pregnancy by removing an embryo or fetus before it can survive outside the uterus. An abortion that occurs spontaneously is also known as a miscarriage. An abortion may be caused purposely and is then called an induced abortion, or less frequently, "induced miscarriage". The word *abortion* is often used to mean only induced abortions. A similar procedure after the fetus could potentially survive outside the womb is known as a "late termination of pregnancy". When allowed by law, abortion in the developed world is one of the safest procedures in medicine. Modern methods use medication or surgery for abortions. The drug mifepristone in combination with prostaglandin appears to be as safe and effective as surgery during the first and second trimester of pregnancy. Birth control, such as the pill or intrauterine devices, can be used immediately following abortion. When performed legally and safely, induced abortions do not increase the risk of long-term mental or physical problems. In contrast, unsafe abortions (those performed by unskilled individuals, with hazardous equipment, or in unsanitary facilities) cause 47,000 deaths and 5 million hospital admissions each year. The World Health Organization recommends safe and legal abortions be available to all women.[13-16]

Around 56 million abortions are performed each year in the world, with about 45% done unsafely. Abortion rates changed little between 2003 and 2008, before which they decreased for at least two decades as access to family planning and birth control increased. As of 2008, 40% of the world's women had access to legal abortions without limits as to reason. Countries that permit abortions have different limits on how late in pregnancy abortion is allowed. Historically, abortions have been attempted using herbal medicines, sharp tools, forceful massage, or through other traditional methods.[14] Abortion laws and cultural or religious views of abortions are different around the world. In some areas abortion is legal only in specific cases such as rape, problems with the fetus, poverty, risk to a woman's health, or incest. In many places there is much debate over the moral, ethical, and legal issues of abortion.[17-18] Those who oppose abortion often maintain that an embryo or fetus is a human with a right to life, and so they may compare abortion to murder. Those who favor the legality of abortion often hold that a woman has a right to make decisions about her own body. Others favor legal and accessible abortion as a public health measure.

Blood

Blood is a body fluid in humans and other animals. It delivers necessary substances like nutrients and oxygen to the cells and transports metabolic waste products away from those same cells.[1] In vertebrates, blood is composed of blood cells suspended in blood plasma. Plasma constitutes 55% of blood fluid (92% by volume water)[19] and contains proteins, glucose, mineral ions, hormones, carbon dioxide and blood cells themselves. Albumin is the main protein in plasma which regulate the colloidal osmotic pressure of blood. The blood composed of RBCs or erythrocytes, WBCs or leukocytes and thrombocytes. The most abundant cells in vertebrate blood are red blood cells which contain hemoglobin (iron-containing protein). It facilitates oxygen transport.[20-21]

In the human body Blood accounts for 7% of body weight, and average density is found to be around 1060 kg/m3 which is very close to pure water's density of 1000 kg/m3. The average adult has roughly 5 litres blood. By volume, the red blood cells constitute about 45% of whole blood, the plasma about 54.3%, and white cells about 0.7%. Whole blood (plasma and cells) exhibits non-Newtonian fluid dynamics. If all human hemoglobin were free in the plasma rather than being contained in RBCs, the circulatory fluid would be too viscous for the cardiovascular system to function effectively. 1 microliter blood contains 4.7 to 6.1 million (male), 4.2 to 5.4 million (female) erythrocytes, 4,000–11,000 leukocytes and 200,000–500,000 thrombocytes: Red Blood Cells contain the blood's hemoglobin and distribute oxygen. Mature red blood cells lack a nucleus and organelles in mammals. Hematocrit is the proportion of blood occupied by red blood cells, and is normally about 45%. The combined surface area of all red blood cells of the human body would be roughly 2,000 times as great as the body's exterior surface.[21] White blood cells are part of the body's immune system which destroy and remove old or aberrant cells and cellular debris, as well as attack infectious agents (pathogens) and foreign substances. The cancer of leukocytes is called leukemia. Platelets take part in blood clotting (coagulation). Fibrin from the coagulation cascade creates a mesh over the platelet plug.

Anaemia

Insufficient red cell mass (anemia) can be the result of bleeding, blood disorders like thalassemia, or nutritional deficiencies, and may require one or more blood transfusions. Anemia can also be due to a genetic disorder in which the red blood cells simply do not function effectively.[22-23] Anemia can be confirmed by a blood test if the hemoglobin value is less than 13.5 gm/dl in men or less than 12.0 gm/dl in women. Several countries have blood banks to fill the demand for transfusable blood. A person receiving a blood transfusion must have a blood type compatible with that of the donor.

MATERIALS AND METHODS

A field of applied *statistics* of *human research surveys*, survey methodology studies the *sampling* of individual units from a *population* and associated techniques of *survey data collection*, such as *questionnaire construction* and methods for improving the number and accuracy of responses to surveys. Survey methodology includes instruments or procedures that ask one or more questions that may or may not be answered. An epidemiologic survey consists of simultaneous assessment of the health outcome and exposures as well as potential confounders and effect modifiers. A survey is considered a cross-sectional study. Some epidemiologists may call it a prevalence study. The survey results provide a 'snapshot' of a population. Surveys are a useful tool for gauging the health of a population or to monitor effectiveness of a preventative intervention or provision of emergency relief.

While a survey may provide a relatively quick and inexpensive method for assessing the health of a population, there are drawbacks as noted below:

Advantages and Disadvantages of Surveys

Inexpensive	Exposure may not have preceded disease or outcome. This limits the assessment of causality. For example, a survey may ask about the current behaviour of smoking and a diagnosis of ashma. While the results may show an association between smoking and asthma, we may not be able to accurately determine which came first.
Relatively quick	Disease and health outcomes with long duration can be over-represented.
Can help establish or clarify a hypothesis	Less severe outcomes may be over-represented because they may not have been diagnosed at the time of the survey. Survey are subject to information bias (e.g. from inaccurate recall or misdiagnosis) and selection bias (e.g. those without telephone cannot be selected for random digit dial survey)

Subject of Study

My topic is to study the diseases found on that area where the Bus Drivers are residing. We have selected this topic because many days I have study that there are various types of diseases in my village and many people of the village are suffering from these diseases. In the absence of information in rural areas and also in the urban areas, the man is getting infected with various types of diseases. All the people are distressed because of some of their health problems and the knowing the cause of the problem is compelled to lead life in suffering. Due to not getting proper guidance, they are circling hospital and finally death is embracing.

We collected the samples and placed a drop of blood from Peripheral Blood Sample on a clean glass slide and prepared smear as per convenience. Few minutes waited as per air – dry completely before the staining. In few of the cases, Peripheral Blood Smear Examination showed a large number of smudge cells and lymphocytosis composed of mature cells.

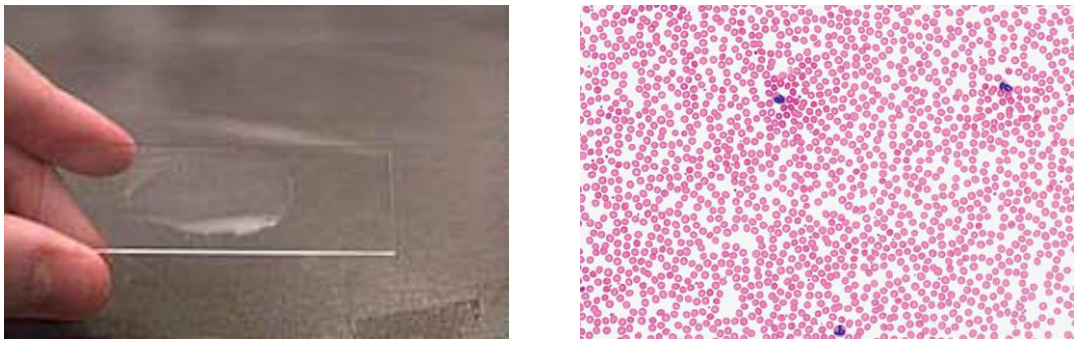

Figure showing the preparation of Smear and the images of the smear under Microscope.

RESULT AND DISCUSSION

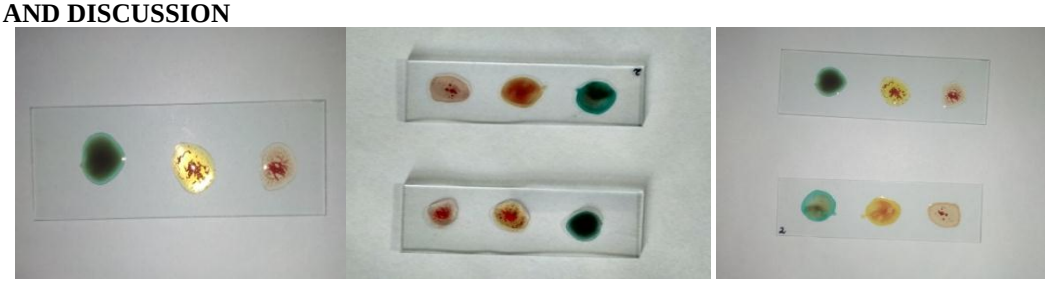

Figure showing the Blood Grouping of few of the samples.

Figure showing the White Bumps and Patches in Tongue.

Figure showing the Shrinked Skins and Red Pimples in the Leg of Diabetes Patients.

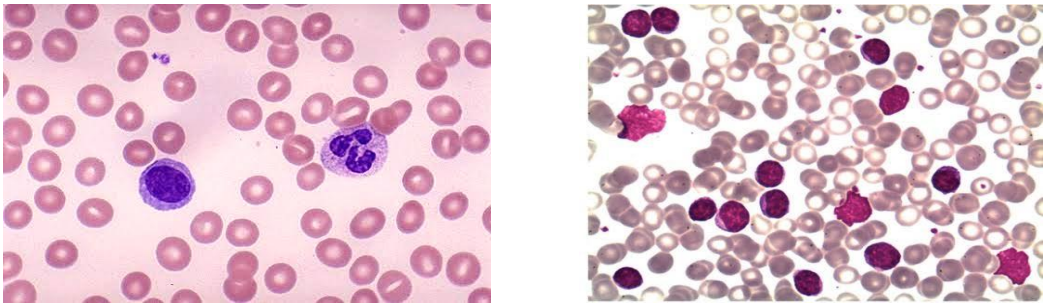

Figure showing the Normal Blood Pictures with mature RBC.

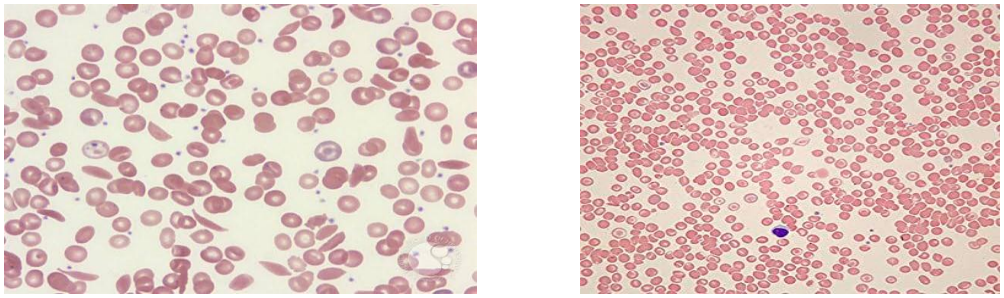

Figure showing the Blood Pictures of Sickle Cell Anaemia Patients.

We already screened through few samples and out of which there are normal control samples, few are belongs to diseased category and few are the addicted background. A Normal Peripheral blood smear indicates the appropriate appearance of red blood cells, with a zone of central pallor occupying space of mature Red Blood Cells (RBC). In few of the sample, we analyzed through Giemsa Stain and found the normal blood smear. At the time of general physical examination, in few cases white bumps and patches are found and it's painful in the tongue. These symptoms are very much common in Diabetes as well as Sugar Patients. In few cases, when we go through their family history, its came in front that abortion history also there. It is may be the marriage in a very early age in the rural area. Blood Grouping also done to see if any findings came from the populations. In most of the samples after analyzing it was found that most of are positive in nature in Blood Grouping.

CONCLUSION

Diabetes is a long-term condition that causes high blood sugar levels. The most common diabetes symptoms include frequent urination, intense thirst and hunger, weight gain, unusual weight loss, fatigue, cuts and bruises that do not heal, male sexual dysfunction, numbness and tingling in hands and feet. An abortion may be caused purposely and is then called an induced abortion, or less frequently, induced miscarriage also found in our study. We also confirmed Anemia by a blood test in which the hemoglobin value is less than 13.5 gm/dl in men or less than 12.0 gm/dl in women. The most common types of cancer in males are lung cancer, prostate cancer and in female we found Breast Cancer. But this result may vary because maximum in number of Patients, they are not agreed to disclosed their personal details. A small research we started to know the exact scenario of the workers those who are working in different places and surroundings. Within a very short period of time, we came to this conclusion that maximum numbers of workers are not aware especially about their food habit and health. So, Education and awareness required for them those who belong in these criteria. Though this type of research is the beginning, it's can't be possible to give the clear-cut conclusion. Further more details research to be required in future to draw an attention towards the population those who are working in different organization.

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