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Blueprinting in Coherence to Diagnostic Momentum: On Account of Cancer Detection in Bahawalpur Community

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Abstract: In the current era, cancer is a critical health problem. Purpose of the study was symptomatic analysis of cancer patients and medical evaluation of haematological and biochemical parameters of patients from different geographical areas of district Bahawalpur. A cross-sectional study was done to find out the diagnostic timeliness in cancer patients. Out of 150 cancer patients, 53% patients were males and 47% females with age from 15 years to 75 years. It has been shown that 76% of patients represent major symptoms of cancer while 24% of patients were showing minor symptoms. Furthermore, cancer patients were classified on the basis of metabolically, haematological and biochemical profiling. There were 83% of patients with anemia and 17% patients have normal hemoglobin count in males and 85 % of total female patients have low haemoglobin level while rest of 15% have normal haemoglobin count. Illiteracy is positively influencing the factors responsible for causing cancer with 53%, whereas 23% less than primary level education and only 1% of patients had completed their graduation. There were 31% of the patients lies in upper lower class of society, 28% lower class, Lower middle class 19%, middle class 14%, upper middle class 7% and only 1 % patients belong to high social status. This study will help to diagnosis the early cancer detection via biochemical and metabolic profiling.

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1. Introduction

A pernicious disorder, cancer is an outcome of cumulative malformation into cell regulatory systems. Development of tumor is a multistep procedure in which normal cells change gradually to neoplastic stage[1] and they attain particular capabilities that permit them to turn into tumorigenic cells. Cancer causes major death in developing and developed countries worldwide with the pervasion of more than 10 million mortalities per year[2]. In 2020, 1.8 million cases are expected to be confirmed with cancer[3], Cancer mortality is expected to rise to an estimated 13 million deaths annually by 2030[4].

Cancer is a group of diseases and its causes of occurrence are still vague, but various factors are known to concomitantly influence the initiation of cancer and its growth[5]. These factors can be tobacco use, excessive body weight, carcinogenic agents, inherited genetic mutations, alcohol consumption, poor nutrition, physical inactivity or various infectious agents. Genetic instability is now accepted as hallmark of cancer which comprises of both structural and chromosomal abnormalities[6]. Chromosomes on the whole

or part of it or amplifications of chromosomes and other structural relocations also transpire at appreciable frequency in many types of cancer. Agedness and genetic mutation will lead to the accumulation of damaged cells in different tissues of the body and cause different types of adenomas and carcinomas. Ultraviolet radiations from sun are the cause of skin, lungs, thyroid and stomach cancer[7]. It also causes basal cell carcinoma, melanoma and squamous carcinoma, benign tumors and breast cancer. Gallbladder cancer is caused by salmonella typhi and *streptococcus bovis* cause colon and rectal cancer. Hepatitis A and B virus are the cause of lung cancer in humans[8]. Exposure to various organic and inorganic chemicals used in pharmaceutical companies, chemical industries and explosive materials are the prominent source of many kinds of cancers, such as, exposure to arsenic, cadmium, radon, benzidine, vinyl chloride, toluene, formaldehydes and many other chemicals can cause different types of cancer[9]. Consumption of alcohol is one of the causes of lymphoma, throat, breast, stomach, oesophagus and ovarian cancers. Cervical, bladder, lungs, pancreas and leukaemia are the result of habitual smoking[10]. Environmental factors like wrong dietary habits, stress, obesity and social status influence the rate of cancer formation[11].

There are many ways to diagnosed the cancer at early stage via characterisation of images generated from computed tomography (CT), judicated eye image, screening using DNA HPV testing[12], [13], metal ions signaling protein and nanotechnology[14][15]. But there is unavailability of documents regarding the health, professional status and social activities. A questionnaire-based survey was completed related to cancer related gut feelings during patient consultations and inferred that average positive predictive value is 35% which elevates by 2% as patient becomes older and 3% increment when General practitioners become aged[16]. There have been 173937 new patients identified to have cancer in 2018 and over the previous 5 years, 118442 cancer related deaths with 310132 prevalent cancer cases were reported in Pakistan[17]. Symptomatic presentation of cancer helps in early diagnosis of disease as it influences the length of diagnostic intervals from the first commencement of disease to the primary patient interval. Characterization of cancer is done on the basis of symptomatic and asymptomatic presentation. Few cancer types have very high predictive values and narrow signature symptoms as it is easy to diagnose it early due to its symptomatic representation whereas other types of cancer have difficulty in diagnosis due to its asymptomatic representation and low predictive values[18]. Diagnosing cancer at early stage is cost effective as it saves money [19] that is to be utilized for drug therapies for advance stage disease[20]. There is no certified data available regarding symptomatic and asymptomatic representation of different types of cancer and to date, no metabolic, biochemical profiling and hematological evaluation of cancer is done from the district of Bahawalpur, Pakistan. In order to bridge the gap between evaluation and diagnosis, current work was designed with the objectives of assessing the knowledge of metabolic, biochemical profiling and hematological evaluation of cancer patients, so far to investigate the symptomatic and asymptomatic illustration of diverse types of cancers and to create awareness in the population of -district Bahawalpur. So, a retrospective cohort study was undertaken to subjectively investigate the symptomatic signatures of cancer and their narrow and broad range symptoms with the connection between the sex, age, gender, socio-economic status and other geographical factors. We aimed to evaluate the underlining causes of late diagnosis which linked with side effects, avoiding wastage of time, resources, expenses on treatment and prevalence and recurrence rate late onset of disease.

2. Materials and Methods

2.1. Sampling

The case-control study was conducted in different medical units of Bahawal Victoria Hospital, BVH. The study was conducted from September, 2019 to February, 2020, for a period of 6 months and included 150 patients from district Bahawalpur and nearby areas. Verbal consent was taken from all the participants and patients with different types of cancer were included in the study. Laboratory findings included hematological profiling such as total number of platelets, total leukocyte count, hemoglobin level in patients and erythrocyte sedimentation rate. Biochemical profiling of patients was performed by analysing the level of urea, total serum albumin level, bilirubin levels and enzymatic tests were also included ..

2.2. The Questionnaire and Physical Examination

Questionnaire was comprised of all the related questions regarding aims of the study, which were created after discussing the important factors with medical attendants at Medical Units of Bahawalpur Victoria Hospital. Each contributor was requested to fill the questionnaire that included;

- Patients' personal information;
- Name, Age, Gender, Residency, Occupation and Qualification along with Income.
- Socioeconomic factors like; working status, education, monthly household income, class of patients and health profile.
- Diagnosis.
- Personal and family history.
- Symptomatic and Asymptomatic presentation and analysis.
- Signs and symptoms; unexpected weight loss, fever and fatigue, night sweats, back and pelvic pain, bloating and indigestion, headaches, non-healing sores, persistent lumps and swollen glands, hoarseness etc.
- Inexplicable anemia.
- Lumps in testicles and uncommon vaginal bleeding.
- Alteration in urination and stool.
- Bronchitis and sinusitis.
- Investigation of dietary habits and environment influenced lifestyles; consumption of alcohol, cigarettes or drugs.
- Laboratory findings and research includes; hematological screening, biochemical screening, biopsy, tissue and bone scanning, tumor marker identification.
- Other related symptoms and diseases.

2.3. History

Precise family and personal history research aids to reduce the risk of injuries and helps in screening of disease and prevention of treatments. Individuals with family records that shows a potential genetic cancer syndrome assist in early diagnosis of cancer[21]. The diagnostic investigation and rationalization process of cancer is listed below in the **Figure 1** which results in early diagnosis and prognosis of disease.

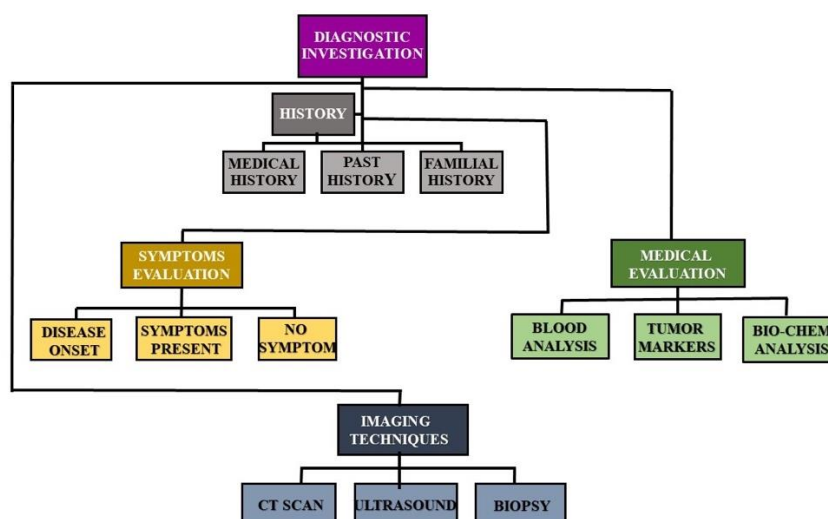


Figure. 1 Diagnostic Investigation and Rationalization of Cancer through Demography

2.4. Blood Sampling:

The blood samples were collected in purple-coloured vials, which had EDTA as a potent anti-coagulant which is an anticoagulant. This was further used for hematological evaluation as a recommended procure[22].

2.4.1 Hemoglobin level

A protein, hemoglobin, is present in red blood cells and transport oxygen to the body parts. Hemoglobin level is measured using techniques like flow cytometry, spectrophotometry. The blood is mixed with the reagent and left for few minutes and then absorbance is measured against the value of reagent blank[23].

2.4.2. Platelets Level

Platelets level was measured using electrical impedance method. In this method, the blood sample is passed in between to electrodes and a florescent dye is used which binds specifically to the platelets RNA to measure platelet count. The normal range for platelet count is 150,000-450,000/mm³ [24]

2.4.3. Total leukocyte count

Manual method to count total leukocyte count was performed using designed chambers with automated analysers. Drop of blood is spread on glass slide, dried and strained. Cells are then counted and classified. The normal TLC range is 4,000-11,000 cells/mm³[25].

2.4.4. Erythrocyte Sedimentation Rate

It is the measure of cells using Coulter's principle. It is the manual counting of erythrocytes. Its range for males is 0-10 mm/1st hour and for females the rate of sedimentation is 0-20mm/1st hour. Elevated level of ESR is an indicator for the presence of inflammation and infections.

2.4.5. Differential Leukocyte Count

Differential leukocyte count is the measurement of each component of white blood cells which comprises of neutrophils, basophils, eosinophils, lymphocytes and monocytes. It was performed manually by adding a drop of blood on a clean microscopic slide and a smear was created, which was studied using a compound electron microscope [25].

2.5. Biochemical profiling

Biochemical profiling comprises of series of blood tests which are performed to evaluate the proper functioning of different body organs specifically liver, kidneys or lungs. It is performed to detect the presence of abnormalities, inflammations, degeneration of cells and infections. Any deformity in the functioning of metabolites will cause alteration in normal values[26]. The blood samples were taken for metabolic evaluation by using analyzer AU5480 (Beckman coulter Ltd. United States) which computes every determination at same time interval automatically. Following parameters were studied in biochemical profiling;

- Urea level(mg/dl)
- Bilirubin level(mg/dl)
- Creatinine level(mg/dl)
- Alanine aminotransferase(mg/dl)
- Alkaline phosphatase(mg/dl)
- Electrolyte's level: sodium and potassium level(mmol/L)

2.6. Data Analysis:

After feeding the data in SPSS 21, we examined the frequency distributions of responses, cross tabulations of individual, work ergonomic, and psychosocial factors in relation to reported point prevalence and lifetime prevalence of cancer. Group differences were further studied by the Chi square test and significant ($P < 0.05$) values were saved. Multivariate and bivariate logistic regressions were analysed to study the effect of several dependent variables on the outcome factors. The associations among individual, work

ergonomic, psychosocial risk factors, and cancer prevalence were expressed by adjusted OR with 95% confidence interval. Only significant determinants were included in the prediction of diagnosis and prevalence of cancer, point prevalence and lifetime prevalence LTP (outcome factors) from individual, ergonomic, and psychosocial risk factors ($P < 0.05$).

3. Results

Patients that were included in the study their age was between 15 to 75 years old. Frequency percentage of male patients was 53% whereas for females, the frequency percentage was 47% with a different percentage of various cancer types in both genders as shown in **Figure 1a**. Out of which 55 cancer patients with a frequency of 37% were amongst the age of 46-55 years, 29 patients with a frequency of 19% were 56-65 years old, 25 patients were from 36-45 years age group and their frequency was 17%, while 18 patients for age group of 26-35 years with 12% frequency and 14 patients for 66-75 years with having frequency of 9% and in the last only 9 patients with frequency 6% for age group of 15-25 years as **Figure 1b**. It was determined that the prevalence of cancer events was more likely observed in adults aged less than 65 years. They have no well-developed mindset and understandings related to the health issues and therefore become more prone to diseases displayed in **Figure 1c**. In the current study, we also did the general symptomatic analysis of patients to know whether they were suffering from the disease or not. The frequency of patients suffering from fever were 88%, cough 68%, fatigue 77%, headache 86%, weight 46%, back pain 31%, indigestion 58%, muscle pain 67%, unexplained bleeding 6%, swallowing 10%, urination problems 24%, lumps were observed in 17%, anemia 64%, hoarseness or the change in voice 8%, skin change 5%, non-healing sores 34%, vaginal bleeding 15% and breast lumps 22%. According to data obtained, the illiteracy rate was highest in cancer patients belonging to different rural areas near by Bahawalpur. Illiteracy rate was 53%, whereas 23% of patients have education less than primary level. This showed that lack of education and unawareness is a key source of incidence of disease and its progression. 9% of patients have completed their primary education, 5% are matriculate and only 1% of patients have completed their graduation which is a very minor count. The data analysis shows that people in Bahawalpur and nearby areas belong to lower income and social status **Figure 1d**.

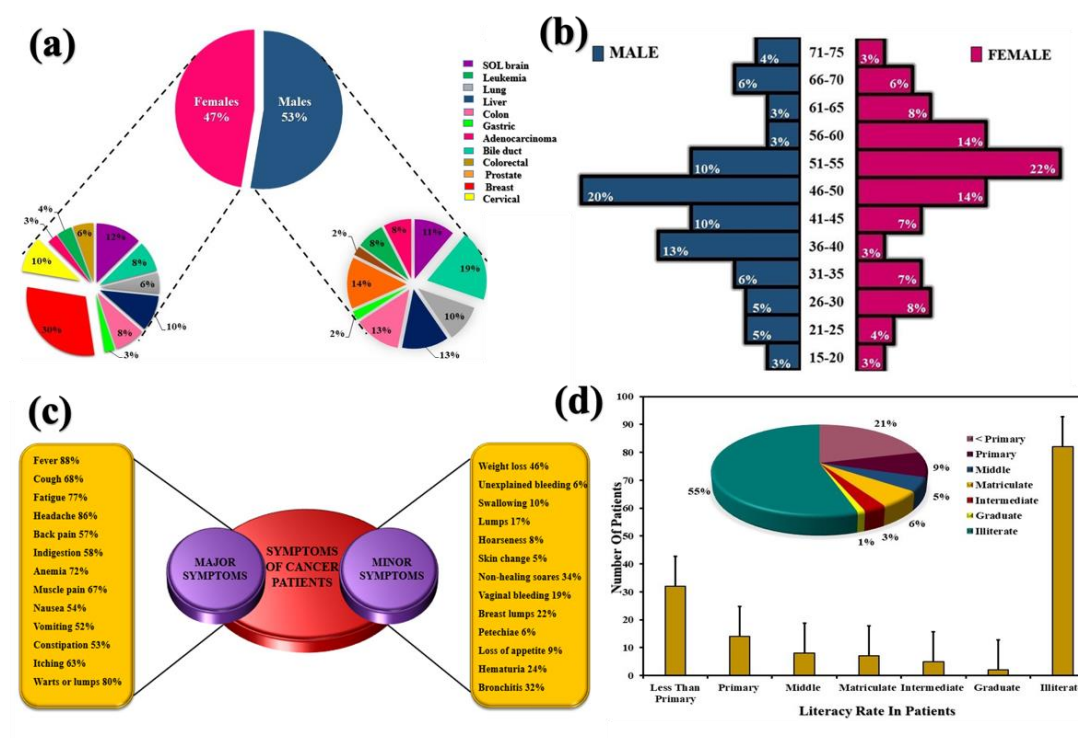
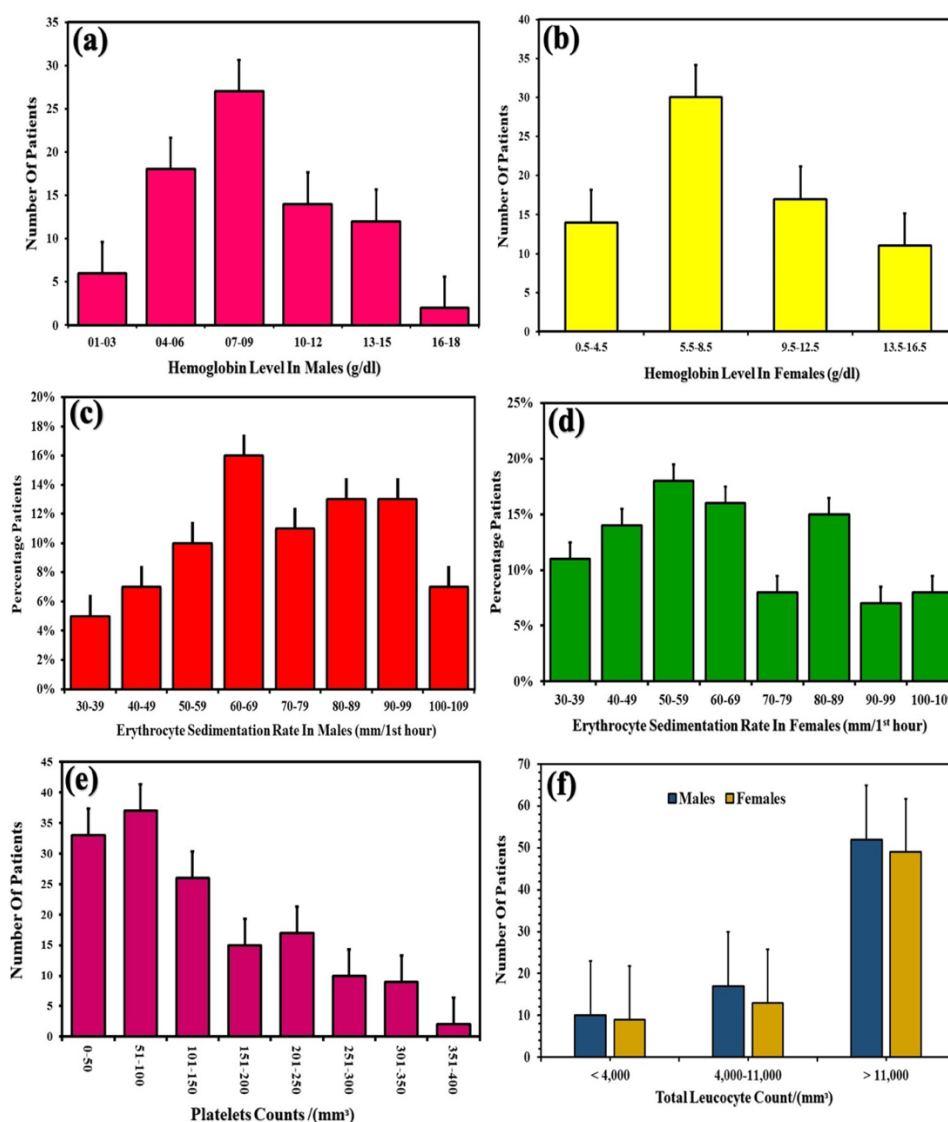


Figure 1. Frequency distribution of cancer patients, data collected from questionnaire (a,b) Gender based cancer types with distributions, Cancer patient symptoms and their economic status rate (c,d)

Anemia is a prime indication for the presence of cancerous cells inside the body. This symptomatic representation helps in the diagnosis of cancer. In males, the normal range for hemoglobin is 13-18g/dl. Hemoglobin level of 24(34%) patients shows hemoglobin level are in the middle of ranges 7-9g/dl. 18(23%) patients showed hemoglobin level in 4-6g/dl. 6(8%) patients hemoglobin level is 1-3g/dl. 14(18%) patients are in between range of 10-12g/dl. 12(15%) have hemoglobin level in amongst 13-15g/dl and 2(2%) patients shows relatively normal hemoglobin range of 16-18g/dl. This was a prime indication for the presence of cancerous cells inside the body. This symptomatic representation helps in the diagnosis of cancer. It was reported that 83% of patients have anemia and 17% patients have normal hemoglobin count in males shown in **Figure 2a**. Similarly, in 71 females, the normal hemoglobin range is 11.5-16.5g/dl. Analysis of hemoglobin level in female cancer patients shows that (42%) females are highly anaemic showing haemoglobin level in between range of 5.5-8.5g/dl. (24%) female patients had hemoglobin level amongst 9.5-12.5g/dl. (15%) females had normal hemoglobin level in between the normal range. 19%) female patients have extremely lower borderline hemoglobin level and immediately needs blood transfusion[27]. This condition is maybe due chemotherapy or radiotherapy received by the patients after diagnosis of cancer. 85 % of total female patients have low hemoglobin level while rest of 15% have normal hemoglobin count as shown in the **Figure 2b**. These results are more closely to previous reported result which indicates that level of hemoglobin is very important parameter for determination of cancer[28].



Figure; 2. Cancer Patient Haematological parameter at BVH, Bahawalpur, Pakistan. (a) Hemoglobin level (a, b)

Erythrocytes sedimentation rate (c,d) Platelets (e) Total Leucocytes (f)

Many other diseases like rheumatoid arthritis, liver disorders, osteomyelitis, renal disease, inflammations can also be diagnosed by examining the elevated level of erythrocyte sedimentation rate[29], [30]. Normal range for erythrocyte sedimentation in males is 0-10mm/1st hr. 16% of total 79 male patients showed highest number of ESR, followed by 13% of patients representing the ESR level in between 80-89mm/1st hr. and 90-99mm/1st hr. None of the patient having cancer showed ESR in normal range. The percentage frequency for ESR in male patients is shown below in **Figure 2c**. In female, the normal erythrocyte sedimentation rate was 0-20mm/1st hr. the highest values of ESR in female patients was recorded as 18%, 16% and 15% between range from 50-59, 60-69, 80-89 respectively as shown in **Figure 2d**. Females showed much higher ESR level as compare to males. Current studies, showed that hemoglobin level, erythrocytes, platelets and leucocytes were important in cancer diagnosis because, all these factor directly or indirectly linked with immunity of person[31].

Platelets are the tiny components of blood that are involved in the process of blood clotting. They immediately migrate to the site of damage and fix it. Thrombocytopenia is abnormally low level of platelets in blood. It is usually found in cancer patients but is a clinically non-significant cancer indication and was discovered during the blood tests. It is usually accompanied by neutropenia and anaemia. Thrombocytopenia is also a result of chemotherapy, the alkylating agents and drugs used or self-apoptotic behaviour of the platelets in response of cancer treatment[32].

Normal range for platelets is 150,000mm³ to 450,000mm³. Platelets Level of patients was recorded in patients at BVH, according to which 37 patients (24%) showed thrombocytopenia having platelets count in between 51,000-100,000. % Patients had severe thrombocytopenia having platelets count below 50,000. % Patients showed mild thrombocytopenia. Rest of the patients % in normal ranges of platelets. This low level of platelets was in response of the cancer or the treatments provided to the patients like chemotherapeutics, chemotherapy or radiotherapy[33]. The platelets level in different patients was represented below in **Figure 2e**. Total **leukocyte** count is an essential diagnostic parameter for cancer. It is the measure of white blood cells in blood. **Figure 2f** represents leucocytosis in cancer patients. Out of % male patients, % male patients show high level of leucocytes, % patients had normal leukocyte count and % male patients have low leukocyte count. In female patients, % patients had high leukocyte count in their medical evaluation, %patients were in normal range and % patients were among lower-than-normal range. More than % of totals patient number in both males and females showed leucocytosis, which confirms the formation of cancerous cells. The low value of leucocytes is due to the medical treatment received by the patients in form of chemotherapy or radiotherapy. Chemotherapy and radiotherapy kill normal cells along with the infectious and cancerous cells[34].

3.1. Biochemical profiling of cancer patient

Biochemical profiling is the measure of chemical entities released by various organs in response to metabolic reactions occurring inside the body. These reactions are the functional indicators of many body organs including heart and liver. Increased level of bilirubin is associated with liver, colon, colorectal or gastrointestinal cancers. It is released by bile fluids and is responsible for many diseases like jaundice, liver dysfunction, fever. Hyperbilirubinemia [35]. Chemotherapy or medicinal aids to cancer patients also causes bilirubinaemia. It was observed that 48% patients had hyperbilirubinemia, whereas 28% patient showed hyperbilirubinemia and 24% patients were in normal range by performing proper filtration of bilirubin from their bodies **Figure 3a**. Urea is a waste product of kidneys found in the filtrate of glomerulus in kidneys. Kidneys eliminate toxic substances from the body in form of urination in order to maintain the homeostasis of the body[36]. Besides urea as an indicator for proper kidneys functioning, it also explains the liver functioning as liver is responsible for conversion of amino acids to urea. Normal range for urea level in blood is 10-50mg/dl . Urea level was studied in 150 cancer patients, according to which 68% patients had high urea level. Chemotherapeutics

administered to the patients should have caused difficulty in kidneys to filter urea out of the body and resulted in its elevation. However, 20% patients showed low urea level due to impairment in liver functioning which fails to convert amino acids to urea and effects the metabolism of body, 12% patients had normal level of urea in blood as shown in **Figure 3b**.

Serum creatinine level was used to diagnose kidneys or liver impairment. Creatinine is secreted out of body by kidneys as a filtrate. If the kidneys fail to filter creatinine it will start accumulating inside the body and will cause kidney failure. Elevated creatinine level is also due to the chemotherapeutics, interleukins or interferons administered in response of cancer [37]. Normal range for serum creatinine is 0.6-1.1mg/dl. In our study, 50% of patients showed high creatinine level. This may be due to kidney impairment, liver dysfunction, testicular and prostate cancer, or lumps and tumorous mass. 40% patients had normal creatinine level and 10% patients showed low count of creatinine as represented in **Figure 3c**. Alanine transaminase is the part of liver functioning test [38]. These enzymes are secreted by the liver. Improper secretion of ALT will result in liver cirrhosis and fatty deposition on liver which may leads to hepatocellular carcinoma in extreme conditions. ALT level is studied in cancer patients. This enzyme is useful in maintaining functional integrity of liver. The normal range for ALT is 7-56U/dl. Out of 150 patients total % patients comprise of 10 males and 7 females show extreme high values of ALT. Rest of the patients also showed reasonable level of high ALT level due to treatments and therapies. 56% patients had high ALT levels whereas 40% patients had normal ALT count. 4% patients had low values of ALT obtained due to additional treatments administered to them along with other anticancer drugs. The results are shown in **Figure 3d**.

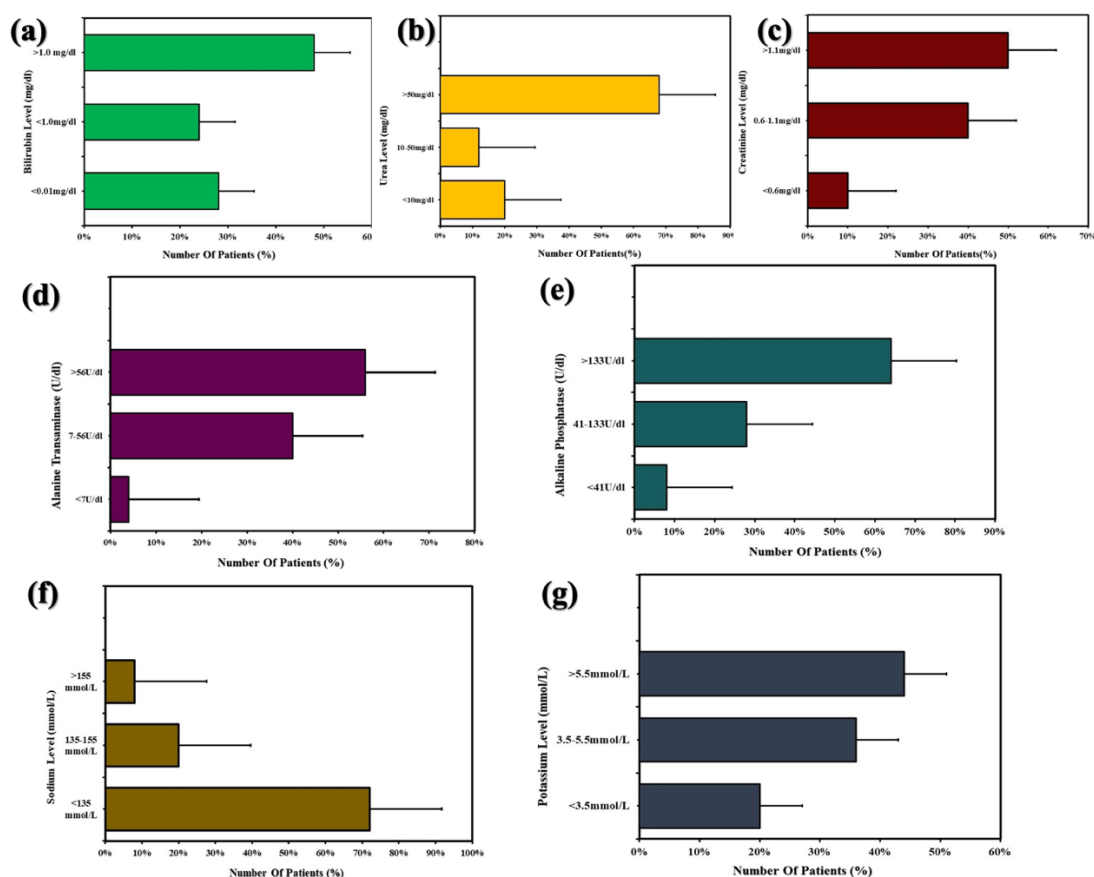


Figure 3. Biochemical Profiling of Cancer Patients at BVH, Bahawalpur, Pakistan. (a-c) Liver metabolites Bilirubin, Urea and Creatine (d, e) Alanine. Alkaline phosphatase (f,g) Sodium and Potassium level.

Alkaline phosphatase is an enzyme specifically responsible for proper liver functioning. It is involved in proceeding normal

metabolism of body. It is present in mitochondria of skeletal muscles or cardiac muscles, in liver and in cytosol of hepatocytes[39]. The normal range for ALP is 41-133U/dl which when exceeds causes sarcomas, osteosarcomas, colorectal, colon, and hepatocellular carcinomas specifically. Its elevated level is a diagnostic parameter of cancer to point out the formation of cancer cells or tumorous lumps and masses. According to the study, 64% patients had high ALP level, 28% patients showed normal values of ALP 8% patients had low ALP count as shown in **Figure 3e**.

Electrolyte level is the proper concentrations of chemicals released by the body within the normal range to maintain the normal homeostasis. Imbalance in the values of these electrolytes will produce adverse effects on the functioning of the body organs as this electrolyte level balance maintains the chemical environment inside and outside of the body. During the research period, impact of two electrolytes was studied in the cancer patients;

Sodium level

Hyponatremia was observed in majority of cancer patients. It is the loss of serum sodium level in response to metabolic disorder. Hyponatremia is found in several types of cancers like colon, colorectal, gastrointestinal, hepatocellular carcinoma due to excessive loss of water and essential body fluids. Vomiting, diarrhea, internal blood loss, kidneys malfunctioning and dietary issues[40]. Hyponatremia represents malfunctioning of water metabolism and body physiological conditions. 135-155mmol/L is the normal range for serum sodium level. Out of 150 patients, 72% patients showed hyponatremia, 20% had normal sodium levels and rest of the 8% had high sodium level as shown in **Figure 3f**.

Elevated level of potassium, hyperkalemia, is the state in which kidneys are unable to filter the excess potassium from the body due to abnormal or metastatic condition. It is found in patients suffering from adrenal cancer, prostate, breast, testicular cancer[41]. Normal potassium range for serum analysis is 1.5-5.5mmol/L. Our study showed that there were 44% of total patients which suffered from hyperkalemia. 36% patients had normal potassium count and 20% patients had low serum potassium level as depicted below in **Figure 3g**.

3.2. Tumor marker for diagnosis of cancer

Tumor markers are the biochemical microstructure released by tumor, cancerous or other body cells in response of metastatic effect of cancer[42]. They are biologically more significant in indicating the cancer formation and progression inside various body organs or tissues. Elevated level of tumor markers is observed in cancer patients. They are released in response of stress produced inside our body like inflammation, genetic issues, metabolic deformities, hematological imbalance, cancer related diseases or they are also be produced by a healthy body. Tumor markers for cancer identification is a significant method for the diagnosis of cancer and finding all possible and effective ways for its treatment[43].

In this study, four different tumor markers are used to indicate the presence of cancer in them. Adrenocorticotrophic (ACTH) hormone aids in the diagnosis of lung cancer in patients[44]. There were 12 patients diagnosed with lung cancer, 75% of the patients show elevated level of adrenocorticotrophic hormone in their blood whereas 25% patients had normal ACTH level. Carcinoembryonic antigen (CEA) is used for the diagnosis of breast cancer in females[45]. In total 20 females were diagnosed with breast cancer, 65% females had high level of CEA and 35% females had low level of CEA in their blood. Alfa-feto proteins (AFP) are used for the diagnosis of liver and prostate cancer in liver cancer diagnosis[46], 54% patients had elevated level of AFP and 46% patients were in normal range. For prostate cancer, 36% patients had elevated AFP level while, 64% showed results within normal range. Cancer antigen 19-9 is used for diagnosing colon, bile duct and gastric cancer [47] in which 75%, 55% and 75% were the highest values above normal range respectively. There were 25% patients with colon cancer, 45% patient's had bile duct cancer and 25% were diagnosed gastric cancer were in normal range for the antigen

Table 1. Tumor markers in cancer diagnostics and their relative % in patients of BVH

ADRENOCORTICOTROPIC HORMONE(ACTH)			CARCINOEMBRYONIC ANTIGEN(CEA)			ALPHA-FETO PROTEIN(AFP)			CANCER ANTIGEN 19-9(CA 19-9)		
REFERENCE RANGE Up to 4.6pg/ml			REFERENCE RANGE Up to 3.8ng/ml			REFERENCE RANGE Up to 1.4ng/ml			REFERENCE RANGE Up to 25.7ng/ml		
TYPE OF CANCER	% OF PATIENT		TYPE OF CANCER	% OF PATIENT		TYPE OF CANCER	% OF PATIENT		TYPE OF CANCER	% OF PATIENT	
	ABOVE LEVEL	BELOW LEVEL		ABOVE LEVEL	BELOW LEVEL		ABOVE LEVEL	BELOW LEVEL		ABOVE LEVEL	BELOW LEVEL
LUNG CANCER	75%	25%	BREAST CANCER	65%	35%	LIVER CANCER	54%	46%	COLON CANCER	75%	25%
-	-	-	-	-	-	PROSTATE CANCER	36%	64%	BILE CANCER	55%	45%
-	-	-	-	-	-	-	-	-	GASTRIC CANCER	75%	25%

The symptomatic analysis is the identifying mark that is done for the identification of the specific problem or a disease. Symptomatic analysis of disease helps in identifying the actual disease from which the patient is suffering[48]. In this study, we also did the general symptomatic analysis of patients to know whether they were suffering from the disease or not. The numbers of patients suffering from fever were 133 with percentage frequency of 88%, the percentage frequency of patients having cough were 68% and number of patients were 102. The number of patients having fatigue were 116 with percentage frequency of 77%, as reported from previous work [15]. Some of cancer with percentage frequency of 86% in 130 patients. Weight loss was observed in 69 patients with the percentage frequency of 46 %, back pain was present in 47 patients with frequency of 31%, indigestion problem was indicated in 87 patients having frequency of 58%, the number of patients suffering with muscle pain were 101 with frequency of 67%, Unexplained bleeding, a symptom present in the patients in severe condition was observed with frequency of 6% only in 9 patients, swallowing was observed in the 16 patients having the frequency of 10%, the frequency of patients with urination problems was 24% in 37patients, a lump/ lumps were observed in 26 patients with 17% frequency Unexplained anaemia is also as a most common symptom of the cancer and was analysed in 97 patients with a frequency of 64%, hoarseness or the change in voice is not so common symptom present in only 13 patients with 8% frequency, skin change was seen in 8 patient suffering from skin cancer with a frequency of 5% only. The patients who had non-healing sores were 52 with 34% frequency, vaginal bleeding [49]is also one of the severe symptoms present in females suffering from that cancer and the symptom was observed in the 23 females with frequency of 15% and lastly the breast lump is associated with females suffering from breast cancer were 33 with a percentage frequency of 22% as given in the **Table.2**

Table. 2. Ssymptomatic analysis of cancer patients as a diagnostic parameter

Sr Number	General Symptoms	number of patients	Frequency
1	Fever	133	88%
2	Cough	102	68%
3	Fatigue	116	77%
4	Headache	130	86%
5	Weight loss	69	46%
6	Back pain	47	31%
7	Indigestion	87	58%
8	Muscle pain	101	67%
9	Unexplained bleeding	09	6%
10	Swallowing	16	10%
11	Urination changes	37	24%
12	Lump	26	17%
13	Unexplained anemia	97	64%
14	Hoarseness	13	8%
15	Skin changes	08	5%
16	Non-healing sores	52	34%
17	Vaginal bleeding	28	19%
18	Breast lump	33	22%

4. Discussion

We found that the occurrence and progression of cancer was more likely to be present in midlife period. In this period, the multiple risk factors and incidence regarding cancer were comparatively higher than in other phases of age. Interventions encouraging healthier lifestyle, safe workplace, proper dietary habits, control of underlying illnesses can result in healthy transformation from midlife to old age fixing the threat of getting cancer [50]. Men in comparison to women are more likely to die of cancer particularly with haematological disorders. According to a study, prevalence of cancers like leukaemia, colorectal, thyroid, bladder, lung and liver are more common in males as compared to females [52]. Cancer events are more likely to occur in males as compared to females due to the lack of estrogenic as sex hormone, which plays a significant role in controlling cancer formation. Oestrogen level causes the inhibition of nuclear factors which in return regulates the transcription of interferon regulatory factors. Overexpression of these interferon regulatory factors will be responsible for malignancies and many other forms of carcinomas. Increased level of oestrogen also promotes the expression of anti-apoptotic proteins which helps in maintaining the mitochondrial membranous integrity as compared to in males. Endogenous sex hormones like progesterone plays a pivotal role in protection against colon cancer. Therefore, female sex hormones like estrogenic plays more significant role in controlling cancer formation as compare to male sex hormones e.g. testosterone [53]. Although, there are many advanced techniques and method which help to diagnosis cancer at very early stages [54], [55]. But the data showed from illiteracy positively influenced the factors responsible for causing cancer [56]. A questionnaire consisting of all the data to related study like insurance status, clinical characteristics sociodemographic which help research to investigate the real situation. A study was conducted in Wisconsin in 2013 and Population based sample size was 1841, Interestingly, results demonstrated that there was 33% elevation in the lower level of health literacy in cancer patients from the rural areas than the patients belonging to the urban areas of Wisconsin. This was because of lower educational assess in the urban areas. Therefore, uneducated people were unable to predict the disease related changes and therefore become more prone to cancer. People with low education, [57][58] low income [59] and socioeconomic conditions [60] face more problem and suffer from cancer.

[61][62]. The symptomatic analysis is the identifying mark that is done for the identification of the specific problem or disease. Symptomatic analysis of disease helps us to identify the actual disease from which the patient is suffering[63].

Cancers like lymphoma or leukemia is due to the battle of cancerous cells with normal red blood cells to occupy more space in bone marrow resulting in anemia. Cancers of colon, colorectal, gastrointestinal tract or adenocarcinomas cause blood loss and the patient becomes anemic[64]. Elevated level of leucocytes will try to occupy space in bone marrow by competing to the red blood cells and disturbs its composition. Normal range for total **leukocyte** count in body is 4000-11,000/mm³[65]. The low value of leucocytes is due to the medical treatment received by the patients in the form of chemotherapy or radiotherapy. Chemotherapy and radiotherapy kill normal cells along with the infectious and cancerous cells. Normal range for platelets is 150,000mm³ to 450,000mm³ [66]. Like many other diseases, cancer can also be diagnosed by examining the higher level of erythrocyte sedimentation rate. It is a sensitive test but changes of inaccurate results are more often to occur[67]. Blood urea level is also an important indicator for cancer diagnosis related to kidneys or liver[68]. Creatinine as diagnostic parameter for cancer is more significant and sensitive for kidneys and liver cancer along with few other types of cancers[69]. The bilirubin released by bile is unable to filter out of the body and remains inside the body as a result of many cancer related disorders[70]. If the level of Alkaline phosphatase exceeds inside the body, it interrupts the functioning of liver and other organs of body[71]. The normal range for Alkaline phosphatase is 41-133U/dl which when exceeds, causes sarcomas, osteosarcomas, colorectal, colon, and hepatocellular carcinomas, specifically. Hyponatremia is observed in majority of cancer patients and is the loss of serum sodium level in response to a metabolic disorder. Hyponatremia is found in several types of cancers like colon, colorectal, gastrointestinal, hepatocellular carcinoma due to excessive loss of water and essential body fluids through Vomiting, diarrhoea, internal blood loss, kidneys malfunctioning and dietary issues. Hyponatremia represents malfunctioning of water metabolism and body physiological conditions[72]. Elevated level of potassium, hyperkalemia, is the state in which kidneys are unable to filter the excess potassium from the body due to an abnormal or metastatic condition. It is found in patients suffering from adrenal cancer, prostate, breast and testicular cancer[41].

5. Conclusions

This study indicate that cancer events are more likely to occur in males as compared to females it may be due to the lack of oestrogen as sex hormone, which plays a significant role in controlling cancer formation. The prevalence of cancer events was more likely to occurs in adults aged less than 65 years. Illiteracy and poverty were positively influencing the factors responsible for causing cancer. Major symptoms were shown by 76% patients while 24% patients were showing minor symptoms of cancer. Majority of cancer patients were found anaemic and had disturbed haematological profiling and found with elevated level of biochemical profiling.

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“Conceptualization, M .H. and S.G. H.; methodology, A.Z.; software, T.T.; validation, Y.M., F.T. and M.H.; formal analysis, T.T.; investigation, Y.M.; resources, S.I.; data curation, A.I, H.; writing—original draft preparation, Y.M.; writing—review and editing, M.D.; visualization, M.N.; supervision, M.H.; project administration, M.N.; funding acquisition, Y.M.

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Competing interest statement

The authors declare no conflict of interest.

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