Correlation of Cancer Types with Stages and Symptoms: Analysis-based Descriptive Cross-sectional Study

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A thesis submitted to the Department of Mathematics and Natural Sciences in partial fulfillment of the requirements for the degree of
Bachelor of Science in Microbiology

Department of Mathematics and Natural Sciences
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May 2023

Declaration

It is hereby declared that

1. The thesis submitted is our own original work while completing our degree at BRAC University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

3. The thesis does not contain material that has been accepted, or submitted, for any other degree or diploma at a university or other institution.

4. We have acknowledged all main sources of help.

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Ethics Statement

The study strictly maintained the principles and guidelines of the Helsinki declarations. Ethical clearance was obtained from the departmental review board of BRAC University, Dhaka, Bangladesh. Informed consent was obtained from the respondents before data collection. During data collection, the privacy of the respondents and confidentiality of the data were maintained strictly. Participation in the survey was completely voluntary, and the collected data was anonymously used only for this current study.

Abstract

Background and aim: One of the leading causes of morbidity and mortality worldwide is Cancer which accounted for nearly 10 million deaths in recent years. Cancer arises from the transformation of normal cells into tumor cells in a multi-stage process that typically progresses from a pre-cancerous lesion to a malignant tumor. The globally most common cancers are breast, lung, colorectal, prostate, skin (non-melanoma), and stomach. Bangladesh is not an exception regarding cancer either. Breast, lung, oral, cervical, and esophageal cancers are the most common ones in Bangladesh. The aim of this descriptive cross-sectional study is to explore cancer types, build correlation with stages, symptoms and comorbidities and analyze biochemical and hematological data to ultimately generate new findings which can assist in the prognosis and diagnosis of cancer and develop proper treatment strategies to improve overall survival.

Materials and Methods: All of the 280 (aged 11-85) respondent's data of this study were diagnosed at Labaid Cancer Hospital and Super Specialty Center. The data were collected from September 12 2022 to April 30, 2023, for our study population which consisted of cancer complete records. Descriptive data has been shown as frequency (%), mean, median, and range, as appropriate. The privacy of the respondents and confidentiality of the data was strictly maintained as per protocol.

Results: Among the 280 respondents, the mean age was 54.45 years. The respondents consisted of 33.2% of males and 66.8% of females. 92.1% of cancer patients exhibited medical symptoms. The number of asymptomatic patients was 7.9% (22). 32.1% (90) of respondents reported only one symptom, while 60.0% (168) reported more than one symptom together. The cancer type that was in the highest number was Breast Cancer 21 % (59), and the lowest was Bladder + Cervical cancer 0.36 %. The minimum, 11.1% of respondents were Stage 1 cancer patients while the maximum, 42.5% of respondents were Stage 2 cancer patients. Most of the biochemical and hematological parameters were within the reference range except a few above the range which can be used as biomarkers for early detection of cancer.

Conclusion: Females were more affected by cancer compared to males. Most of the respondents had breast cancer and the cancer type in the lowest number was tongue cancer. Most of the respondents were in stage 2 of cancer. Anorexia and weakness were the most reported symptoms throughout all the cancer types. Among the patients, the most prominent types of co-morbidities were hypertension, diabetes mellitus, and hypothyroidism. By evaluating the biochemical and hematological reports, higher levels of serum ALT, creatinine, low hemoglobin, high ESR, neutrophil, and platelet count had a strong correlation with the tumor formation and progression of cancer

Acknowledgment

Humble gratitude to the respectful and cooperative individuals from Labaid Cancer Hospital and Super Specialty Centre. I solemnly thank Fahim Kabir Monjurul Haque sir (Assistant professor, Brac University) for his kind suggestions and sacrifices along the way.

Table of Contents:

List of tables:

List of Figures:

Chapter 1

Introduction

Cancer, one of the leading causes of morbidity and mortality worldwide accounted for nearly 10 million deaths in recent years and this presents even more of a complex and multifaceted challenge in healthcare up until the present day. Cancer arises from the transformation of normal cells into tumor cells in a multi-stage process that typically progresses from a pre-cancerous lesion to a malignant tumor. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age, combined with the tendency for cellular repair mechanisms to be less effective as a person ages. The globally most common cancers are breast, lung, colorectal, prostate, skin (non-melanoma), and stomach. The cancer burden can be reduced through early detection of cancer and appropriate treatment and care of cancer patients. Many cancers have a high chance of cure if diagnosed early and treated appropriately. Between 30 and 50% of cancers can currently be prevented by avoiding risk factors, detecting cases, and treating them as early as possible (World Health Organization: WHO, 2022). In the case of Bangladesh, Breast, lung, oral, cervical, and esophageal cancers are the most common (Cancer Today, n.d.). The most common symptoms associated with cancer are pain, anorexia leading to weight loss, fatigue, fever, skin change, unhealed sores, and anemia (Ellis, 2002). The limited amount of evidence that is currently available regarding correlations between presenting symptoms and stage at diagnosis ignores the fact that some symptoms at the presentation (particularly those of a nonspecific nature) are common for several different types of cancer. For instance, abdominal pain is a usual symptom of colorectal, ovarian, and renal cancer. (Koo et al., 2020).

Early diagnostic interventions are by nature based on the cancer's current symptoms. However, these programs may not have much of an influence on cancer outcomes if the chosen symptoms primarily indicate advanced-stage disease. It is crucial to understand the connections between the stage of cancer

at diagnosis and the symptoms that are currently present. (Koo et al., 2020). Programs for early diagnosis of cancer concentrate on shortening the time between the discovery of the first symptoms and treatment. Barriers can lower a patient's chances of receiving an early diagnosis and treatment at any stage. These include poor cancer awareness among the public; suboptimal knowledge at the primary health care level about cancer symptoms and/or adequate diagnosis follow-up; poor accessibility; low affordability and/or quality of diagnosis and treatment services, and the numerous logistical, financial, and psychosocial barriers preventing patients from accessing services promptly. (World Health Organization: WHO, 2010b). Therefore, descriptive analysis of the association between cancer stages and symptoms can assist in early detection, precise diagnosis, and tailored treatment strategies.

1.1 Objective

With a wealth of clinical data at our disposal, we thoroughly examined the symptoms patients exhibited at various cancer stages. Our primary objective is to establish correlations between the symptoms and cancer stages across various types of malignancies by utilizing insightful tables and graphs which are created based on the collected data of 280 cancer patients from Labaid Cancer Hospital and Super Specialty Centre. It is expected that the article and the findings have the potential to support, develop and enhance early detection methods. It is also expected that the findings can provide refined diagnostic approaches and inform personalized treatment strategies for cancer patients throughout Bangladesh.

Chapter 2

Methodology

2.1 Study Design

Descriptive Cross-sectional study.

2.2 Sample Size

For this cross-sectional, population-based study we analysed data of 280 patients.

Data was collected from Labaid Cancer Hospital and Super Speciality Center, Dhaka, Bangladesh. Challenges relating to collecting data include the possibility of obtaining low data as individuals do not want to provide their medical reports and incomplete data because most patients don't undergo all of their investigations at the same medical center. Therefore, we collected data for our study population, which consisted of cancer patients with complete and our desired records.

2.3 Study Population and Setting

This descriptive cross-sectional study based in Labaid Cancer Hospital and Super Speciality Center, Dhaka, Bangladesh, from September 12, 2022 to April 30, 2023, followed 280 patients (aged 11-85) who were diagnosed with cancer following procedures such as imaging, laboratory tests (including tests for tumor markers), tumor biopsy, endoscopic examination, surgery, or genetic testing.

3inclusion criteria were applied while selecting the study population: (i) all patients were diagnosed with cancer (ii) all the patients' had complete biochemical and haematological reports (iii) all patients have stages mentioned in their medical report.

Baseline data on age, gender, symptoms and comorbidities (diabetes, hypertension, asthma, cardiac diseases, respiratory diseases, kidney diseases, neurological disorders etc.) were collected from the

reports. The data related to biochemical tests, Haematological tests, and CBC (complete blood count) tests were collected. This study focused on responses received from the patients after minimum 2 days to 4 months days of their diagnosis. Major symptoms were defined as generalized weakness, headache, anorexia, body pain, constipation, nausea, Oral mucositis, vomiting, abdominal pain, cough, shortness of breath, restlessness and insomnia etc.

2.4 Statistical Analysis

Descriptive data has been shown as frequency (%), mean, median and range, as appropriate. No imputation was made for missing data. Microsoft excel was used to create all the data tables and to generate all the graphs, bars charts and pie charts.

2.5 Ethical Considerations

The study strictly maintained the principles and guidelines of the Helsinki declarations. Permission was obtained and granted from the authority of Labaid Cancer Hospital and Super Speciality Center, Dhaka, Bangladesh. Informed consent was obtained from the respondents before data collection. During data collection, the privacy of the respondents and confidentiality of the data were maintained strictly. Participation in the survey was completely voluntary, and the collected data was anonymously used only for this current study.

Chapter 3

Results

3.1 Basic characteristics of the respondents:

	Respondants,n(%) N=280	Symptomatic,n (%) N=258	Asymptomatic,n (%) N=22
Gender			
Male	93(33.2)	85(91.4)	8(8.6)
Female	187(66.8)	173(92.5)	14(7.5)
Age,years			
Mean	54.45		
Median	55		
Minimun	11		
Maximum	85		
Symptoms reported alone	90(32.1)		
Symptoms reported with other symptoms	168(60.0)		
No complaints/no symptoms reported	22(7.9)		

Table 01- Basic characteristics of the respondents

Total 280 cancer patient's data was collected for the study. Among the respondents, 33.2% (n=93) respondents were male and 66.8% (n=187) were female. The minimum age of the respondents was 11 year while maximum was 85 years, and the mean age of the respondents was 54.54 years. The median for the age of respondent was 55 year. Among the 280 respondent that were diagnosed with cancer, 92.1% respondent exhibited medical symptoms. Out of 92.1% symptomatic respondent 30.4 %(85) respondent were male and 61.7 %(173) respondent were female. The number of asymptomatic patients was 7.9%(22), were female respondent was 5%(14) and male respondent was 2.9%(8).Among the patients who exhibited symptoms, 32.1%(90) respondent reported only one symptoms, while 60.0%(168) reported more than one symptoms together.(Table 01)

3.2 Cancer type and its stages

	Total,n(%) N=280	Stage 1 N=31	Stage 2 N=119	Stage 3 N=89	Stage 4 N=41
Bladder Cancer	14(5)	3	4	5	2
Bladder Cancer+Cervical Cancer	1(0)		1		
Blood Cancer	12(4)	2	3	7	
Bone Cancer	6(2)	2	2	2	
Brain Cancer	5(2)		2	2	1
Breast Cancer	59(21)	1	40	16	2
Buccal Mucosa Cancer	3(1)		1	1	1
Cervical Cancer	14(5)	2	6	4	2
Colon Cancer	7(3)		4	1	2
Colorectal Cancer	6(2)	2	1	1	2
Endometrial Cancer	8(3)	1	3	3	1
Esophageal cancer	8(3)	2	4	2	
Gallbladder Cancer	6(2)	1	2	2	1
Kidney Cancer	3(1)			1	2
Laryngeal Cancer	7(3)		3	3	1
Liver Cancer	5(2)			1	4
Lung Cancer	22(8)	1	9	7	5
Mouth Cancer	5(2)		2	2	1
Oral Cancer	4(1)	1	2		1
Ovarian Cancer	11(4)	1	4	4	2
Pancreatic Cancer	11(4)	1	4	4	2
Prostate Cancer	5(2)		2	2	1
Skin Cancer	5(2)	2	2	1	
Stomach Cancer	11(4)	1	3	4	3
Throat cancer	5(2)		2	1	2
Thyroid Cancer	6(2)		3	2	1
Tongue Cancer	3(1)	2	1		
Tonsil Cancer	5(2)	2	2	1	
Vaginal Cancer	5(2)	1	2	2	
Vulvar Cancer	18(6)	3	5	8	2

Table: 02 – Cross tabulation between Cancer type and its stages.

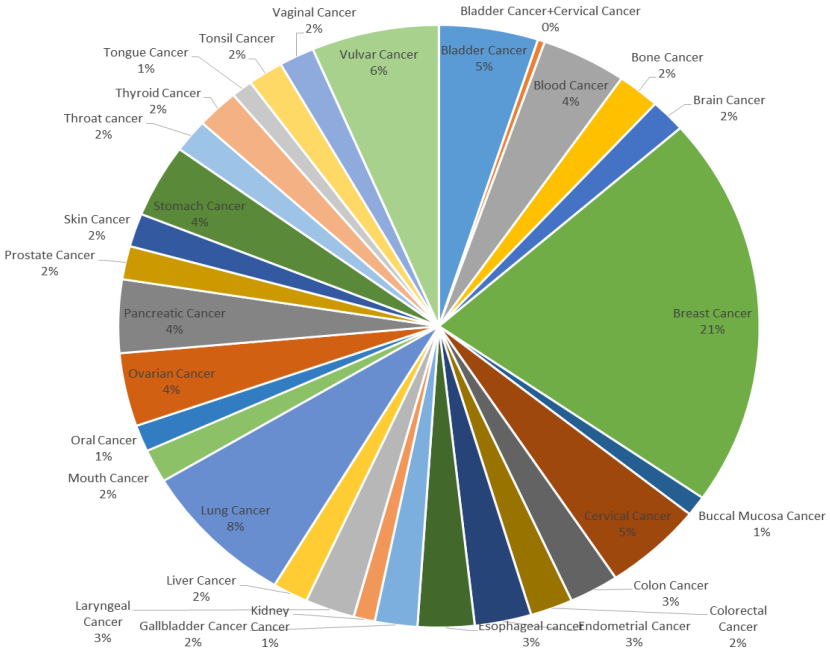

Figure 01: Cancer types of respondents

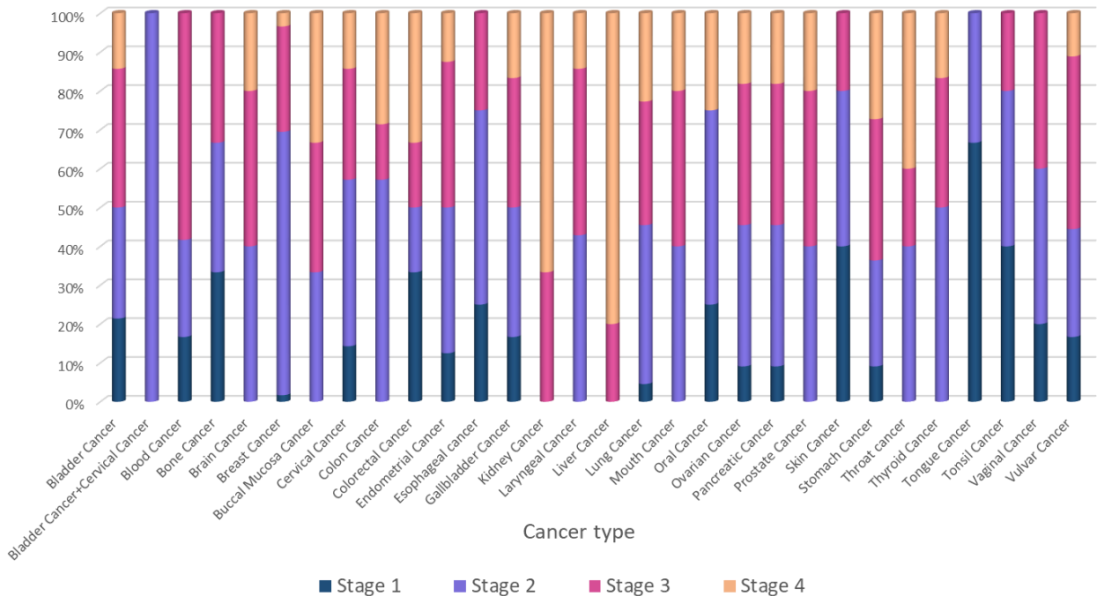

Figure: 02 – Stages of respondents with Cancer type.

Among 280 respondents 30 types of cancer was observed. The cancer type that was in highest number was Breast Cancer 21 %(59), and the lowest was Bladder + Cervical cancer 0.36 %(1).The other types of cancer which was greatly abundant were Lung Cancer 8%(22), Vulvar Cancer 6%(18), Cervical cancer 5%(14), Blood cancer 4% (12), Stomach cancer 4%(11), Pancreatic cancer 4%(11) and Ovarian Cancer 4%(11). The type of cancer that was seen moderately among the respondents were Endometrial cancer 3%(8), Esophageal cancer3%(8), Laryngeal cancer3%(7) and colon cancer 3%(7). The type of cancer that was noticed to a smaller extent amidst the respondents are Bone cancer 2% (6), colorectal cancer 2% (6), and gallbladder cancer 2% (6), thyroid cancer 2% (6), Brain cancer 2% (5), liver cancer 2% (5),mouth cancer 2% (5),prostate cancer 2% (5), skin cancer 2% (5),throat cancer 2% (5), tonsil cancer 2% (5), vaginal cancer 2% (5),Oral cancer 1%(4), tongue cancer 1%(3), kidney cancer 1%(3) and Buccal mucosa cancer 1%(3).(Figure 01)

The 280 respondents with a variety of cancer can also be defined into four cancer stages. 11.1%(31) respondents were Stage 1 cancer patient, 42.5% (119) respondents were Stage 2 cancer patient, there were 31.8% (89) respondent in Stage 3 and 14.6% (41) respondent had Stage 4 cancer. The minimum,

11.1% respondents was in Stage 1 cancer patient while maximum, 42.5% respondents was in Stage 2 cancer patient. For all the type of cancer stage 2 respondents was in highest number compare to other 3 stages. Some cancer such as Bladder cancer, Breast cancer, cervical cancer, colorectal cancer, endometrial cancer, oesophageal cancer, gallbladder cancer, lung cancer, ovarian cancer, pancreatic cancer, stomach cancer and vulvar cancer has respondent from all 4 stages. Patients with Blood cancer, bone cancer, brain cancer, buccal mucosa cancer, colon cancer, laryngeal cancer, mouth cancer, oral cancer, prostate cancer, throat cancer, thyroid cancer, tonsil cancer and vaginal cancer had respondents from 3 types of stages. And respondents having lounge cancer, kidney cancer and liver cancer had patients from only 2 kinds of stages. And one patient who exhibited Bladder cancer and cervical cancer together was from stage 2. (Figure 02)

3.3 Types of Cancer with Symptoms and Stages

SL. No	Symptoms	Total, N=280	Breast Cancer (with stages)				Liver Cancer (with stages)				Vulvar Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)		2										
2	Oral ulcer	6 (2.14%)		1										
3	Weakness	63 (22.5%)	1	12						4			6	
4	Anorexia	63 (22.5%)		6					3		1			
5	Insomnia	13 (4.64%)		2	1									
6	Tingling sensation in hands and legs	3 (1.1%)		2										
7	Abdominal pain	32 (11.43%)		1						4				
8	Nausea	34 (12.14%)		1					3					
9	Breast pain	2 (0.7%)		2										
10	Burning sensation in pelvic	3 (1.1%)												
11	Headache	9 (3.2%)			1									
12	Constipation	21 (7.5%)												
13	Pain in limbs	13 (4.64%)		3									1	1
14	Vertigo	4 (1.4%)		1										
15	Ascites	2 (0.7%)		1										
16	Bipedal edema	7 (2.5%)		1										
17	Cough	32 (11.43%)		4										
18	Vaginal spotting	2 (0.7%)												
19	Itching	15 (5.4%)		4	2								2	
20	Oral mucositis	17 (6.1%)		2	2	1								
21	Lump	9 (3.2%)		1										
22	Pain in anal canal	5 (1.8%)												
23	Body pain	24 (8.6%)		2							1			
24	Tonsilitis	3 (1.1%)		1										
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)		2		1								
28	Hyper acidity	9 (3.2%)												
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)												
31	Pain during deglutition	4 (1.4%)		1										
32	Discoloration of skin	3 (1.1%)		1										
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)												
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)		1										
39	Head nodule	2 (0.7%)												
40	Cold	5 (1.8%)			1									
41	Swelling in neck	4 (1.4%)		1	1									
42	Dysphagia /difficulty swallowing	13 (4.6%)		1	1									
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)			1									
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)												
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)			1									
54	Burning sensation in the anus	6 (2.1%)										1	2	
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)		1										
57	Dysuria/ painful urination	8 (2.9%)										2		
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)		1										
61	Vomiting	15 (5.4%)		1						3				
62	Chalky stools	2 (0.7%)								2				
63	Abdominal swelling	7 (2.5%)								4				
64	Vulva bleeding	2 (0.7%)											1	1

SL. NO.	Symptoms	Total, N=280	Bladder Cancer (with stages)				Thyroid Cancer (with stages)				Lung Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)												
3	Weakness	63 (22.5%)												
4	Anorexia	63 (22.5%)	2									1	1	1
5	Insomnia	13 (4.64%)	1		1							3	1	
6	Tingling sensation in hands and legs	3 (1.1%)								1		2		
7	Abdominal pain	32 (11.43%)												
8	Nausea	34 (12.14%)		1		1								
9	Breast pain	2 (0.7%)		2	1	1		3	1			1		
10	Burning sensation in pelvic	3 (1.1%)												
11	Headache	9 (3.2%)						1	2					
12	Constipation	21 (7.5%)								1			1	
13	Pain in limbs	13 (4.64%)										1	1	
14	Vertigo	4 (1.4%)						2						3
15	Ascites	2 (0.7%)						2						
16	Bipedal edema	7 (2.5%)												
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)		1		1						5	4	3
19	Itching	15 (5.4%)												
20	Oral mucositis	17 (6.1%)												
21	Lump	9 (3.2%)		1	1								1	
22	Pain in anal canal	5 (1.8%)												
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)		2				2					1	
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)										2		
28	Hyper acidity	9 (3.2%)										1		
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)										1		
31	Pain during deglutition	4 (1.4%)										1	1	
32	Discoloration of skin	3 (1.1%)										1		
33	Restlessness	2 (0.7%)										1		
34	Anxiety	1 (0.4%)												
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)											1	
38	Rectal bleeding	1 (0.4%)									1			
39	Head nodule	2 (0.7%)												
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)												
42	Dysphagia /difficulty swallowing	13 (4.6%)							1					
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)												
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)												1
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)												
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)			1	1								
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)												
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)										1		
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. NO.	Symptoms	Total, N=280	Ovarian Cancer (with stages)				Prostate Cancer (with stages)				Tongue Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)				1			1		1			
3	Weakness	63 (22.5%)	1		1	1					1			
4	Anorexia	63 (22.5%)			2	1								
5	Insomnia	13 (4.64%)				1								
6	Tingling sensation in hands and leg	3 (1.1%)							1					
7	Abdominal pain	32 (11.43%)	1	1	3									
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)		2										
11	Headache	9 (3.2%)	1		2	1								
12	Constipation	21 (7.5%)												
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)			1									
15	Ascites	2 (0.7%)			1									
16	Bipedal edema	7 (2.5%)		3	1			1	1					
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)												
19	Itching	15 (5.4%)	1											
20	Oral mucositis	17 (6.1%)									1			
21	Lump	9 (3.2%)												
22	Pain in anal canal	5 (1.8%)	1		2	1		1				1		
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)							1					
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)			1									
27	Peripheral neuropathy	5 (1.8%)			1									
28	Hyper acidity	9 (3.2%)												
29	Dysentery	4 (1.4%)												
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56	Nipple discharge	1 (0.4%)							1					
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)												
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Vaginal Cancer (with stages)				Colon Cancer (with stages)				Brain Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)		1				1	1					
3	Weakness	63 (22.5%)						1	1					
4	Anorexia	63 (22.5%)												
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)	1					1	1			2	1	
7	Abdominal pain	32 (11.43%)										1		
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)								1				
11	Headache	9 (3.2%)										1	2	
12	Constipation	21 (7.5%)												1
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)						2						
16	Bipedal edema	7 (2.5%)												
17	Cough	32 (11.43%)			1									
18	Vaginal spotting	2 (0.7%)												
19	Itching	15 (5.4%)												
20	Oral mucositis	17 (6.1%)								1				
21	Lump	9 (3.2%)	1							1				
22	Pain in anal canal	5 (1.8%)	1					1		1				1
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)						1						
28	Hyper acidity	9 (3.2%)												
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)												
31	Pain during deglutition	4 (1.4%)												
32	Discoloration of skin	3 (1.1%)												
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)												
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)											1	
39	Head nodule	2 (0.7%)												
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)												
42	Dysphagia /difficulty swallowing	13 (4.6%)												
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)												
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)												
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)												
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)												
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Endometrial Cancer (with stages)				Pancreatic Cancer (with stages)				Throat cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)					1	2	3	2		1		1
3	Weakness	63 (22.5%)					1	2	2	1		1		
4	Anorexia	63 (22.5%)		1										
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)			2	1			2	1				
7	Abdominal pain	32 (11.43%)						1	1					
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)												
11	Headache	9 (3.2%)		1	1									
12	Constipation	21 (7.5%)		1										
13	Pain in limbs	13 (4.64%)		1										
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)			2			1						
16	Bipedal edema	7 (2.5%)												
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)			2									
19	Itching	15 (5.4%)			2									1
20	Oral mucositis	17 (6.1%)												
21	Lump	9 (3.2%)												
22	Pain in anal canal	5 (1.8%)												
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)					1	1		1				
28	Hyper acidity	9 (3.2%)						1						
29	Dysentery	4 (1.4%)											1	
30	Chest pain	5 (1.8%)												
31	Pain during deglutition	4 (1.4%)												
32	Discoloration of skin	3 (1.1%)												
33	Restlessness	2 (0.7%)											1	
34	Anxiety	1 (0.4%)				1								
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)	1											
39	Head nodule	2 (0.7%)												
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)										1		
42	Dysphagia /difficulty swallowing	13 (4.6%)												
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)										1		
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)												
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)				1								
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)						1						
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Stomach Cancer (with stages)				Colorectal Cancer (with stages)				Blood Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)				1		1			2	2	1	
3	Weakness	63 (22.5%)		2	3		2	1						
4	Anorexia	63 (22.5%)						1						
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)		1	1				1	1			2	
7	Abdominal pain	32 (11.43%)		1	1	1	1		1				1	
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)										1	1	
11	Headache	9 (3.2%)			1		1			1				
12	Constipation	21 (7.5%)		1										
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)												
16	Bipedal edema	7 (2.5%)								1			2	
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)										1	2	
19	Itching	15 (5.4%)												
20	Oral mucositis	17 (6.1%)	1											
21	Lump	9 (3.2%)												
22	Pain in anal canal	5 (1.8%)				1							2	
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)											2	
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)	1						1					
28	Hyper acidity	9 (3.2%)				1								
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)							1					
31	Pain during deglutition	4 (1.4%)												
32	Discoloration of skin	3 (1.1%)			2									
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)		1										
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)												
39	Head nodule	2 (0.7%)								1				
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)												
42	Dysphagia /difficulty swallowing	13 (4.6%)												
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)								1				
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)												
50	Sore throat	4 (1.4%)										1		
51	Face swelling	1 (0.4%)											2	
52	Eye pain	2 (0.7%)							1					
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)												
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)			1									
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)		1	1	1			1	1				
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)		1	1				1					
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Cervical Cancer (with stages)				Esophageal Cancer (with stages)				Buccal Mucosa Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)					2							
2	Oral ulcer	6 (2.14%)		1				2						
3	Weakness	63 (22.5%)		3	2	1		2					1	1
4	Anorexia	63 (22.5%)	1		1									
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)		2										
7	Abdominal pain	32 (11.43%)												
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)												
11	Headache	9 (3.2%)		2	3									
12	Constipation	21 (7.5%)												
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)												
16	Bipedal edema	7 (2.5%)	1				1	2	1					
17	Cough	32 (11.43%)		1										
18	Vaginal spotting	2 (0.7%)		1										
19	Itching	15 (5.4%)												
20	Oral mucositis	17 (6.1%)												1
21	Lump	9 (3.2%)	1		1									
22	Pain in anal canal	5 (1.8%)						1	1			1		
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)						1						
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)		1	1									
28	Hyper acidity	9 (3.2%)		1										
29	Dysentery	4 (1.4%)						1	1					
30	Chest pain	5 (1.8%)												
31	Pain during deglutition	4 (1.4%)												
32	Discoloration of skin	3 (1.1%)												
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)						1	1					
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)												
39	Head nodule	2 (0.7%)						1	1					
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)					2							
42	Dysphagia /difficulty swallowing	13 (4.6%)						1	1					
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)										1		
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)						2						
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)		2		1								
54	Burning sensation in the anus	6 (2.1%)												
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)												
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)					2							
59	Hoarseness of voice	2 (0.7%)					2							
60	Burning sensation throat	3 (1.1%)						1	1					
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Oral Cancer (with stages)				Kidney Cancer (with stages)				Gallbladder Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)		1						2	1	1		1
3	Weakness	63 (22.5%)		1		1					1	2		1
4	Anorexia	63 (22.5%)												
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)							1	1			1	
7	Abdominal pain	32 (11.43%)		1										
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)												
11	Headache	9 (3.2%)		1										
12	Constipation	21 (7.5%)												
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)												
16	Bipedal edema	7 (2.5%)												
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)												
19	Itching	15 (5.4%)				1								
20	Oral mucositis	17 (6.1%)											1	
21	Lump	9 (3.2%)												
22	Pain in anal canal	5 (1.8%)												
23	Body pain	24 (8.6%)											2	
24	Tonsilitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)								2		1		
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)												
28	Hyper acidity	9 (3.2%)												
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)												
31	Pain during deglutition	4 (1.4%)												
32	Discoloration of skin	3 (1.1%)												
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)												
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)												
39	Head nodule	2 (0.7%)		1										
40	Cold	5 (1.8%)		1										
41	Swelling in neck	4 (1.4%)	1	1										
42	Dysphagia /difficulty swallowing	13 (4.6%)												
43	Burning sensation in body	3 (1.1%)								1				
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)		1										
46	Cheek pain	2 (0.7%)		1										
47	Swelling in mandible	2 (0.7%)		1										
48	Incomplete defecation	1 (0.4%)				1								
49	Burning sensation around lips	1 (0.4%)												
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)												
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)												
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)												
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Skin Cancer (with stages)				Bone Cancer (with stages)				Laryngeal Cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)										1	2	
2	Oral ulcer	6 (2.14%)										1		
3	Weakness	63 (22.5%)												1
4	Anorexia	63 (22.5%)												
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)												
7	Abdominal pain	32 (11.43%)										2	3	
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)										1		
11	Headache	9 (3.2%)										1		
12	Constipation	21 (7.5%)												
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)												
16	Bipedal edema	7 (2.5%)												
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)		1										
19	Itching	15 (5.4%)												1
20	Oral mucositis	17 (6.1%)						1						
21	Lump	9 (3.2%)												
22	Pain in anal canal	5 (1.8%)												
23	Body pain	24 (8.6%)												
24	Tonsilitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)												
28	Hyper acidity	9 (3.2%)												
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)												1
31	Pain during deglutition	4 (1.4%)		1										
32	Discoloration of skin	3 (1.1%)												
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)												
35	Numbness in both limbs	4 (1.4%)										1	3	
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)												
39	Head nodule	2 (0.7%)												
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)												
42	Dysphagia /difficulty swallowing	13 (4.6%)			1									
43	Burning sensation in body	3 (1.1%)												
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)												
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)					1	1	2					
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)												
57	Dysuria/ painful urination	8 (2.9%)					1							
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)										2		
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

SL. No	Symptoms	Total, N=280	Mouth cancer (with stages)				Tonsil Cancer (with stages)				Bladder+ cervical cancer (with stages)			
			1	2	3	4	1	2	3	4	1	2	3	4
1	Palpitation	3 (1.1%)												
2	Oral ulcer	6 (2.14%)					1	1						
3	Weakness	63 (22.5%)		2	1		2	2	1			1		
4	Anorexia	63 (22.5%)												
5	Insomnia	13 (4.64%)												
6	Tingling sensation in hands and legs	3 (1.1%)										1		
7	Abdominal pain	32 (11.43%)										1		
8	Nausea	34 (12.14%)												
9	Breast pain	2 (0.7%)												
10	Burning sensation in pelvic	3 (1.1%)												
11	Headache	9 (3.2%)												
12	Constipation	21 (7.5%)												
13	Pain in limbs	13 (4.64%)												
14	Vertigo	4 (1.4%)												
15	Ascites	2 (0.7%)												
16	Bipedal edema	7 (2.5%)												
17	Cough	32 (11.43%)												
18	Vaginal spotting	2 (0.7%)												
19	Itching	15 (5.4%)		1	2									
20	Oral mucositis	17 (6.1%)		1			1							
21	Lump	9 (3.2%)										1		
22	Pain in anal canal	5 (1.8%)												
23	Body pain	24 (8.6%)												
24	Tonsillitis	3 (1.1%)												
25	Pain in hip joint	1 (0.4%)												
26	Fever	8 (2.9%)												
27	Peripheral neuropathy	5 (1.8%)												
28	Hyper acidity	9 (3.2%)												
29	Dysentery	4 (1.4%)												
30	Chest pain	5 (1.8%)												
31	Pain during deglutition	4 (1.4%)												
32	Discoloration of skin	3 (1.1%)												
33	Restlessness	2 (0.7%)												
34	Anxiety	1 (0.4%)												
35	Numbness in both limbs	4 (1.4%)												
36	Dryness of mouth	5 (1.8%)												
37	Hyper Salivation	1 (0.4%)												
38	Rectal bleeding	1 (0.4%)												
39	Head nodule	2 (0.7%)												
40	Cold	5 (1.8%)												
41	Swelling in neck	4 (1.4%)		2	2	1	1							
42	Dysphagia /difficulty swallowing	13 (4.6%)												
43	Burning sensation in body	3 (1.1%)			1									
44	Unable to talk/ aphasia	2 (0.7%)												
45	Diarrhea	1 (0.4%)												
46	Cheek pain	2 (0.7%)												
47	Swelling in mandible	2 (0.7%)												
48	Incomplete defecation	1 (0.4%)												
49	Burning sensation around lips	1 (0.4%)						1						
50	Sore throat	4 (1.4%)												
51	Face swelling	1 (0.4%)												
52	Eye pain	2 (0.7%)												
53	Shortness of breath/dyspnea	3 (1.1%)												
54	Burning sensation in the anus	6 (2.1%)												
55	Ewings sarcoma	4 (1.4%)												
56	Nipple discharge	1 (0.4%)										1		
57	Dysuria/ painful urination	8 (2.9%)												
58	Sacroiliitis	1 (0.4%)												
59	Hoarseness of voice	2 (0.7%)												
60	Burning sensation throat	3 (1.1%)												
61	Vomiting	15 (5.4%)												
62	Chalky stools	2 (0.7%)												
63	Abdominal swelling	7 (2.5%)												
64	Vulva bleeding	2 (0.7%)												

Table 03: Cross tabulation between stages of cancer types and Symptoms

A total of 280 respondents of 30 different types of cancers were taken for this study and among these respondents, 64 types of different symptoms were observed. Different types of cancers like breast, liver, vulvar, thyroid, lung, ovarian, prostate, tongue, vaginal, colon, brain endometrial, pancreatic, throat, stomach, colorectal, blood, cervical, esophageal, buccal mucosa, oral, kidney, gall bladder, bladder, skin, mouth, bone, laryngeal, tonsil, cervical+ bladder (exceptional) were our concern of the study. In this table, the stages of cancer (1,2,3,4) along with the symptoms are included like palpitation n=3 (1.1%), oral ulcer n=6 (2.14%), weakness n=63 (22.5%), anorexia n=63 (22.5%), insomnia n=13 (4.64%), tingling sensation in hands and legs n=3 (1.1%), abdominal pain n=32 (11.43 %), nausea n=34 (12.14%), breast pain n=2 (0.7%), burning sensation in pelvic n=3 (1.1%), headache n=9 (3.2%), constipation n=21 (7.5%), pain in limbs n=13 (4.64%), vertigo n=4 (1.4%), ascites n=2 (0.7%), bipedal edema n=7 (2.5 %), cough n=32 (11.43%), vaginal spotting n=2 (0.7%), itching n=15 (5.4%), oral mucositis n=17 (6.1%), lump n=9 (3.2%), pain in the anal canal n=5 (1.8%), body pain n=24 (8.6%), tonsilitis n=3 (1.1%), pain in hip joint n=1 (0.4%), fever n=8 (2.9%), peripheral neuropathy n=5 (1.8%), hyperacidity n=9 (3.2%), dysentery n=4 (1.4%), chest pain n=5 (1.8%), pain during deglutition n=4 (1.4%), discoloration of skin n=3 (1.1%), restlessness n=2 (0.7%), anxiety n=1 (0.4%), numbness in both limb n=4 (1.4%), dryness of mouth n=5 (1.8%), hyper salivation n=1 (0.4%), rectal bleeding n=1 (0.4%), head nodule n=2 (0.7%), cold n=5 (1.8%), swelling in neck n=4 (1.4%), difficulty in swallowing n=13 (4.6%), burning sensation in body n=3 (1.1%), unable to talk n=2 (0.7%), diarrhea n=1 (0.4%), cheek pain n=2 (0.7%), swelling in mandible n=2 (0.7%), incomplete defecation n=1 (0.4%), burning sensation around lips n=1 (0.4%), sore throat n=4 (1.4%), face swelling n=1 (0.4%), eye pain n=2 (0.7%), shortness of breath n=3 (1.1%), burning sensation in anus n=6 (2.1%), Ewings sarcoma n=4 (1.4%), nipple discharge n=1 (0.4%), painful urination n=8 (2.9%), sacroiliitis n=1 (0.4%),

hoarseness of voice n=2 (0.7%), burning sensation throat n=3 (1.1%), vomiting n=15 (5.4%), chalky stools n=2 (0.7%), abdominal swelling n=7 (2.5%), vulva bleeding n=2 (0.7%) in different stages (1,2,3,4) of cancers reported. Overall, it has been observed that the number of patients having different symptoms in stage-2 and stage-3 is comparatively more than the other two stages.

3.4 Cancer stages with symptoms

Sl. NO.	Symptoms	Total,N=535, n(%)	Stage-1	Stage-2	Stage-3	Stage-4
1	Abdominal pain	32 (6)	1	11	13	7
2	Abdominal swelling	7 (1)		1	2	4
3	Anorexia	63 (12)	10	29	17	7
4	Anxiety	1 (0)			1	
5	Ascites	2(0)		1	1	
6	Bipedal edema	7 (1)		4	3	
7	Body pain	24 (4)	1	11	6	6
8	Breast pain	2 (0)		2		
9	Burning sensation around lips	1 (0)				1
10	Burning sensation in anus	6 (1)		3	2	1
11	Burning sensation in body	3 (1)		1	2	
12	Burning sensation in pelvic	3 (1)		1	2	
13	Burning sensation throat	3 (1)	2	1		
14	Chalky stools	2 (0)			2	
15	Cheek pain	2 (0)	2			
16	Chest pain	5 (1)		2	3	
17	Cold	5 (1)		2	2	1
18	Constipation	21 (4)	2	7	10	2
19	Cough	32 (6)	2	16	9	5
20	Diarrhea	1 (0)				1
21	Discoloration of skin	3 (1)		3		
22	Dryness of mouth	5 (1)		1	4	
23	Dysentery	4 (1)		3		1
24	Dysphagia /difficulty swallowing	13 (2)	4	5	3	1
25	Dysuria/ painful urination	8 (1)		3	3	2
26	Ewings sarcoma	4 (1)	1	1	2	
27	Eye pain	2 (0)			2	
28	Face swelling	1 (0)		1		
29	Fever	8 (1)		4	2	2
30	Head nodule	2 (0)	1		1	
31	Headache	9 (2)		4	3	2
32	Hoarseness of voice	2 (0)	2			
33	Hyper acidity	9 (2)	2	3	3	1
34	Hyper Salivation	1 (0)	1			
35	Incomplete defecation	1 (0)		1		
36	Insomnia	13 (2)	2	6	3	2
37	Itching	15 (3)		7	8	
38	Lump	9 (2)	3	3	1	2
39	Nausea	34 (6)	2	15	15	2
40	Nipple discharge	1 (0)		1		
41	Numbness in both limb	4 (1)		2	1	1
42	Oral mucositis	17 (3)	1	4	8	4
43	Oral ulcer	6 (1)	3	1	2	
44	Pain during deglutition	4 (1)		2	1	1
45	Pain in anal canal	5 (1)	2	1	1	1
46	Pain in hip joint	1 (0)			1	
47	Pain in limbs	13 (2)		7	1	5
48	Palpitation	3 (1)		2	1	
49	Peripheral neuropathy	5 (1)		3	2	
50	Rectal bleeding	1 (0)		1		
51	Restlessness	2 (0)			2	
52	Sacroiliitis	1 (0)	1			
53	Shortness of breath/dyspnea	3 (1)			2	1
54	Sore throat	4 (1)		4		
55	Swelling in mandible	2 (0)		1	1	
56	Swelling in neck	4 (1)		2	2	
57	Tingling sensation in hands and legs	3 (1)		2		1
58	Tonsilitis	3 (1)		1	2	
59	Unable to talk/ asphasia	2 (0)			1	1
60	Vaginal spotting	2 (0)		1	1	
61	Vertigo	4 (1)		4		
62	Vomitting	15 (3)		7	3	5
63	Vulva bleeding	2 (0)			1	1
64	Weakness	63 (12)	7	30	13	13

Table 04: Stages of Cancers with Symptoms

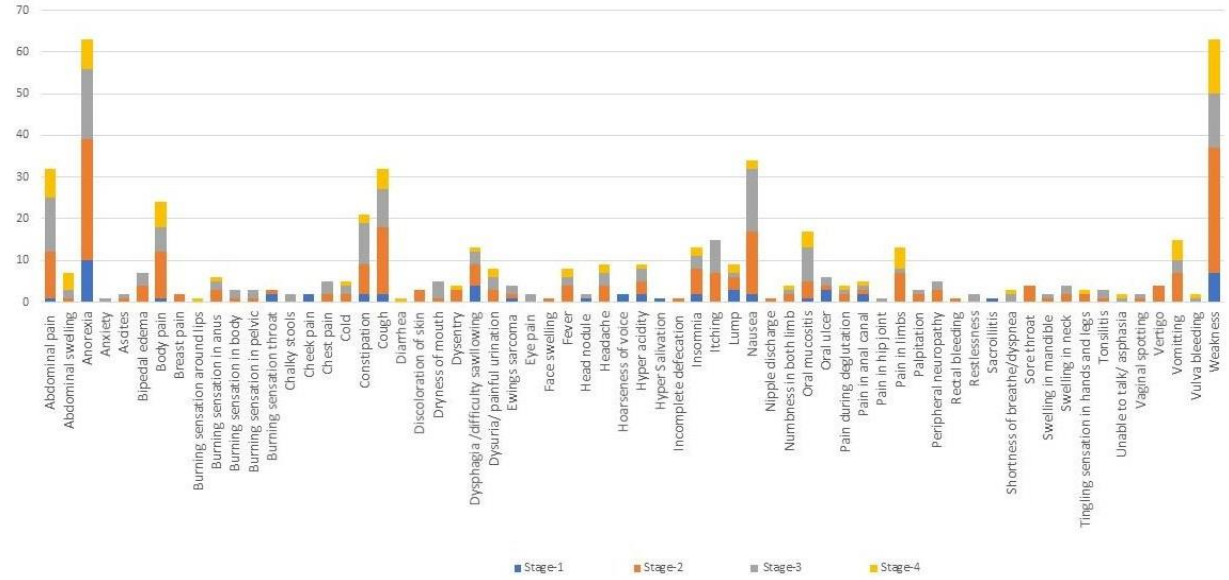

Figure 03: Stages of Cancer Patients with Symptoms

In Table 4 and figure 3, there were 64 distinct symptoms in total, 535 in 30 different tumors. The two stages with the highest rates of symptoms were stage 2 (42.6%) and stage 3 (32%) of reported malignancies), respectively. For instance, in stage 1, anorexic individuals reported 10 persistent symptoms, whereas only 9.7% of patients reported additional symptoms including a burning sensation in the throat, difficulty swallowing, or an oral ulcer. In addition, although anorexia was the main symptom in stage 2, quite a few patients also experienced abdomen discomfort, body ache, a cough, and nausea. Stage 3 symptoms included anorexia as well as abdominal pain, a cough, nausea, constipation, and itching. Finally, of the 15.7% of symptoms reported in stage 4, anorexia and abdominal discomfort were the most common, with very few patients reporting any other symptoms.

In Table 4 and figure 3, overall, there were 64 unique symptoms, with 535 occurring in 30 different cancers. Stage 2 (42.6%) and stage 3 (32%) of reported cancers had the highest frequencies of symptoms, respectively. In our analysis, stage 2 patients accounted for 42.5% of all reported patients, whereas stage 3 patients accounted for 31.8% of all reported patients.

For instance, only 9.7% of patients reported additional symptoms such as a burning sensation in the throat, difficulty swallowing, or an oral ulcer, compared to stage 1 anorexic persons who reported 10 persisting symptoms. However, only 11.1% of patients were documented at stage 1, which was the lowest amount. Though anorexia was the primary symptom in stage 2, many patients also reported having abdominal pain, body aches, a cough, and nausea. Anorexia was one of the stage 3 symptoms, along with nausea, constipation, abdominal pain, a cough, and itching. Anorexia and abdominal pain were the most prevalent symptoms among the 14.64 % of patients who reported stage 4, where 15.7 % of symptoms were reported, and very few patients reported any additional symptoms.

3.5 Correlation of comorbidities with cancer

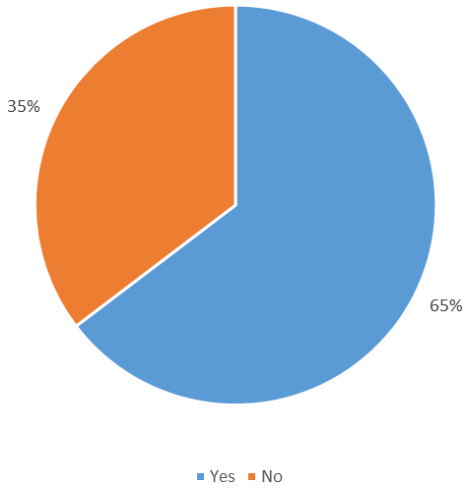

Figure 04: Presence of comorbidities among the respondents

Among the 280 respondents, 64.6% (181) patients had various comorbidities and 35.4% (99) respondents did not have any co-occurring conditions.

Cancer	No Co-morbidity, n=99	Acute kidney injury (AKI), n=2	Alcoholic liver disease,n=1	anemia, n=1	arthirits, n=5	Atrial fibrillation (AF), n=1	Autoimmune hemolytic anemia (AIHA), n=3
Breast Cancer	18				2		
Liver Cancer							3
Vulvar Cancer	10						
Bladder Cancer	5	2					
Thyroid Cancer	3						
Lung Cancer	7			1			
Ovarian Cancer	3						
Prostate Cancer	1						
Tongue Cancer	3						
Vaginal Cancer	1						
Colon Cancer	2		1				
Brain Cancer	3						
Endometrial Cancer	1					1	
Pancreatic Cancer	3						
Throat cancer	1						
Stomach Cancer	3						
Colorectal Cancer	3						
Blood Cancer	8				2		
Cervical Cancer	7						
Esophageal cancer	3						
Buccal Mucosa Cancer	1						
Oral Cancer	2						
Kidney Cancer							
Gallbladder Cancer							
Skin Cancer	2						
Bone Cancer	3				1		
Laryngeal Cancer	2						
Tonsil Cancer	2						
Mouth Cancer	2						
Bladder Cancer+ Cervical Cancer							

Cancer	Benign Prostatic Enlargement (BEP), n=3	Beta thalassemia trait, n=1	Bronchial asthma (BA), n=11	Cardiovascular disease, n=3	Cervical spondylosis, n=1	Cholelithiasis, n=7	Chronic Kidney disease (CKD), n=6
Breast Cancer		1	2				
Liver Cancer	2						
Vulvar Cancer							
Bladder Cancer							
Thyroid Cancer							
Lung Cancer			1	1	1	2	1
Ovarian Cancer			1				1
Prostate Cancer							
Tongue Cancer							
Vaginal Cancer							
Colon Cancer				1			
Brain Cancer							
Endometrial Cancer			1				
Pancreatic Cancer							2
Throat cancer							
Stomach Cancer			2				1
Colorectal Cancer							
Blood Cancer							
Cervical Cancer						3	1
Esophageal cancer							
Buccal Mucosa Cancer							
Oral Cancer							
Kidney Cancer			2				
Gallbladder Cancer			2				
Skin Cancer							
Bone Cancer							
Laryngeal Cancer				1			
Tonsil Cancer	1						
Mouth Cancer						2	
Bladder Cancer+ Cervical Cancer							

Cancer	Chronic obstructive pulmonary disease (COPD), n=3	Chronic peptic ulcer disease, n=1	chronic rheumatic heart disease (CRHD), n=1	Chronic Type B viral hepatities, n=3	Claustrophobia, n=1	colostostomy bag in situ, n=1	Coronary artery bypass graft (CABG), n=1
Breast Cancer	1						
Liver Cancer				3			
Vulvar Cancer							
Bladder Cancer							
Thyroid Cancer							
Lung Cancer	2						
Ovarian Cancer							
Prostate Cancer						1	
Tongue Cancer							
Vaginal Cancer							
Colon Cancer							
Brain Cancer							
Endometrial Cancer			1				
Pancreatic Cancer							
Throat cancer							
Stomach Cancer		1					
Colorectal Cancer							
Blood Cancer							
Cervical Cancer							
Esophageal cancer					1		
Buccal Mucosa Cancer							
Oral Cancer							
Kidney Cancer							
Gallbladder Cancer							
Skin Cancer							
Bone Cancer							
Laryngeal Cancer							1
Tonsil Cancer							
Mouth Cancer							
Bladder Cancer+ Cervical Cancer							

Cancer	Covid-19, n=1	Diabetes Mellitus (DM), n=84	Dyslipidemia, n=4	Hemorrhoidectomy, n=1	Hepatitis B, n=1	Heterotopic ossification (HO) stroke, n=1	Hypertension (HTN), n=125
Breast Cancer		22		1	1		30
Liver Cancer							3
Vulvar Cancer		3					5
Bladder Cancer	1	2	1				6
Thyroid Cancer		3					2
Lung Cancer		6					11
Ovarian Cancer		2					5
Prostate Cancer		2					4
Tongue Cancer							
Vaginal Cancer		1					2
Colon Cancer		3					2
Brain Cancer		1					2
Endometrial Cancer		5	1				5
Pancreatic Cancer		3					4
Throat cancer		1					1
Stomach Cancer		5	2				7
Colorectal Cancer		2					3
Blood Cancer		3					
Cervical Cancer		1					5
Esophageal cancer		3					3
Buccal Mucosa Cancer		1					2
Oral Cancer		1					2
Kidney Cancer		2					3
Gallbladder Cancer		3					3
Skin Cancer		3					1
Bone Cancer		2					3
Laryngeal Cancer		1					4
Tonsil Cancer		3				1	3
Mouth Cancer							3
Bladder Cancer+ Cervical Cancer						1	

Cancer	Hypothyrodism, n=34	Ischemic heart disease (IHD), n=6	Ischemic heart disease Percutaneous coronary intervention (IHD-PCI), n=1	Kidney stone, n=1	Lipoma, n=1	Lumbar spondylosis, n=6	Multiple sclerosis(MS), n=1
Breast Cancer	15						
Liver Cancer		3					
Vulvar Cancer	4						
Bladder Cancer	4	1					
Thyroid Cancer							
Lung Cancer				1	1		
Ovarian Cancer						2	
Prostate Cancer							
Tongue Cancer							
Vaginal Cancer	1	1					
Colon Cancer							
Brain Cancer							
Endometrial Cancer	1	1					1
Pancreatic Cancer	4						
Throat cancer	2						
Stomach Cancer			1				
Colorectal Cancer							
Blood Cancer							
Cervical Cancer	1						
Esophageal cancer						2	
Buccal Mucosa Cancer							
Oral Cancer							
Kidney Cancer							
Gallbladder Cancer							
Skin Cancer							
Bone Cancer	1						
Laryngeal Cancer	1						
Tonsil Cancer						2	
Mouth Cancer							
Bladder Cancer+ Cervical Cancer							

Cancer	Nonalcoholic steatohepatitis (NASH), n=1	Old cannabidiol (CBD), n=1	Osteoarthritis, n=1	Osteopenia, n=1	Peptic ulcer disease, n=1	percutaneous transluminal coronary angioplasty (PTCA), n=1
Breast Cancer						1
Liver Cancer						
Vulvar Cancer						
Bladder Cancer						
Thyroid Cancer						
Lung Cancer			1			
Ovarian Cancer						
Prostate Cancer					1	
Tongue Cancer						
Vaginal Cancer						
Colon Cancer						
Brain Cancer						
Endometrial Cancer	1					
Pancreatic Cancer						
Throat cancer						
Stomach Cancer						
Colorectal Cancer						
Blood Cancer						
Cervical Cancer						
Esophageal cancer				1		
Buccal Mucosa Cancer						
Oral Cancer						
Kidney Cancer						
Gallbladder Cancer						
Skin Cancer		1				
Bone Cancer						
Laryngeal Cancer						
Tonsil Cancer						
Mouth Cancer						
Bladder Cancer+ Cervical Cancer						

Cancer	Post Coronary artery angiography (CAG), n=1	Pulmonary tuberculosis, n=2	Rheumatoid arthritis (RA), n=1	Transurethral resection of the prostate (TURP), n=1	Type II Diabetes, n= 2	UTI,n=1
Breast Cancer		2	1		1	
Liver Cancer						
Vulvar Cancer						
Bladder Cancer	1					
Thyroid Cancer						
Lung Cancer				1		
Ovarian Cancer						
Prostate Cancer						
Tongue Cancer						
Vaginal Cancer						
Colon Cancer						
Brain Cancer						
Endometrial Cancer					1	1
Pancreatic Cancer						
Throat cancer						
Stomach Cancer						
Colorectal Cancer						
Blood Cancer						
Cervical Cancer						
Esophageal cancer						
Buccal Mucosa Cancer						
Oral Cancer						
Kidney Cancer						
Gallbladder Cancer						
Skin Cancer						
Bone Cancer						
Laryngeal Cancer						
Tonsil Cancer						
Mouth Cancer						
Bladder Cancer+ Cervical Cancer						

Table 05: Comorbidities of respondents in different cancer type

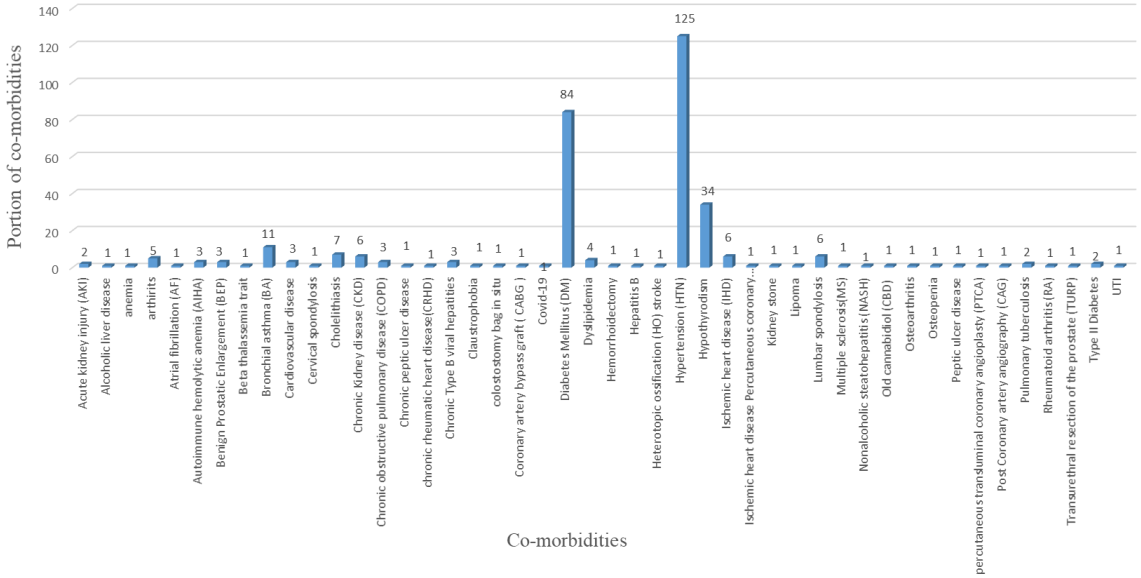

Figure 05: Numbers of respondent's comorbidities

A total of 47 different types of co morbidities was recorded and among them the greatest number of reported comorbidities were Hypertension (37%), Diabetes Mellitus (25%) and

Hypothyroidism (10%). Other comorbidities included Acute kidney injury (1%), Alcoholic liver disease (0.1%), anaemia (0.1%), arthritis (1%), atrial fibrillation (0.1%), Autoimmune haemolytic anaemia (1%), Benign Prostatic Enlargement (1%), Beta thalassemia trait (0.1%), Bronchial asthma (3%), Cardiovascular disease (1%), Cervical spondylosis(0.1%), Cholelithiasis (2%), Chronic Kidney disease (2%), Chronic obstructive pulmonary disease (1%), Chronic peptic ulcer disease (0.1%), chronic rheumatic heart disease (0.1%), Chronic Type B viral hepatitis (1%), Claustrophobia (0.1%), colostostomy bag in situ(0.1%), Coronary artery bypass graft (0.1%), Covid-19 (0.1%), Dyslipidaemia (1%), Haemorrhoidectomy(0.1%), Hepatitis B(0.1%), Heterotopic ossification stroke(0.1%), , Ischemic heart disease (2%), Ischemic heart disease Percutaneous coronary intervention (0.1%), Kidney stone (0.1%), Lipoma (0.1%), Lumbar spondylosis (2%),Multiple sclerosis(0.1%), Non-alcoholic steatohepatitis (0.1%), Old cannabidiol (0.1%), Osteoarthritis(0.1%), Osteopenia (0.1%), Peptic ulcer disease (0.1%), Percutaneous transluminal coronary angioplasty (0.1%), Post Coronary artery angiography (0.1%), Pulmonary tuberculosis (1%), Rheumatoid arthritis (0.1%), Transurethral resection of the prostate (0.1%), Type II Diabetes(1%) and UTI(0.1%).

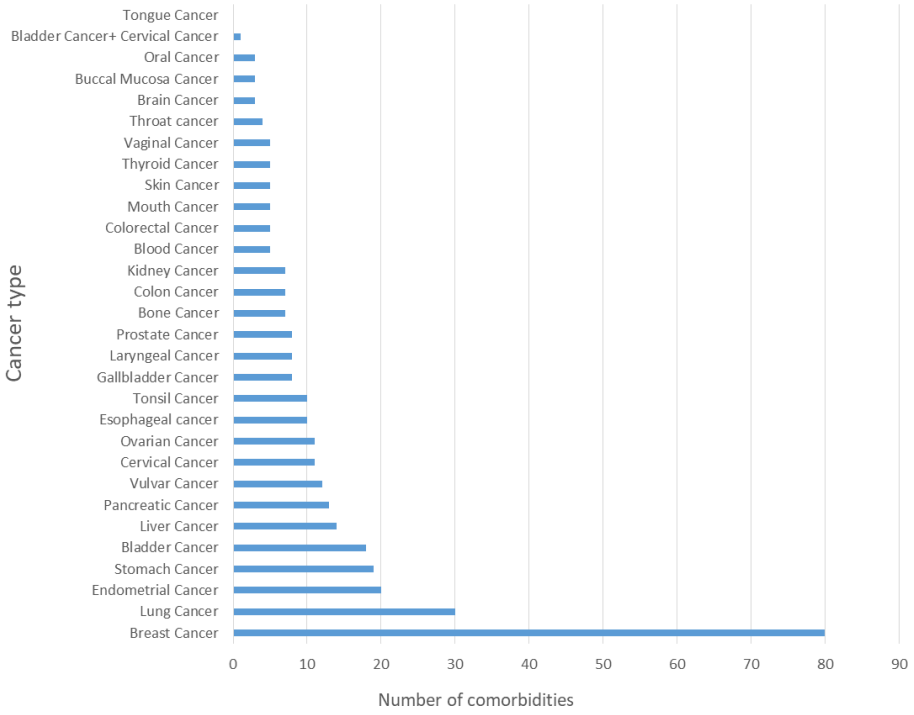

Figure 07: Comorbidities of respondent with Cancer type

Among the 181 respondents who had comorbidities, patients with breast cancer had the most, 23.7% co morbidities, whereas patients with tongue cancer did not have any, 0% comorbidities. The following number of comorbidities were found in various types of cancer patients. Lung Cancer patients had (9%), Endometrial Cancer and Stomach Cancer patients had (6%) , Bladder Cancer (5%) ,Liver Cancer, Pancreatic Cancer and Vulvar Cancer had (4%). Patient with Cervical Cancer, Ovarian Cancer, Esophageal cancer and Tonsil Cancer had (3%) co morbidities. (2%) comorbidity was seen in patients having Gallbladder Cancer, Laryngeal Cancer, Prostate Cancer, Bone Cancer, Colon Cancer and Kidney Cancer. Rest of the cancer type such as Blood Cancer, Colorectal Cancer, Mouth Cancer, Skin Cancer, Thyroid Cancer, Vaginal Cancer, Throat cancer, Brain Cancer, Buccal Mucosa Cancer, Oral Cancer showed (1%) comorbidities.

3.6 Clinical findings of the respondents

Biochemical reports	Respondents, n(%) N=280	Within the range, n(%) N=392	above range, n(%) N=154	below range, n(%) N=13
SGPT(ALT)-Serum/ IU/L Reference Range: <50	280	184(65.71)	96(34.29)	
Creatinine/ µmol/L Reference Range: 62:00 -115.00	280	209(74.64)	58(20.71)	13(4.64)

Table 6: Biochemical report of the cancer patients

Table (6) represents the biochemistry test data of cancer patients. In the case of SGPT (ALT) levels, the reference range is <50 IU/L, and 65.71% (n=184) respondents had their SGPT level within the reference range, 34.29% (n=96) had it above the range and no respondents had it below the reference range. In the case of the Creatinine level, the reference range is 62-115 µmol/L, and most of the respondents which are 74.64% (n=209) had their creatinine level within the range, 20.71% (n=58) respondents had their level above the range while only 4.64% (n=13) had their creatinine level below the reference range.

Haematology N=280	Within the range, n(%)	above range, n(%)	below range, n(%)
Hb (Haemogloin)/ gm /dl Reference range: 11.5-16.5	78(27.86)	0	202(72.14)
ESR/ mm in 1st hour Reference range:F<20 mm,M<12 mm			
Male, n=93	2(2.15)	91(97.85)	
Female, n=187	11(5.88)	176(94.12)	
RBC Count/ x10^12/L Reference range : 3.80-5.50	113(40.36)	3(1)	164(58.57)
WBC/ x 10^9/L Reference range: 4.00-11.00	197(70.36)	51(18.21)	32(11.43)
Neutrophils/% Reference range: 40.00-75.00	132(47.14)	144(51.43)	4(1.43)
Lymphocytes/% Reference range:20.00-40.00	108(38.57)	6(2.14)	166(59.29)
Monocytes/% Reference range:2.00-8.00	225(80.36)	50(17.86)	5(1.7)
Eosinophils/% Reference range:1.00-6.00	226(80.7)	5(1.7)	49(17.5)
Basophils/% Reference range:<01	270(96.43)	10(3.57)	0
Platelets count/x 10^9/L Reference range: 150-450	155 (55.36)	32(11.43)	93(33.21)

Table 7: Hematological report of the cancer patients

Table (7) portrays the CBC report data of the cancer patients. It depicts the reports of the respondents' hemoglobin level, ESR rate, RBC, WBC, Neutrophils, lymphocytes, monocytes, eosinophils, and platelets count. In the case of Hemoglobin, the normal range is 11.5-16.5 gm/dl where 27.86% (n=78) respondents had their level within the reference range and 72.14% (n=202) had it below the range leaving no respondents with a hemoglobin level above the normal range. Regarding the Erythrocyte Sedimentation Rate (ESR), the reference range is <12 mm for males and <20 mm for females. Of the male respondents, only 2.15% (n=2) had their ESR rate within the range and 97.85% (n=91) had a rate above the range. Of female respondents, 94.12% (n=176) had an ESR rate above the range while only 5.88% (n=11) had it within the range. As for RBC count, the reference range is from 3.80 to 5.50 x10^12/L, and 58.57% (n=164) of respondents had an RBC count below the range, 40.36% (n=113) of them

had a count within the range leaving only 1% (n=3) of the respondents with a rate above the range. In the matter of WBC count, the reference range is 4-11x 10^9/L where 70.36% (n=197) respondents' WBC count was within the range, 18.21% (n=51) respondent's count was above the range while only 11.43% (n=32) of them had a count below the reference range. Concerning neutrophils count, the reference range is 40-75%, and 47.14% (n=132) respondents had neutrophils count within the range, 51.43% (n=144) had a count over the range while only 1.43% (n=4) respondents had their neutrophils count below the reference range. In the case of lymphocytes, the reference range is 20-40% where 38.57% (n=108) respondents had lymphocyte count within the range, 59.29% (n=166) had it below the range and only 2.14% (n=6) of the patients had a count above the reference range. As for monocyte count, most of the respondents which are 80.36% (n=225) had a count within the normal range, 17.86% (n=50) of the respondents had a count above the range while only 1.7% (n=5) of them had a monocyte count below the reference range. Regarding Eosinophil count, the reference range is 1-6%, and the majority of the respondents which is 80.7% (n=226) had a count within the range, 17.5% (n=49) of them had a count below the range and only 1.7% (n=5) of them had an eosinophil count over the reference range. In the case of Basophil count, 96.43% (n=270) of the respondents had a count within the reference range and 3.57% (n=10) of them had an above-the-range basophil count. Finally, for platelet count, 55.36% (n=155) of the respondents had their platelets well within the range, 11.43% (n=32) of them had a count above the range and 33.21% (n=93) of the respondents had a platelet count below the reference range which is 150-450x 10^9/L.

Chapter 4

Discussion:

This is a descriptive cross-sectional study based on the demographic data, types, stages, symptoms, and clinical characteristics of 30 different types of cancer. The data have been collected from the patients who were either examined or admitted to the Labaid Cancer Hospital and Super Speciality Center.

The types of data that have been collected were based on the availability of all the features like age, gender, symptoms, and comorbidity which has a significant association with various kinds of cancers. The demographic data represents the age and gender of the respondents, in our study most of the respondents were female and the age range was between 11 years to 85 years. Out of 280 respondents with 30 types of cancers, breast cancer was the highest in number, also patients from stage 2 and stage 3 had an elevated number of symptoms and comorbidities reported.

By inspecting the biochemical reports, if the SGPT (ALT) levels are out of reference range then that indicates an impairment in liver function and it also works as a possible biomarker. Also, kidney function observed through creatinine level was correlated with the risk of cancer. Similarly, in hematological reports, high ESR, WBC, low hemoglobin, neutrophil, and platelet count had a strong correlation with the progression of cancer.

The socio-demography findings of this study depict that 33.2% were male, 66.8% were female. There was greater number of female respondent than male as certain kinds of cancer affect women more often than men. It is crucial to remember, however, that not all types of cancer are more common in women. The causes of gender variations in cancer rates are complex and

vary depending on the type of cancer. (National Cancer Institute, 2022) A few variables that may contribute to women's greater cancer incidence are Factors Biological, Hormonal Variables, Screening Practices, Occupational Exposures, and Reproductive Factors (Balwierz, Biernat, & Siodłak, 2023).

The mean age of the respondents was 54.54 years, which was consistent with the findings (WebMD, 2022)**.** 92.1% of the 280 patients who were diagnosed with cancer reported having medical symptoms. 30.4 %(85) of the 92.1% symptomatic respondents were male, whereas 61.7 %(173) were female. The lowest age among the respondents was 11 year who was patient of Bone cancer and the highest was 76 year respondent was patient of Ovarian Cancer. It was seen 78% of the respondent was above 45 year. The most important risk factor for the condition is age. People aged 45 and up account for more than nine out of ten cancer diagnoses. (WebMD, 2022).

Among 280 respondents Breast Cancer 21 %(59) was in highest in number as for this study the amount of female respondent was greater 66.8%. Vulvar Cancer 6 %(18), Cervical cancer 5 %(14) and Ovarian Cancer 4 %(11) are the other types of cancer that was greatly abundant in female respondents, the responses regarding the type of cancer were consistent with (Hussain, 2013). The other types of cancer which was greatly abundant, were Lung Cancer 8 %(22), Stomach cancer 4 %(11), Pancreatic cancer 4 %(11) are three prevalent cancers in males. Other types of cancers are oesophagus cancer and stomach cancer which was seen in other findings (Hussain, 2013).

The stage of your cancer describes its severity, including the size of the tumor and if it has spread. Among the 280 respondents, 11.1% (31 respondents) had stage 1 cancer, 42.5% (119 respondents) had stage 2 cancer, 31.8% (89) had stage 3 cancer, and 14.6% (41) had stage 4

cancer. Understanding the cancer's stage can help you determine its severity, your prognosis, and the best course of therapy. Even if a cancer worsens or spreads, it is always referred to by the stage that was assigned to it at diagnosis. The initial stage is updated to reflect new knowledge regarding how a cancer has evolved over time. Consequently, the cancer may change in stage while the stage does not (National Cancer Institute, 2022).

Anorexia (22.5%) and weakness 22.5%) were the two symptoms that 280 individuals with 30 different types of cancers reported experiencing the most frequently out of every symptom. Following this, abdominal pain (11.43%) and nausea (12.14%) were the second most common types of symptoms among the patients assessed. A lump, bipedal edema, difficulty swallowing, itching, constipation, vomiting, insomnia, and acidity weren't necessarily symptoms of every form of cancer we listed. Additionally, symptoms for a specific form of cancer included rectal bleeding (0.4%), vulva bleeding (0.7%), face swelling (0.4%), numbness and discomfort in extremities, pain in the eye (0.7%), palpitations (1.1%), etc. For instance, nipple discharge and rectal bleeding were signs of breast cancer, hip pain indicated prostate cancer, and sacroiliitis indicated bone cancer. Similar to this, bipedal edema was a sign of a few cancers, including ovarian, colon, endometrial, and pancreatic tumors. There are a few symptoms that are common for most of the types of cancers in different stages, also, few symptoms were observed for any particular cancer. For the majority of cancer types in various stages, there are a few symptoms that are typical, and only a few signs have been seen for each particular disease. Globally, a lump or mass in the breast is the most typical indicator of breast cancer. Other symptoms include skin irritability, redness, scaliness, and nipple abnormalities or spontaneous nipple discharge (American Cancer Society, 2018).

Based on our data, general weakness has been the most typical breast cancer symptom. It was also accompanied by other symptoms such as oral mucositis, nipple discharge, and itching/skin irritation throughout different stages of cancer. Anorexia, abdominal pain, and swelling have been prevalent cases of liver cancer both internationally and according to our data, but liver enlargement, which is the most typical clinical symptom globally in advanced stages, was not seen in our data. The symptoms of liver cancer usually appear at the higher stages. Blood in the urine or other symptoms, such as increased frequency or urgency of urination or discomfort or irritation during urination are the symptoms that are less common in our country that help higher-resource countries identify bladder cancer early. The most common symptoms of bladder cancer have been weakness and painful urination mostly in stage-1 and 2. Rectal bleeding, blood in the stool, abdominal pain, a decrease in appetite, and weight loss are among the symptoms. Sometimes, cancer-related blood loss results in anemia, which produces symptoms including weakness and restlessness (American Cancer Society, 2018). Similar to other countries, colon cancer commonly manifests as weakness, anorexia, and abdominal pain in our country in stage 2, stage, and stage 4.

The most prevalent symptoms of lung cancer, which worsen with increasing stage number, include a chronic cough, blood-stained sputum, chest pain, hoarseness of voice, and shortness of breath (American Cancer Society, 2018). Similar to what we've seen from our data, cough, fever, and limb pain are typical symptoms in Bangladesh as well. Globally, the most typical symptoms of esophageal cancer are discomfort or difficulty swallowing and weight loss, while in our country (according to our statistics), the most typical cases are anorexia, weakness, oral ulcers, cough, difficulty swallowing, and sore throat noticed in stage 1 and stage 2. Also, globally it has been observed that as stomach cancer progresses, symptoms may include nausea, upper abdominal pain or discomfort, constipation or diarrhea, bloody stools, bloody vomiting,

loss of appetite, weight loss, anemia, and feelings of fullness or pressure in the stomach (American Cancer Society, 2018).

Similar to our data, the most frequent instances included anorexia, abdominal pain, swelling, nausea, and vomiting observed in stage 2 and stage 3. In the case of cervical cancer, anorexia, insomnia, constipation, vaginal spotting, and pain in the anus are the common symptoms throughout all the stages but globally the most common symptom is abnormal vaginal bleeding.

Staging of cancer is a way of describing the extent and spread of cancer in the body. The stage of cancer can help healthcare professionals determine the appropriate treatment options and provide a prognosis for the patient.

The staging of cancer can be related to the symptoms experienced by patients, as different stages of cancer may cause different symptoms. For example, early-stage cancer may not cause any noticeable symptoms, while advanced-stage cancer may cause more severe symptoms (Davis,2022). Despite the fact that basic signs and symptoms are not highly specific, cancer symptoms and signs vary depending on the precise type and stage of cancer. Cancer symptoms and indicators vary depending on the type of cancer, its location, and/or the extent of the cancer cells' dissemination. Cancers are frequently classified according to their kinds, symptoms, and staging, which is carried out through various tests like biopsies. Stage 1 typically denotes cancer that is mild and localized to the organ where it first developed. Stage 2 typically denotes that the tumor has grown more significantly than in stage 1 but that cancer has not yet begun to spread to the nearby tissues. Stage 2 can also refer to the spread of cancer cells into nearby lymph nodes. This is dependent upon the specific type of cancer. A more severe cancer is typically indicated by stage 3. There are cancer cells in the neighboring lymph nodes, and they

may have already begun to spread to the tissues around them. Stage 4 indicates that cancer has moved from the original site to another organ of the body (National Cancer Institute,2022).

According to our analysis of many cancers, stage 1 patients often have nonspecific symptoms that could also be caused by other conditions. In addition, stage-2 patients are more likely to experience symptoms like anorexia, cough, weakness, nausea, and stomach pain. Stage 3 individuals are more likely to experience symptoms like anorexia, weakness, constipation, itching, nausea, and abdominal pain than stage 2 patients. However, patients suffering from stage-4 cancer are frequently shown to exhibit specific symptoms for that stage of the disease, such as oral mucositis, bodily pain, and abdominal swelling. Nevertheless, depending on how far along in the stage a cancer is, its symptoms may change (Elswaifi et al., 2020).

Among the total respondents, 64.6% (181) patients had various comorbidities and 35.4% (99) respondents did not have any co-occurring conditions. Hypertension (37%), Diabetes Mellitus (25%), Hypothyroidism (10%) and Bronchial asthma (3%) was found to be the most common comorbidities among the respondents of this study. People with cancer frequently exhibit comorbidities, or the coexistence of several chronic illnesses. Cancer patients have been found to have higher rates of some comorbidities, including hypertension, diabetes mellitus, and hypothyroidism. These disorders have repeatedly been linked to higher comorbidity rates in cancer patients, despite the fact that particular percentages can change depending on the study group and cancer type. Obesity, lack of exercise, and unhealthful eating patterns are among cancer risk factors that are mainly linked to an increased risk of hypertension, diabetes mellitus, and hypothyroidism. The greater occurrence of these comorbidities in cancer patients may be attributed to these shared risk factors (Al-Jawaldeh & Abbass, 2022). The immune system's biological response, inflammation, can be brought on by a number of things, including

pathogens, damaged cells, and toxic substances. The heart, pancreas, liver, kidney, lung, brain, digestive tract, and reproductive system may all experience acute or chronic inflammatory reactions, which may result in tissue damage, disease and cancer development. Both cancer and other comorbidities frequently have chronic inflammation. Inflammatory processes can contribute to the origin of diseases like hypertension, diabetes mellitus, and hypothyroidism as well as the formation and progression of cancer. (Linlin Chen, Deng, Li, Wang, & Zhao, 2017) Certain cancer treatments, such as chemotherapy and targeted therapies, might have metabolic consequences that increase the risk of acquiring or worsening diseases such as hypertension and diabetes mellitus. As per (Cohen, 2023) modern anticancer medications have dramatically increased cancer survivability at the price of cardiovascular side effects such heart disease, thromboembolic disease, and hypertension.

These comorbidities tend to become more common as people age. It is usual for older people with cancer to have a higher possibility of pre-existing diseases such hypertension, diabetes mellitus, and hypothyroidism because the risk of cancer increases with age. Recent research conducted by (Furman, Campisi, & Verdin, 2019) has shown that certain social, environmental, and lifestyle factors can encourage systemic chronic inflammation (SCI), which can then cause a number of illnesses, including cardiovascular disease, cancer, diabetes mellitus, chronic kidney disease, non-alcoholic fatty liver disease, hypothyroidism, and autoimmune disorders, which collectively represent the leading causes of disability and mortality worldwide.

In this study SGPT (ALT) level was mostly within the range of the cancer patients. But the 34.29% of the patients had a higher ALT enzyme level in their liver which is associated with cancer morbidity. Patients with cancer and chronic illnesses have higher serum ALT and AST values. Fatty liver, hypertension, and cancer are all linked to these alterations in these liver

enzymes. According to one research on the relationship between aminotransferase and mortality, abnormal ALT or AST levels are an indicator of mortality over the long term in the population. A potential biomarker for the prevalence of cancer is the aminotransaminase, alanine aminotransferase level, or the ratio of AST to ALT. The findings suggested that health promoters and professionals thought that an impairment in liver function may be used to diagnose cancer. Higher levels of serum ALT, AST, and AST/ALT ratio levels are therefore possible biomarkers for early diagnosis of cancer and health assessment. (Chen et al., 2022). Creatinine levels of the patients were discussed and most of the patients had normal levels of creatinine. Around 20% of them had higher levels of creatinine. These levels of creatinine below or above the normal range can be used to detect cancer incidence and risk. There is an adequate correlation between creatinine, kidney function, and cancer risk. To observe the functionality of the kidneys of cancer patients, the estimated glomerular filtration rate (ml/min/1.73m2) was calculated using creatinine (eGFRcr), cystatin C (eGFRcys) and creatinine-cystatin C (eGFRcr-cys) in a research article. The risk of cancer incidence and cancer death were displayed graphically across the spectrum of eGFRcr, eGFRcys, and eGFRcr-cys. The relationship between eGFR and both cancer outcomes was largely linear and negative below ~90 ml/min/1.73m2 for eGFRcys and eGFRcr-cys, and below ~75 ml/min/1.73m2 for eGFRcr, there was also a J-shaped relationship for eGFRcr and eGFRcr-cys, with an elevated risk of cancer incidence and death >90 ml/min/1.73m2. which suggests that eGFRcr, eGFRcys, and eGFRcr-cys can detect the heightened risk of cancer at an earlier stage (Lees et al., 2021). Therefore, analysis using creatinine or cystatin C or both together can capture early chronic kidney disease which can detect elevated risk of cancer incidence and cancer death in a patient. Serum creatinine levels can also specifically detect prostate cancer possibility. Patients with decreased and increased serum creatinine levels have a significantly

higher prognostic risk of prostate cancer. The prognostic risk of prostate cancer was lowest when serum creatinine levels were in the range of 70.1–76.8 μmol/L. Controlling the serum creatinine level at 70.1 to 76.8 μmol/L in patients with prostate cancer may be beneficial for their prognosis (Gu et al., 2022). All these findings can be useful for earlier detection, diagnosis and assist in forming personalized treatment strategies.Table (7) represents the hematological reports of cancer patients. Most of these hematological parameters are also correlated with cancer detection and diagnosis. Hemoglobin levels were normal only in 27.86% of the patients. Most of the respondents (72.14%) had hemoglobin lower than the normal range. The information regarding hemoglobin levels can be beneficial to help cancer patients who have anemia as co-morbidity. Anemia is a common cancer consequence that is linked to fatigue and decreased quality of life. There is evidence from retrospective studies of data from patients with solid tumors and cancer that a low baseline hemoglobin level is a predictive factor for poor outcomes. Low Hemoglobin may also function as a chemotherapeutic negative predictive indicator in specific circumstances. There are several reasons to monitor Hemoglobin levels in cancer patients, including the fact that raising Hemoglobin levels corrects anemia and consequently enhances physical performance and quality of life, as well as the possibility of improving therapeutic outcomes (Van Belle, 2004). Hence, there is a correlation between the hemoglobin level and the quality of life of anemic cancer patients. Raising hemoglobin in anemic cancer patients would improve their quality of life (Lind et al., 2002). Our collected data also had a few cancer patients who are anemic. Hospitals and health care can utilize this finding to create personalized treatment strategies to increase the hemoglobin level of cancer (specifically anemic) patients and utilize hemoglobin as a negative predictive indicator in chemotherapy to ensure the increment in their overall survival and quality of life. 97.84%, most of the patients had their ESR higher than the reference range. The most presumed reason is

there is a strong association between elevated erythrocyte sedimentation rate and cancer. Heightened ESR is typical in cancer patients and it affects their overall survival. A study was conducted and ESR was found to be significantly associated with cancer. Patients with increased ESR had worse survival compared to those with normal values (Tas & Erturk, 2017). A specific relation between elevated ESR and progression in prostatic cancer was also discovered. ESR is a marker for a higher risk of prostate cancer death and progression. Both a low and a high ESR are likely indicators of patients with regressing host defense mechanisms because the ESR may represent components of the tumor-host connection (Johansson et al., 1992). This can indicate overall survival time and weakened host defense mechanism in the patients, a piece of crucial information that can be used to prepare proper treatment strategies for the patients to enhance host defense mechanism and improve overall survival. 97.84% of the patients in our data with higher ESR will most presumably have less survival time than those with normal ESR. 18.21% of the respondents had a higher WBC count than the normal range. Elevated White Blood Cell (WBC) count is associated with a risk of venous thromboembolism followed by cancer development (Blix et al., 2013). Meaning WBC count higher than the reference range of someone can indicate that they might develop cancer soon along with venous thromboembolism later on. Elevated WBCs could potentially be one of many important markers for specifically increased lung cancer risk (Wong et al., 2020). This finding can be beneficial to conduct proper treatment followed by early detection of cancer. Neutrophil levels in cancer are considered two sides of the same coin. Neutrophils are the most common leukocytes in the blood and are regarded to be the first line of defense during inflammation and infections. Additionally, it has been observed that neutrophils infiltrate a variety of tumor forms. Tumor-associated neutrophils (TANs) have important roles in the development of malignant illnesses. Neutrophils can indeed act as effective antitumor-effector

cells. However, growing clinical evidence demonstrates that TANs are associated with a bad prognosis. Neutrophil recruitment is regulated by the tumor microenvironment, and TANs subsequently promote tumor growth. Neutrophils might thus be advantageous or harmful to the host (Uribe-Querol & Rosales, 2015).

Compared to respondents with a normal neutrophil count, 51.43% of the respondents with higher neutrophil count have either a higher chance of enhancing their overall survival if the neutrophils work as antitumor effector cells or they might have a lower survival time if neutrophils support tumor progression. There was no correlation found between abnormal monocyte levels and cancer detection but monocytes with phenotypic alterations can help perform therapeutic approaches that can create long-term antitumor immunity and halt cancer progression. Recent research has shown that peripheral blood monocyte phenotypic variations can act as diagnostic, prognostic, and predictive biomarkers. These discoveries offer exciting new therapeutic cancer tools because monocytes are easily collected through blood collection. Strong evidence suggests that cancer-induced monocyte reprogramming plays a significant role in tumor progression given the appearance of immunosuppressive monocytes in the blood of cancer patients and their well-established relationship with a poor prognosis. These monocytes may contribute to developing cutting-edge therapeutic strategies that have the power to build long-lasting antitumor immunity and stop cancer progression (Kiss et al., 2020). Platelet levels can affect primary tumor growth and chemotherapy. It has become clear that platelets are active participants in basic tumor development and all stages of cancer progression, rather than being bystander cells in the circulation. They invade the tumor microenvironment and engage the cancer cells there. Platelets shield CTCs from the immune system's and other pro-apoptotic stimuli's fatal assault while they are in circulation. Platelets offer signals to create a pre-metastatic niche and aid CTCs in adhering to the endothelium. They even affect how well

cancer patients respond to targeted medicines like chemotherapy (Haemmerle et al., 2018). Each of the findings can contribute to the enhancement of early detection, refinement of diagnostic approaches, and implement tailored treatment strategies in hospitals and health care. Lymphocytes, Eosinophils, and basophils count had no direct or strong correlation established with cancer risk or development.

4.1 Limitations

We were unable to include all of the patient data that had been obtained in our study since significant information was missing from the reports of the collected data; as a result, only 280 respondents were used. Due to the authority's ethical requirements, this study was not able to collect information on treatment regimens. Additionally, not all of the tests recommended in that specific hospital are performed by patients who self-examine in the hospital, for which there was a lack of data. We could gather a vast amount of information with additional time and research, which would allow us to assess Bangladesh's cancer patients' conditions in great detail.

Chapter 5

Conclusion

Through overall analysis of the 280 data, it was observed that most of the respondents had breast cancer and the lowest number of cancer types was tongue cancer. Most of the respondents were in stage 2 of cancer. Anorexia and weakness were the most reported symptoms throughout all the cancer types. Among the patients, the most prominent types of co-morbidities were hypertension, diabetes mellitus, and hypothyroidism. By evaluating the biochemical and hematological reports, higher levels of serum ALT, creatinine, low

hemoglobin, high ESR, neutrophil, and platelet count had a strong correlation with the tumor formation and progression of cancer.

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