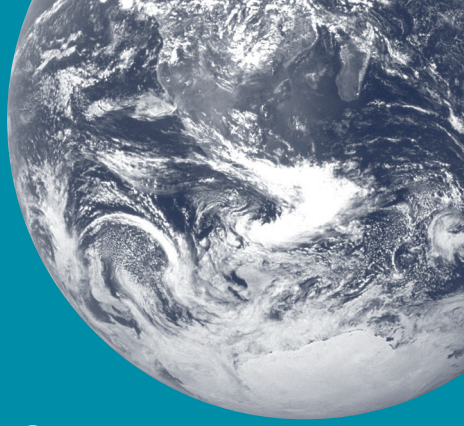
World Cancer Research Journal WCRJ 2018; 5 (3): e118



TIME DELAY BARRIERS IN DIAGNOSIS AND TREATMENT OF CANCER

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Abstract – *Objective:* *Diagnostic and treatment delays can be reduced to improve the prognoses of the cancer patients. A limited number of studies have carried out regarding delays in diagnosis and treatment of cancer patients in developing countries. We performed a deep study from 2016 to 2017 for evaluating multiple components of delay time at different stages experienced by the cancer patients. This study aims at exploring treatment delay among the cancer patients in Lahore and nearby areas of Lahore (Pakistan) using Qualitative and Quantitative strategies and an effort has been made to develop a practical approach to facilitate the clinicians to reduce the delay in diagnosis and treatment of cancer.*

Patients and Methods: *In this study, we prepared a particular questionnaire and interviews were made from 673 patients to determine which factors were responsible for the total delay in treatment of cancer. We considered six time intervals which include: Patient delay interval (the time from first noticing the symptoms to visit a hospital): Referral delay interval (the time between referring the patients to different hospitals and doctors): Oncologist delay interval (the time from the assessment by an oncologist to diagnosis of the cancer): Treatment delay interval (the time from diagnosis of the disease to treatment started): System delay interval (the time from first medical contact to the start of the treatment): Total delay interval (the time from noticing symptoms to the start of the cancer treatment). We calculated the means, medians, 25th and 75th percentiles of the delays in days among different groups of patients by using SPSS version 20.0 and obtained the Ethical approval from all the participating centers.*

Results: *Mean age of the patients at the time of diagnosis was 37.6 years. Males to females ratio was 0.65 where 39.4% were male patients and 60.6% were female patients. It was found that the breast cancer was the most commonly occurring disease in 36.7% of the total patients. The highest total delay, with mean 258 days, was in the breast cancer patients and the lowest, with mean 94 days, was found to be in the blood cancer patients. The median of total delay was 363 days along with (219, 547) 25^{th} and 75^{th} percentiles, the median patient delay was 270 days along with (180, 390) 25^{th} and 75^{th} percentiles, the median referral delay was 20 days along with (11, 34) 25^{th} and 75^{th} percentiles, the median oncologist delay was 9 days along with (4, 14) 25^{th} and 75^{th} percentiles, the median physician delay was 25 days along with (13, 48) 25^{th} and 75^{th} percentiles, the median treatment delay was 28 days along with (12, 45) 25^{th} and 75^{th} percentiles, the median system delay was 40 days along with (14, 64) 25^{th} and 75^{th} percentiles.*

Conclusions: *We concluded that the patient delay in our population is associated with lack of awareness, low household income and difficulties in approaching the healthcare facilities. The referral and system delays increased due to lack of cancer hospitals and facilities available in the hospitals for cancer diagnosis and treatment. The delay in scheduling diagnostic tests and waiting time for radiation therapy were found to be quite long that consequently increased the system delay.*

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As the cancer incidence rate has been increasing in our country, therefore it is suggested that the government should take measures to improve primary health care system so the diagnosis of cancer in patients could be possible at the early stage and should also build new cancer hospitals across the country.

KEYWORDS: *Cancer, Delay factors, Patient delays, Health care system, Socioeconomic delay.*

INTRODUCTION

World cancer day is an international day that is marked on February 4 every year to raise awareness about the cancer disease among people and to encourage its prevention, detection, and treatment worldwide. Cancer is also called malignancy, which is an abnormal growth of cells. There are many types of cancer including breast cancer, skin cancer, lung cancer, prostate cancer and lymphoma etc. Its incidence rate has increased steadily since the beginning of this century. A cancer diagnosis is always distressing[1]. The financial cost of cancer treatment is high for the patients as well as for the society. Although the cost of cancer treatment is already high, the lack of health knowledge and other barriers to healthcare further prevent many Pakistani cancer patients from obtaining optimal treatment. The cancer treatment means a definitive surgery, neoadjuvant chemotherapy or radiation, or the initiation of chemotherapy or hormonal therapy for metastatic disease. It has been observed that the earlier the diagnosis of the cancer is, the higher the chances of the removal of a primary tumor from the body by surgery or by radiation will be. Hence, it would increase the survival rates[2]. The time interval from the first symptom to the start of the treatment is often called Treatment Delay. Delays in the healthcare system have become a critical concern in many countries[3]. It is essential to reduce the time delay from detection to diagnosis and then from diagnosis to the treatment. The treatment delay is strongly linked with poorer overall survival of the cancer patients[4]. In this study, we have tried to find a possible relationship between the delay time in treatment and the survival of the patient. This study aims at exploring the treatment delay among cancer patients in Lahore (Pakistan) using Qualitative and Quantitative strategies and developing a practical approach to facilitate the clinicians. The time interval between the detection of symptoms in the patient and the very first visit to a doctor for medical checkup is called the Patient Delay. The most significant factors in determining the patient delay are related to the nature of the patient's symptoms and the resident area of the patient[5]. Some socioeconomic factors such as education, household income and social support from the family members can be closely related to delay in the treatment[6]. Socioeconomic factors in a country such as Pakistan may also affect the timing to visit a doctor after noticing the symptoms, diagnosis of the disease and commandment of treatment after the diagnosis. Moreover, the system delay in the treatment of cancer faced by the patients after the visit to a doctor has been studied extensively. This study examined the delay time in cancer diagnosis and the treatment among different groups of patients who came from different areas that were enrolled in Jinnah Hospital Lahore. We have tried to identify a relationship between the delay time and the cancer treatment. One major set of interactions is the way in which different groups of people have responded after the diagnosis of cancer and the ability of cancer treatment[7]. Social inequalities in the healthcare system have also been identified in our country. There is no guidance in Pakistan concerning the delay between referral and the start of cancer treatment. Patient delay, General practitioner delay and System delay are some delay stages that are directly responsible for the overall treatment delay[8]. The diagnostic evaluation is usually conducted in a series of processes. Waiting time for the results of medical tests such as biopsy may explain the long system delay in the treatment of cancer[9,10]. The combination of these factors represents a powerful argument for a public health campaign to be launched in reducing delay time regarding the treatment of cancer.

RELATED WORK

Health insurance status of the patient is one of the significant factors that can be related to the delay in the first treatment of cancer[11]. Between the years 2013 and 2014 in the Netherlands, a clinically relevant improvement was made with guidelines, which were demonstrated in different hospitals. Within this period, median treatment delay decreased from 34 to 29 days. This decrease in treatment time can improve the life of the cancer patients[12]. Delay in radiation therapy was found to be associated with the factors such as black race, being non-married, later years of diagnosis, larger tumor size and positive surgical margin[13]. An increased risk of resectable tumors progressing to

unresectability was noted when the interval between the diagnostic imaging and planned surgery exceeded 32 days[14]. The diagnostic delay is associated with higher cancer-related distress among survivors. The delay in diagnostic tests of many people is also due to the fear of cancer in them[15]. Delay in the initiation of radiation for a period exceeding six months from diagnosis resulted in a higher failure rate among the patients[16]. Appraisal delay, illness delay, behavioral delay and scheduling delay are linked with the patient delay[17]. Leading reasons for the delay in primary care were associated with comorbidity, waiting time for investigations and lack in explicit follow-up appointment[18]. The delay in the treatment of cancer is significantly associated with lack of social support from spouses and close-family members[19]. The study found that a higher proportion of older patients delayed or refused therapy due to poor health as they considered that their survival was not possible. This type of attitude is responsible for the delay in treatment[20]. Waiting time for radiotherapy increased the risk of spreading cancer in the body and thus reduced the survival[21]. In African and American women, it has been experienced the most delay in initial diagnosis and initiation of breast cancer treatment occurred compared to the women of other racial subgroups (Hispanics, American Indians, Alaskan Natives and Asian Americans)[22]. Patients with less education and lower household income presented more advanced disease at the time of diagnosis, received less effective treatment and had poorer long-term survival[23]. The diagnosis to treatment interval was significantly longer in transferred cancer patients than the patients without a transfer[24]. System delay was found as a substantial part of the total delay time experienced by the cancer patients[25]. Women with self-reported breast symptoms have shorter diagnostic intervals[26]. The study found that the transfer from one hospital to another after the diagnosis caused the delay in cancer treatment[27]. The total delay time in the treatment of breast cancer was diminished by increasing awareness regarding breast cancer[28]. High quality cancer diagnosis played a vital role in minimizing the delay time for the diagnosis of cancer[29]. Difficulties in approaching to healthcare facilities increased the delay in treatment of breast cancer in Northern Pakistan[30]. The study investigated that advanced quality assurance in cancer diagnosis among different types of hospitals could decrease the time in the diagnosis of cancer[31]. Patients with self-detected abnormalities have a large patient delay than those who were detected by the healthcare system[32]. Cancer with a late presentation has a very prominent concern with the better treatment in developing countries. This late presentation or delay should be decreased[33]. A mammogram was very useful in early detection of the disease. Trained physicians and nurses can teach the affected woman how to do the breast self-examination once a week to decrease delay in breast cancer treatment[34]. Early detection and treatment can improve the quality of life among the survivors. Many screening programs can be used to decrease the delay in diagnosis of cancer[35]. Delay in diagnosis or treatment direct towards dangerous results and varied tumor site and stage[36].

PATIENTS AND METHODS

According to the results of the 6th population and housing census carried out in 2017, the total population of Pakistan is 207.774 million and that of Lahore is 11.13 million. We performed the research for a deep one-year period to calculate the delays time before the cancer diagnosis and treatment. According to a published report, Pakistan is one of 62 countries in which the death rate with all cancer types has increased[37]. Data from the International Agency for Research on Cancer reported that there were 148000 newly diagnosed cancer patients and 101000 patients died of cancer per annum in Pakistan[38]. Punjab cancer registry published a report for Lahore district on its official website. According to this report, from the year 2010 to 2012, all age-groups and both genders combined, 15,840 new cancer cases were diagnosed in Lahore district[39]. Framework development utilized systematic literature review, soft systems thinking, hand searching of key journals and Google Scholar were used to identify related articles and consensus group. We systematically read the papers and reread them to include additional concepts. The literature review aimed at generating a comprehensive list of factors leading to treatment delay. We prepared the questionnaire, and interviews were scheduled. The interviews were conducted in a comfortable environment in a separate room in the hospital by a team of two nurses and two researchers. Each interview, with a single patient, was lasted for about 30 to 45 minutes. Before the interview, each patient was given a brief introduction about the purpose of the study. We excluded the patients who were unable to speak or lacked the capacity to communicate. The patients with previous cancer but came with another type were considered as special cases and totally 673 patients were included in this study. The word ‘‘Delay’’ was utilized simply to represent a time interval at various stages before the start of the treatment. We defined the six time intervals: Patient delay interval (time from first noticing the symptoms to first visit to a hospital), Referral delay interval (time between referring the

patients to different hospitals and doctors), Oncologist delay interval (time from assessment by an oncologist to diagnosis of the cancer), Treatment delay interval (time from diagnosis of the disease to treatment start), System delay interval (time from first medical contact to start of the treatment) and Total delay interval (time from noticing the symptoms to start of the cancer treatment). Variables included in data analysis were: age, gender, occupation, education level, family size, religion, socioeconomic status, marital status, cancer beliefs and perceptions, clinical stage, size of a tumor, social support from spouses and area of residence. Socioeconomic status included self-reported monthly household income and insurance status. We categorized the patients into six groups according to their reported monthly household income and declared the area of residence of the patients as village, town, tehsil, district, and division. The level of diagnosing hospital marked as the regional hospital, district hospital and tertiary hospital. Moreover, the hospital ownership counted as public or private. The demographic survey included financial strain related to food, housing, clothing, medicine, and transportation. Heart or vascular disease, diabetes, epilepsy, stroke, arthritis, asthma, mental or emotional disorder and any other illness were combined into a single-word 'comorbidity'. All other variables were measured in the questionnaire and classified the patients according to their cancer type and symptoms such as lumps, high pain, abnormal discharge, bleeding, moles and unexplained weight loss. The time that patients consume during the decision making, their discussions with friends and family members were included in patient delay[17,19]. The date of the first admission in the hospital was confirmed from the medical record of the hospital. Physician delay covered the period from the first presentation to a doctor until initiation of an investigation of potentially cancer-related symptoms[24,26]. System delay indicates the time consumed by the patients in different kinds of examinations for the diagnosis of cancer such CT Scans, MRI, Ultrasound, Mammography and clinical laboratories evaluations. Time from diagnosis to surgery and surgery to receive radiation was also covered in system delay[8,10]. We tried to relate the different variables such as age, socioeconomic status, education and area of residence of the patient with the different delay times at different stages. We divided the patients according to their cancer type and calculated the patient delay interval, physician delay interval, treatment delay interval, system delay interval and total delay interval. We also calculated the means, medians, 25th and 75th percentiles of the delays in days among different patients groups by using SPSS version 20.0. Ethical approval was taken from all the participants before starting the study.

RESULTS

The results obtained from this study represent the multiple delay times which occurred during the process of diagnosis and treatment of cancer and are shown in tables I, II and III.

We calculated the delay times considering the very long-range of individual and environmental factors. Mean age of the patients at the time of diagnosis was 37.6 years. The largest age group was 31-40 year with 19% of the patients and age group >70 years with minimum number (2%) of the patients. Patients were found 5% in 1-10 year age group, 13% in 11-20 year age group, 17% in 21-30 year age group, 16% in both 41-50 and 51-60 years age groups and 10% in 61-70 year age group. Males to females ratio was 0.65. This research had 39.4% male and 60.6% female patients. Breast cancer was, the most commonly occurring cancer, 36.7% of the patients, followed by the lung cancer 17% of the patients. Median total delay was 363 days along with (219, 547) 25th and 75th percentiles, median patient delay was 270 days (180, 390) 25th and 75th percentiles, median referral delay was 20 days along with (11, 34) 25th and 75th percentiles, median oncologist delay was 9 days along with (4, 14) 25th and 75th percentiles, median physician delay was 25 days along with (13, 48) 25th and 75th percentiles, median treatment delay was 28 days along with (12, 45) 25th and 75th percentiles, median system delay was 40 days along with (14, 64) 25th and 75th percentiles. Breast cancer was reported with the maximum total delay time with mean 258 days and the lowest with mean 94 days was found in blood cancer patients. Patient delay was the significant part of the total delay 63%, physician delay was 10%, treatment delay was 16% and system delay was 11% as shown in Figure 1.

Factors which influence the patient delay in our populations include: taking the symptoms not serious, lack of knowledge about the services provided by healthcare system, use of the alternative methods for treatment instead of consulting the doctor, lack of resources, health insurance, efficiency of taking decisions, poor residential area of the patient and lack of social support from the friends and family members. The prolonged patient delay time with mean 250 days was observed in 51-60 year age group and the lowest, with mean 37 days, was observed in 1-10 year age group as shown in Figure 2.

Mean patient delays in the different residence groups shown in Figure 3.

The area of residence of the patients was also an important factor regarding the patient delay. The patients from villages and small towns showed large patient delay compared to those who were living in the large cities, districts and divisions.

TABLE 1. Median Delay, 25th and 75th Percentiles in days according to variables.

Variables	*Numbers*	*Patient delay*			*Physician delay*					
					Referral delay			*Oncologist delay*		
		Median	*25th*	*75th*	*Median*	*25th*	*75th*	*Median*	*25th*	*75th*
Over all	673	270	180	390	20	11	34	9	4	14
Sex										
Male	265	240	165	360	18	11	32	8	5	14
Female	408	285	225	390	24	12	39	9	5	16
Age										
1-10 Y	37	30	15	65	10	6	18	3	2	6
11-20 Y	89	40	24	70	12	7	21	4	2	9
21-30 Y	117	73	30	148	18	11	27	5	3	11
31-40 Y	129	166	120	274	16	9	30	5	3	12
41-50 Y	109	185	105	364	15	9	32	6	3	14
51-60 Y	110	224	165	390	20	11	39	7	4	16
61-70 Y	70	136	104	300	12	7	25	5	2	10
>70 Y	12	60	36	82	11	6	23	6	3	12
Education										
Illiterate	344	270	150	405	24	10	40	9	4	16
Primary	32	225	135	375	16	9	32	7	3	12
Middle	45	240	105	360	15	7	32	8	5	14
Metric	139	180	90	285	18	11	39	7	3	12
Intermediate	53	135	60	240	12	5	30	6	2	12
Bachelor	38	90	45	165	12	4	32	6	2	10
Master	22	60	25	150	14	5	24	5	2	10
Income per month in Rupees										
< 10000	200	270	135	390	22	12	38	9	4	15
10000-20000	136	240	150	374	20	9	36	8	4	16
21000-30000	127	195	105	337	12	7	24	8	3	14
31000-40000	84	135	75	272	14	5	22	6	2	10
41000-50000	78	90	63	135	9	4	20	4	2	8
> 50000	48	86	56	126	8	4	17	5	2	9
Cancer type										
CA Breast	152	255	120	375	16	7	24	7	4	14
CA Rectum	34	128	78	273	12	5	28	6	2	12
CA Parotid	53	90	60	105	12	4	30	7	2	11
CA Endometrium	62	60	20	90	14	5	29	8	3	16
CA Lung	103	205	90	315	18	8	32	10	3	17
CA Mouth	32	90	45	180	15	6	28	7	3	12
CA Glioma	41	270	135	300	16	9	34	6	2	10
CA Larynx	29	45	25	90	9	4	21	5	2	9
CA Bones	23	86	34	127	21	10	38	11	5	23
CA Kidney	34	78	26	148	13	5	35	15	7	26
CA Cervix	26	105	53	228	24	10	41	18	7	27
CA Melanoma	31	85	38	139	18	7	33	13	5	21
CA Brain	24	48	18	96	19	8	26	16	8	24
CA Blood	29	64	27	132	23	6	39	9	3	19
Area of residence										
Village	196	285	165	390	18	8	34	9	4	14
Town	119	270	135	345	14	6	30	8	3	12
Tehsil	137	210	135	270	16	7	28	7	3	14
District	106	180	105	225	12	5	24	6	2	9
Division	115	90	45	120	10	4	22	5	3	9

Mean patient delay was 265 days; median 285 days along with (165, 390) 25th and 75th percentiles among the patients who were living in small villages. The results suggested that the patients with higher education and income belonged to urban areas and the patients with lower education and income resided in rural areas and suburbs of big cities. The patients from the rural areas experienced referral

TABLE 2. Median Delay, 25th and 75th Percentiles in days according to variables.

Variables	Numbers	Physician delay			Treatment delay			System delay		
		Median	25th	75th	Median	25th	75th	Median	25th	75th
Over all	673	25	13	48	28	12	45	40	14	64
Sex										
Male	265	24	12	42	26	12	40	36	10	56
Female	408	26	14	55	28	15	44	42	14	67
Age										
1-10 Y	37	13	5	22	9	3	14	22	8	36
11-20 Y	89	16	6	28	14	5	21	28	10	44
21-30 Y	117	24	9	52	23	9	32	32	14	62
31-40 Y	129	22	11	46	28	12	44	30	12	54
41-50 Y	109	25	8	40	25	12	40	30	14	56
51-60 Y	110	20	7	36	26	13	42	36	15	64
61-70 Y	70	18	6	30	22	10	34	27	11	47
> 70 Y	12	14	5	24	12	5	28	24	9	38
Education										
Illiterate	344	32	14	56	26	9	41	38	13	60
Primary	32	24	8	40	24	12	40	32	12	54
Middle	45	23	10	46	23	9	32	29	11	51
Metric	139	25	14	41	25	14	38	40	14	58
Intermediate	53	22	9	34	22	8	36	34	12	56
Bachelor	38	20	7	36	16	6	28	26	10	42
Master	22	17	7	28	12	4	21	20	6	32
Income per month in Rupees										
< 10000	200	30	12	58	30	12	46	40	12	64
10000-20000	136	26	9	52	26	12	38	34	14	52
21000-30000	127	24	8	40	23	8	36	36	12	60
31000-40000	84	21	6	32	20	7	34	30	11	48
41000-50000	78	13	5	28	16	5	28	28	9	42
> 50000	48	13	6	26	15	6	22	27	14	53
Cancer type										
CA Breast	152	24	10	42	30	13	46	40	12	64
CA Rectum	34	20	6	34	22	7	34	28	8	46
CA Parotid	53	22	8	38	25	12	40	26	7	46
CA Endometrium	62	18	5	30	24	11	38	30	10	42
CA Lung	103	28	12	60	28	12	44	36	12	54
CA Mouth	32	22	9	40	20	7	32	28	8	40
CA Glioma	41	24	9	44	26	11	42	36	10	56
CA Larynx	29	20	7	38	18	6	28	26	7	40
CA Bones	23	32	15	58	23	8	37	52	23	78
CA Kidney	34	27	11	46	34	14	49	57	25	82
CA Cervix	26	34	16	54	26	13	52	44	26	75
CA Melanoma	31	13	8	34	32	15	48	40	24	87
CA Brain	24	35	16	58	25	11	43	55	21	94
CA Blood	29	28	9	53	37	15	56	53	18	86
Area of residence										
Village	196	28	11	45	26	12	48	42	14	64
Town	119	30	12	54	28	15	46	38	12	60
Tehsil	137	26	9	42	26	11	44	36	10	58
District	106	14	7	32	22	9	40	28	8	36
Division	115	14	6	30	16	5	26	22	7	32

delay due to the lack of facilities in the hospitals. Mean referral delay was 43 days among the patients who were living in the villages and was 15 days experienced by the patients who were living in the divisions as shown in Figure 4.

The literacy rate of the patients was very low, 51% of the patients were uneducated, mostly women from rural areas, who never went to any school in their life. A significant difference in the total delay time was noted among different educational groups.

TABLE 3. Median Delay, 25th and 75th Percentiles in days according to variables.

Variables	Numbers	Total delay in days		
		Median	25th	75th
Total	673	363	219	547
Sex				
Male	265	326	199	498
Female	408	381	268	556
Age				
1-10 Y	37	51	30	110
11-20 Y	89	82	49	135
21-30 Y	117	130	53	244
31-40 Y	129	213	144	368
41-50 Y	109	160	139	496
51-60 Y	110	307	192	532
61-70 Y	70	242	132	411
> 70 Y	12	110	49	175
Education				
Illiterate	344	360	196	562
Primary	32	338	167	604
Middle	45	315	135	439
Metric	139	270	132	422
Intermediate	53	213	90	360
Bachelor	38	152	78	271
Master	22	109	42	231
Income per month in Rupees				
< 10000	200	370	173	558
10000-20000	136	326	185	517
21000-30000	127	278	147	476
31000-40000	84	206	104	384
41000-50000	78	135	60	216
> 50000	48	121	52	183
Cancer type				
CA Breast	152	300	155	526
CA Rectum	34	310	126	442
CA Parotid	53	163	87	229
CA Endometrium	62	122	56	200
CA Lung	103	286	122	473
CA Mouth	32	160	69	292
CA Glioma	41	356	165	446
CA Larynx	29	124	56	196
CA Bones	23	185	76	210
CA Kidney	34	140	68	223
CA Cervix	26	129	63	284
CA Melanoma	31	183	95	276
CA Brain	24	134	53	206
CA blood	29	112	54	189
Area of residence				
Village	196	381	202	547
Town	119	366	174	505
Tehsil	137	298	165	414
District	106	244	129	332
Division	115	142	63	208

The mean total delay time was 278 days, median 360 days which was experienced by the illiterate patients. The mean total delay was 233 days in patients who studied up to the matriculation level, 208 days in the patients who educated up to the intermediate level and the mean total delay was 103 days for graduated patients. The patients, according to their monthly self-reported household income, were classified into different groups. Income from 1 to 30 thousand was fixed as low income and from 30 to 50 thousand as high income. 30% patients were with monthly income less than 10 thousand, 20% with more than 10 thousand, 18% with more than 20 thousand, 12% with more than 30 thousand, 7% with more than 40 thousands and 7% with more than 50 thousand. Mean total delay time was 265 days, median 370 days in the low-income group and was 186 days median 280 days in the high-income group. The longest treatment delay time, with mean 78 days, was noted in the patients with monthly income less than 10 thousand. In low-income groups, an upward trend in the total delay time was noticed. The mean treatment delay time in different income groups is shown in Figure 5.

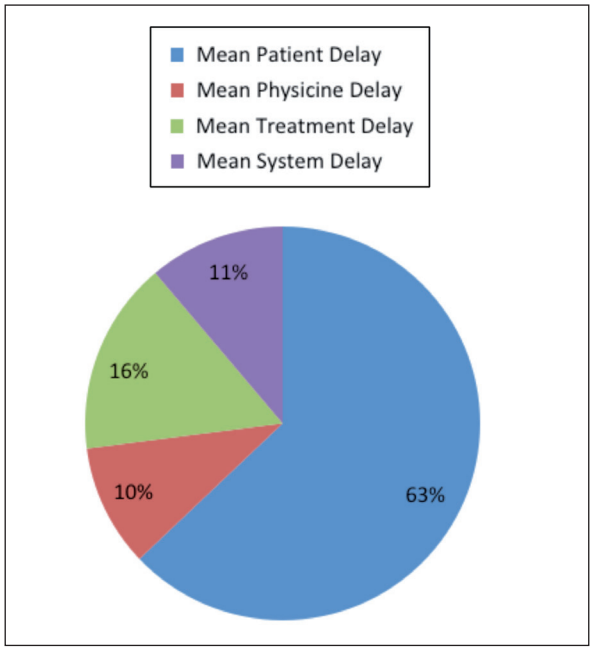

Fig. 1. Percentages of different delays time.

DISCUSSION

Jemal et al[40] found that the highest cancer incidence rate in the world was in South Asia and Pakistan was one of them. Torre et al[41] observed that total delay rate varied greatly across the developed and developing countries rates which was generally low in Northern America, Australia, New Zealand, Northern and Western Europe. This may be due to the socioeconomic differences in developed and the developing countries. The patient delay has a very significant contribution to the total delay time in diagnosis and treatment of cancer.

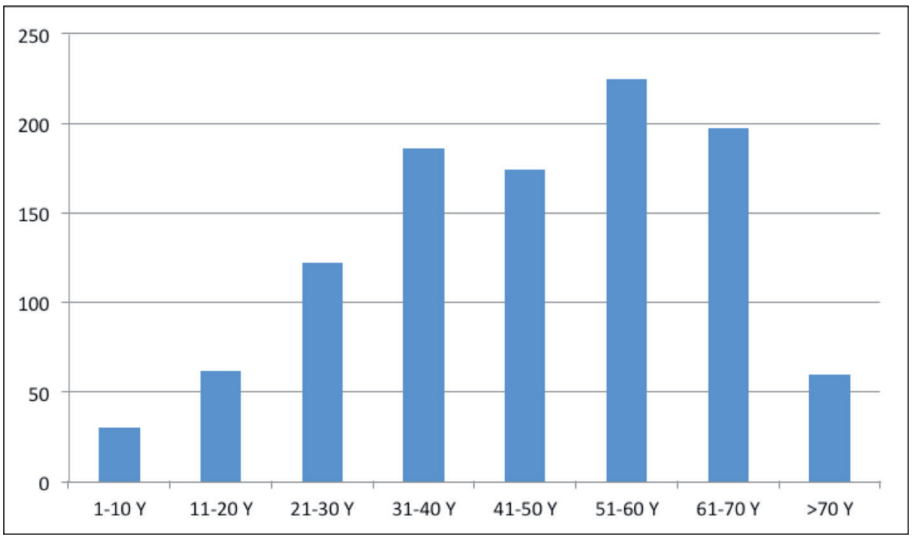

Fig. 2. Different age groups along the x-axis vs. mean patient delays (in days) along the y-axis.

The mean total delay in breast cancer patients was 258 days which is greater than the time is mentioned in other studies. Memon et al[31] found patient delay time with mean 180 days in the treatment of breast cancer in Northern Pakistan. Research methodology may have some role to play for this difference. Feng et al[42] found the mean duration of the delay was 5.13 months in China which is slightly similar to our results. A wide range of factors discussed earlier is believed to be directly or indirectly link with Delay in cancer treatment. These factors and relations between them pose great challenges for government and policymakers to take actions to reduce diagnostic and system delay. Patients with rapid growing symptoms showed less patient delay with mean 53 days compared to those with slow-growing lumps or symptoms (mean 128 days). We found that socio-cultural context in different patients, mostly in females, was responsible for treatment delay. Referred patients encountered large system delay. Patients have to wait for 3 to 4 weeks for the biopsy results that increased the system delay. We found that patients with age less than 20 years tended to have a shorter patient delay than the older ones. It is expected that the close parental observation of the younger patients might help in recognizing the symptoms and signs, patients with age from 30 to 40 years showed large patient delay time due to rigid job time schedule. We observed that strong beliefs in traditional medicine and strong religious beliefs in spiritual treatment in general population were responsible for late presentation to a physician. We have found that the patients have knowledge about the available healthcare services experienced less referral and system delays. Further research requires for verifying whether the improvements in diagnostic investigations and with-

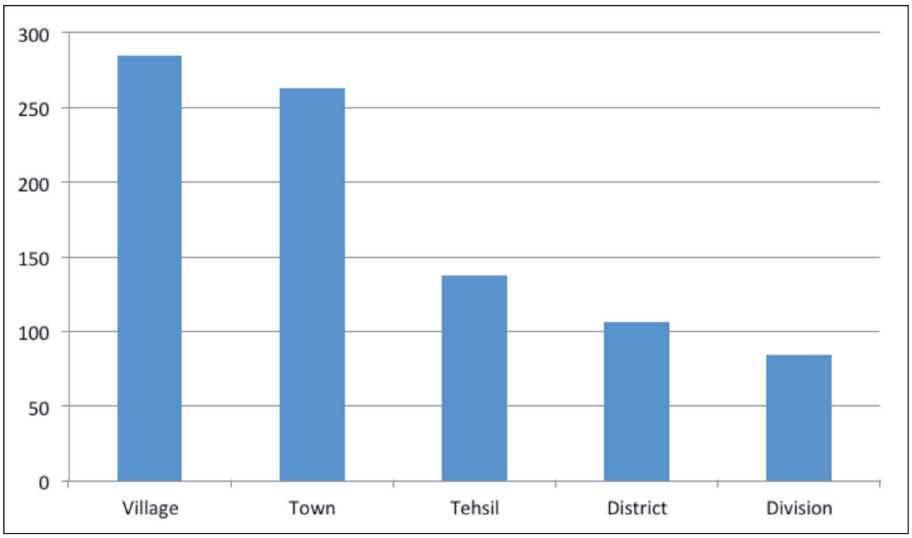

Fig. 3. Different resident groups along x-axis vs. mean patient delays (in days) along y-axis.

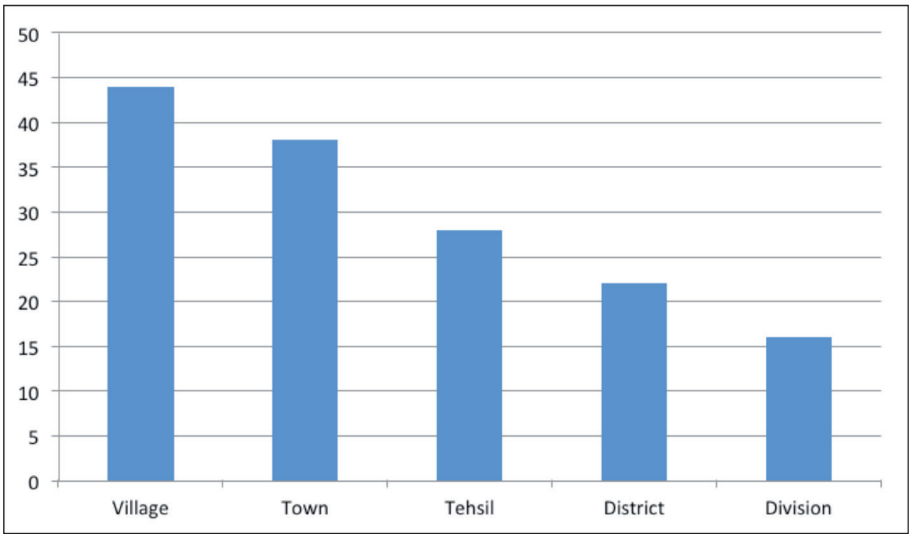

Fig. 4. Different resident groups along the x-axis vs. mean referral delays (in days) along the y-axis.

in the healthcare system can affect delay time in diagnosis and treatment of cancer. This study has been carried out for the first time in Pakistan that describes multiple factors which are associated with delays and represent the patient delay, referral delay, oncologist delay, treatment delay, system delay and total delay in days in different groups of people who are suffering from cancer. Further research is required across other areas of the country to obtain data on a large scale.

CONCLUSIONS

We have concluded that the patient delay in our population is associated with lack of awareness, low household income and difficulties in approaching the healthcare facilities. The patient delay is responsible for the diagnosis of the disease at an advanced stage. The referral and system delays increased due to lack of cancer hospitals and non-availability of facilities in the hospitals for cancer diagnosis and treatment. Delay in scheduling diagnostic tests and waiting time for radiation therapy were very high that increased the system delay. After diagnosis, many patients waited more than three months for radiation therapy due to the lack of facilities in the government hospital. The most commonly reported physician barrier was the physician of first contact who believed that the disease is not related to cancer. The interviews with the patients verified that after the diagnosis of cancer, most of the patients considered it a deadly disease and they lost the hope for survival. This type of the behavior leads the patients towards delay in treatment. The society and the family of the patient can overcome the fear of cancer treatment to some extent. We found that patients delay, physician delay, and system delay are some delay stages between diagnosis and treatment

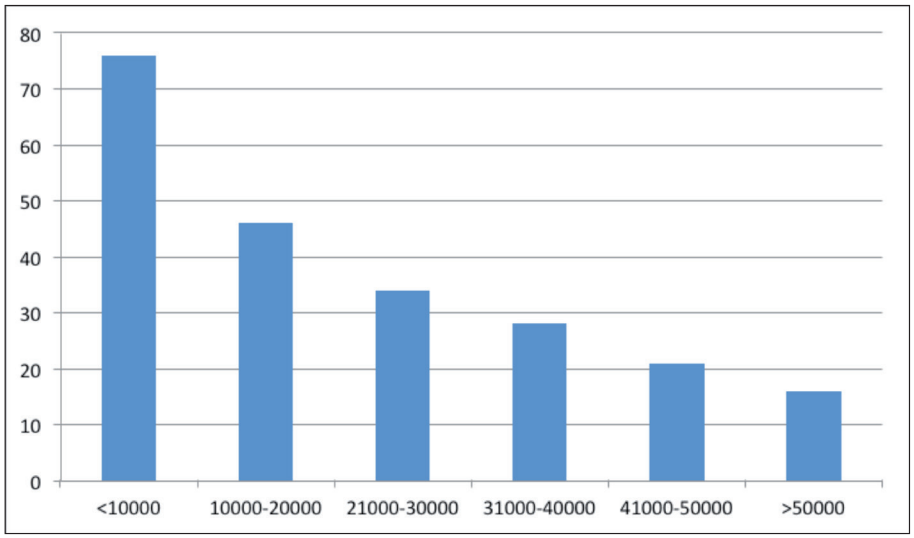

Fig. 5. Different income groups along the x-axis vs. mean referral delays (in days) along the y-axis.

of cancer. As the cancer incidence rate is increasing in Pakistan, the government should take steps to improve primary healthcare system. So, the diagnosis of cancer could be possible at an early stage and should build new cancer hospitals.

Conflict of Interest:

The Authors declare that they have no conflict of interests.

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