



## Original Article

## Quality of Life of Blood Cancer Investors in India

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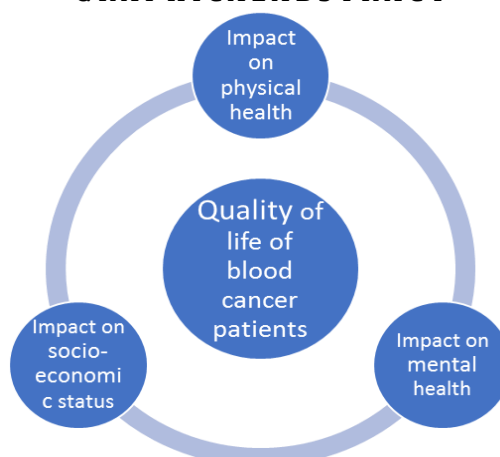
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## ABSTRACT

The meaning of "Quality of Life" (QoL) varies from person to person. A person's perception of the term depends on the situation. This research study makes an attempt to analyse various facets of QoL with respect to blood cancer victims within the investor community in the area of study. The research includes comprehending the QoL influence on blood cancer patients in the state of Odisha, India, to decode the opinion differences among people of various age categories. As declared by the Ministry of Health and Family Welfare of Odisha, an average of 50,000 cancer patients is identified resulting in 25,000 deaths in the state every year. This is more than other states with the same population size in the country. Data collection and analysis was conducted by employing three variables; namely, physical health, mental health, and socio-economic status on blood cancer patients to enhance their QoL. Findings of the study revealed the majority of participants believed weakness, insomnia, pain, and psychological disorders were the prominent challenges blood cancer victims had to overcome. Rural areas of Odisha lack healthcare infrastructure when compared to the urban areas. Moreover, socially and financially weaker respondents are more optimistic regarding treatment and life than their richer counterparts.

## GRAPHICAL ABSTRACT



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## Introduction

According to the World Health Organization (WHO), there are over 2.2 million blood cancer cases detected every year with around 1.7 million deaths [1]. 14.1 per 100,000 men and women are diagnosed with blood cancer annually, out of which 6 succumb to it [2]. This makes blood cancer a leading cause of death globally [1, 2]. There are numerous factors contributing towards the development and unfortunate death because of blood cancer such as the stage of cancer, family history, chemotherapy, etc. which are subjected to change [3]. Developmental issues lead to variation in type of tumour, treatment prescribed, and diagnosis. Lack of cancer knowledge and its etiology are the causes for this issue [3]. The average age of blood cancer detection in developed countries like the USA is 60. Breast cancer is usually diagnosed after 50 years of age while lung and colon cancer are diagnosed at an average age of 70 and 68, respectively. Colorectal cancer is diagnosed much earlier when compared to other types of cancer. Adults develop the risk of blood cancer after the age of 45 and children can be affected by the deadly disease at a very young age of 2 [4]. Blood cancer can be detected by physical examination, blood tests, and bone marrow tests. The disease can then be treated by chemotherapy, targeted therapy, radiation, bone marrow transplant, immunotherapy, immune cells engineering, and clinical trials [5]. Elderly patients are averse to radiation therapy as they are afraid of the process [6, 7].

Blood cancer is often diagnosed in the Stages I, II, or III where patients undergo chemotherapy, targeted therapy, or radiation while Stage IV patients undergo bone marrow transplant and other advanced treatments [8]. Blood cancer survival rates have improved with progress in medical science and active treatment. There are 70-80% chances of survival for patients below 60 years of age, 26% for chronic blood cancer patients, and 65% for acute blood cancer patients. However, long-term intense blood cancer treatment comes with its own set of side-effects like kidney damage, heart complications, central nervous system damage, digestive track

disturbances, hair loss, and variation in blood cell count [9].

Previous studies have revealed physical exercise as key to improve the health of blood cancer patients. Blood cancer survivors tend to live a long and stable life if they keep themselves physically active. Exercise is a major way of keeping oneself active and can also assist in improving the QoL and health of blood cancer survivors [10]. Moreover, research has further established that lifestyle of cancer patients shares a negative relationship with anxiety and overall well-being. This makes men and women realize their lifestyle has contributed towards developing blood cancer [11, 12].

In addition, socio-economic status of cancer survivors plays a crucial role in maintaining their QoL. Blood cancer survivors belonging to poorer families find it difficult to get access to proper treatment and hence, are not able to maintain their lifestyle [13]. A blood cancer survivor has to be financially stable to be able to afford a good quality life for his own [14]. A blood cancer survivor may be negatively influenced by nascent social channels and comprehension [15]. Cancer death rates share a significant relationship with social engagement and general wellbeing [16, 17]. There is no extensive research in India in this context. Hence, it calls for a study to be conducted to fill up this gap.

## Literature Review

Blood cancer is a deadly disease that comes with a very expensive and long-term treatment process. Its survivors and their near and dear ones undergo immense stress in every way, physically, mentally, and economically, which affects their lifestyle [18].

Blood cancer is an exhaustive disease. The already existing physical, mental, and economic stress due to cancer results in lifestyle changes and affects the QoL of the blood cancer survivor [19].

QoL of a blood cancer survivor is affected because its diagnosis negatively influences the lifestyle of the patient majorly because of the long-term treatment and financial burden [20].

**Table 1:** Description of Respondents

Demographic Features	Frequency	Percentage
Sex		
Male	170	85.00%
Female	30	15.00%
Total	200	100
Age 21-30	60	30.00%
Age 31-40	110	55.00%
Age 41-50	20	10.00%
Age 51-60	10	5.00%
Age Total	200	100
Marital Status		
Married	160	80.00%
Single	40	20.00%
Total	200	100
Educational Status		
Under-Graduate	170	85.00%
Post-Graduate	30	15.00%
Total	200	100
Job Experience		
0-5 years	70	35.00%
6-10 years	50	25.00%
11-15 years	40	20.00%
15-20 years	27	13.50%
21+ years	13	6.50%
Total	200	100
Monthly Income		
<50,000 INR	30	15.00%
>50,000 INR	170	85.00%
Total	200	100
Having family history of cancer		
Yes	130	65%
No	70	35%
Total	200	100
Health issues apart from cancer (diabetes, hypertension, etc.)		
Yes	40	20%
No	160	80%
Total	200	100
Blood Group		
+ve	170	85%
-ve	30	15%
Total	200	100

**Table 2:** Schedule of research work

Advancement of the study	Month-1	Month-2	Month-3	Month-4	Month-5
Conceptualization and research paradigm					
Review of Literature					
Gap finding and data collection					
Data analysis and conclusion work					

Cancer in any form is preventable. For blood cancer survivors to have a long and healthy life, it is crucial for them to make lifestyle changes and enhance their QoL [21].

Blood cancer and lifestyle share a significant relationship with each other. The risk of blood cancer development and re-occurrence is reduced if one maintains a healthy lifestyle and enhances the QoL [22].

The multi-ethnic cohort study revealed blood cancer risk is related to lifestyle apart from genes. Thus, lifestyle management is necessary to either avoid the dreaded disease or control it [23].

Cancer development is associated with QoL. It can be controlled, and its re-occurrence can be avoided if lifestyle and dietary changes are made mandatory among patients [24].

Blood cancer patients undergo massive mental turmoil during the tenure of their treatment. Anxiety, depression, and distress levels are common among them even after successful completion of treatment. Therefore, exercise and lifestyle changes are suggested by doctors and researchers [25].

Psychological issues in a blood cancer survivor increase at least twice in case of re-occurrence. It also increases physical symptoms. This affects the survivors' mental and physical health which can be controlled by implementing lifestyle changes [26].

Healthy diet, body weight, physical activity, limited alcohol consumption, and avoidance of smoking contribute towards avoidance and control of blood cancer by assisting a person in maintaining a sustainable lifestyle and QoL [27].

Cancers like blood cancer and ovarian cancer can be detected before they occur in case of family history. Maintaining a high QoL by making changes in lifestyle can ensure such cancers are prevented [28].

Cancer, being a long-term and exhaustive disease, causes psychological disorders like obsessive compulsive disorder, paranoia, depression, and hysteria among its survivors. This affects their mental health [29].

As cancer involves the long-term treatment, there are chances of medication errors in the process. This affects the physical and mental health of the patients [30].

Families with children suffering from cancer undergo a lot of financial and mental stress, especially mothers. This leads to deterioration of mental health among the family members [31].

Cancer affects the self-efficacy of a patient and decreases cognitive and behavioural functioning. Hence, QoL is negatively impacted.

During Covid-19, cancer treatment was hampered the most. This led to a lot physical, mental, and financial hardship among the patients. Hence, their QoL was affected [32, 33].

### Research Objectives

- To examine the QoL influence on blood cancer patients in the study area.
- To study the differences of opinion relating to respondents of various age brackets

### Scope of the study

This study covers the state of Odisha in India. Data collection was limited to Cuttack, Khurdha, Puri, and Deogarh districts of the state. There are 20 blocks in total such as Baranga, Cuttack Sadar, Kantapada, Mahanga, Niali, Nischintakoili, Salepur, Tangi, and Choudwar. Two prominent cities of the state were also included- Bhubaneswar, the provincial capital and Cuttack. All the participating investors had forms of blood cancer. The respondents were in the age group of 21-70 years old.

Table 1 indicates that 35% of investors did not have any family history of any form of cancer while the rest had. The majority of the respondents belonged to 21-40 age group, followed by 50-70. 20% of the respondents had other health issues like diabetes, hypertension, obesity, etc. 15% of the participants belonged to negative blood groups while others had positive blood groups. The majority of them had monthly income > 50,000 INR, most of whom were married, succeeded by single. 85% were undergraduates with 35% having 0-5 years of work experience.

### Martials and Methods

#### Research methodology

**Table 3:** Calculation of upper and lower limits of weight

Category	QoL and Physical health	QoL and Mental health	QoL and Socio-economic status
Participant's age bracket (21-30)			
Weight Upper Limit	$10 \times 60 \times 5 = 3000$	$6 \times 60 \times 5 = 1800$	$6 \times 60 \times 5 = 1800$
Weight Lower Limit	$10 \times 60 \times 1 = 600$	$6 \times 60 \times 1 = 360$	$6 \times 60 \times 1 = 360$
Participant's age bracket (31-40)			
Weight Upper Limit	$10 \times 110 \times 5 = 5500$	$6 \times 110 \times 5 = 3300$	$6 \times 110 \times 5 = 3300$
Weight Lower Limit	$10 \times 110 \times 1 = 1100$	$6 \times 110 \times 1 = 660$	$6 \times 110 \times 1 = 660$
Participant's age bracket (41-50)			
Weight Upper Limit	$10 \times 20 \times 5 = 1000$	$6 \times 20 \times 5 = 600$	$6 \times 20 \times 5 = 600$
Weight Lower Limit	$10 \times 20 \times 1 = 200$	$6 \times 20 \times 1 = 120$	$6 \times 20 \times 1 = 120$
Participant's age bracket (51-60)			
Weight Upper Limit	$10 \times 10 \times 5 = 500$	$6 \times 10 \times 5 = 300$	$6 \times 10 \times 5 = 300$
Weight Lower Limit	$10 \times 10 \times 1 = 100$	$6 \times 10 \times 1 = 60$	$6 \times 10 \times 1 = 60$

(Author's work)

**Table 4:** Analysis of data

Variables	Age Bracket (21-30)	Age Bracket (31-40)	Age-Bracket (41-50)	Age Bracket (51-60)
Blood cancer patients QoL and physical health				
General health problems	412	547	124	51
Weakness	590	429	245	62
Insomnia	356	416	133	49
Irregular appetite	161	467	163	75
Require assistance while doing physical activities	275	583	203	89
Pain and aches	246	1002	50	63
Fatigue	293	956	24	26
Total Weight	2333	4400	942	415
Weight upper limit	3000	5500	1000	500
Weight lower limit	600	1100	200	100
Total weight and weight upper limit comparison	77.76%	80%	94%	83%
Average weight	84%			
Blood cancer patients QoL and mental health				
Depression	648	1017	123	54
Temper Issues	302	421	115	31
Isolation	54	107	43	73
Personality disorder	36	200	28	12
Suicidal thoughts	290	683	175	58
Anxiety	200	641	80	60
Total weight	1530	3069	564	288
Weight upper limit	1800	3300	600	300
Weight lower limit	360	660	120	60
Total weight and weight upper limit comparison	85%	93%	94%	96%
Average weight	92%			
Blood cancer patients QoL and Socio-economic status				
Money leads to rational decision-making	325	296	32	23
Enhances life satisfaction	262	694	43	34
Develops humanitarian instincts	127	109	54	61

Decreases day to day issues	386	741	171	86
Enhances self esteem	103	383	99	43
Provides hope of recovery	193	423	62	11
Leads to psychological stability	80	489	91	15
Total weight	1476	3135	552	273
Weight upper limit	1800	3300	600	300
Weight lower limit	360	660	120	60
Total weight and weight upper limit comparison	82%	95%	92%	91%
Average weight	90%			

(Source: Tables 3, 8, 9, 10, and 11)

The present study includes both primary and secondary data. Secondary data was collected from various journals, websites, newspapers, books, etc. In the case of primary data, 29 variables were recognized after conducting a thorough literature review and 5 core group discussion each constituting of 6 members.

A well-structured close ended questionnaire was prepared. It was divided into 2 parts. The first part consisted of demographics related questions and the second part included questions with respect to each variable. A pilot study was conducted on it to test the reliability and validity of variables. 50 participants from each variable were considered, out of which 22 variables were retained. A likert scale has been used for this study ranging from 5 (represents “Strongly Agree”) to 1 (represents “Strongly Disagree”). 250 questionnaires were circulated for data collection, 230 filled-up questionnaires were collected amounting to approximately 92% of the total questionnaires. After due scrutiny of filled-up questionnaires, 30 questionnaires were found incomplete either concerning demographic or any specific question. The final sample size taken was 200 for the study. A total of 5 months, from September 2022 to February 2023, was required to complete the study. Non-probability sampling method (convenient sampling technique) was used for collecting the sample of the study. As indicated in Table 2, the first month was utilized to conceptualize and draw the research paradigm, the second month for review of literature, the third and the fourth month involved gap finding and data collection, and the last month included data analysis and conclusion work of the research study.

Table 3 indicates the upper and lower limits of weight assigned to each of the participant. The scores are being calculated on the basis of number of respondents multiplied by highest or lowest weight as the case may be with and multiplied with number of variables.

#### Sample size of the study

The sample size will be based on a ratio between 1:4 and 1:10 in this study (Rummel, 1970; Schwab, 1980). As mentioned in the above method, the smallest sample size is 4x the items and the largest sample size is 10x the items. The current study has 22 variables. Hence, the sample size should be between 88 and 220. The considered sample size is 200, which is within the limit.

#### Framing of hypothesis

Focused on physical health.

H<sub>0</sub>: Blood cancer patients have significant opinion difference with respect to the relationship between QoL and physical health.

H<sub>1</sub>: Blood cancer patients have no significant opinion difference with respect to the relationship between QoL and physical health.

Focused on mental health.

H<sub>0</sub>: Blood cancer patients have significant opinion difference with respect to the relationship between QoL and mental health.

H<sub>1</sub>: Blood cancer patients have no significant opinion difference with respect to the relationship between QoL and mental health.

Focused on socio-economic status.

H<sub>0</sub>: Blood cancer patients have a significant opinion difference with respect to the relationship between QoL and socio-economic status.

H<sub>1</sub>: Blood cancer patients have no significant opinion difference with respect to the relationship between QoL and socio-economic status.

*Hypothesis analysis*

Focused on physical health.

H<sub>0</sub>: Blood cancer patients have a significant opinion difference with respect to the relationship between QoL and physical health.

H<sub>1</sub>: Blood cancer patients have no significant opinion difference with respect to the relationship between QoL and physical health.

As it can be seen in Table 5, the p-value is less than 0.05 and the F-value is 42.23 which is less than the F-critical value of 4.56. This is concluded that H<sub>0</sub> is rejected. Hence, QoL and physical health share a significant positive relationship with each other.

Focused on mental health.

H<sub>0</sub>: Blood cancer patients have a significant opinion difference with respect to the relationship between QoL and mental health.

H<sub>1</sub>: Blood cancer patients have no significant opinion difference with respect to the relationship between QoL and mental health.

As per Table 6, the p-value is less than 0.05 and the F-value is 731.17 which is less than the F-critical value of 3.46. This is concluded that H<sub>0</sub> is rejected. Hence, QoL and mental health share a significant positive relationship with each other.

Focused on socio-economic status.

H<sub>0</sub>: Blood cancer patients have significant opinion difference with respect to the relationship between QoL and socio-economic status.

H<sub>1</sub>: Blood cancer patients have no significant opinion difference with respect to the relationship between QoL and socio-economic status.

As it can be seen Table 7, the p-value is less than 0.05 and the F-value is 827.43, which is less than the F-critical value of 3.46. This concludes that H<sub>0</sub> is rejected. Hence, QoL and socio-economic status share a significant positive relationship with each other.

**Results and Discussion**

As presented in Table 4, when asked about QoL and physical health, respondents from all the age groups had 77.76%, 80%, 94%, and 83% of actual weighted scores to the maximum possible score, respectively.

**Table 5:** Opinion on QoL and physical health relationship among blood cancer patients

Specifications	N	F-value	P-value	F-critical value
21-30	10	42.23	0.00	4.56
31-40	10			
41-50	10			
51-60	10			

(Author's work)

**Table 6:** Opinion on QoL and mental health relationship among blood cancer patients

Specifications	N	F-value	P-value	F-critical value
21-30	6	731.17	0.00	3.46
31-40	6			
41-50	6			
51-60	6			

(Author's work)

**Table 7:** Opinion on QoL and socio-economic status relationship among blood cancer patients

Specifications	N	F-value	P-value	F-critical value
21-30	6	827.43	0.00	3.46
31-40	6			
41-50	6			
51-60	6			

(Authors' work)

**Table 8:** Participants in the age bracket (21-30) years old- 60 respondents

Participants age bracket (21-30) years old- 60 respondents						
Variables	DA	N	A	CA	CCA	Weight
	5	4	3	2	1	
QoL and physical health of blood cancer patients						
General health problems	23	12	10	07	08	412
Weakness	21	11	09	15	04	590
Insomnia	25	07	14	13	01	356
Irregular appetite	17	13	12	13	05	161
Require assistance while doing physical activities	19	10	11	03	07	275
Pain and aches	13	17	15	04	11	246
Fatigue	27	08	03	12	10	293
QoL and mental health of blood cancer patients						
Depression	24	16	14	03	03	648
Temper issues	25	12	11	08	04	302
Isolation	26	14	13	02	01	54
Personality disorder	21	17	11	06	05	36
Suicidal thoughts	25	08	04	12	11	290
Anxiety	27	03	05	05	20	200
QoL and socio-economic status of blood cancer patients						
Money leads to rational decision-making	23	24	06	02	05	325
Enhances life satisfaction	22	25	04	03	06	262
Develops humanitarian instincts	26	22	05	04	03	127
Decreases day to day issues	25	11	12	05	07	386
Enhances self esteem	19	16	08	12	05	103
Provides hope of recovery	21	14	07	09	08	193
Leads to psychological stability	17	16	09	02	15	80

(Author's work)

**Table 9:** Participants in the age bracket (31-40) years old-110 respondents

Participants age bracket (31-40) years old- 110 respondents						
Variables	DA	N	A	CA	CCA	Weight
	5	4	3	2	1	
QoL and physical health of blood cancer patients						
General health problems	73	17	13	05	02	547
Weakness	69	18	14	06	03	429
Insomnia	79	16	10	04	01	416
Irregular appetite	75	16	12	06	01	465
Require assistance	66	19	14	07	04	584



while doing physical activities						
Pain and aches	61	21	15	08	05	1002
Fatigue	83	16	01	04	06	956
QoL and mental health of blood cancer patients						
Depression	91	03	03	09	04	1017
Temper issues	55	22	17	10	06	421
Isolation	53	23	19	09	04	107
Personality disorder	49	24	20	10	05	200
Suicidal thoughts	89	03	04	10	04	683
Anxiety	93	02	03	09	03	641
QoL and socio-economic status of blood cancer patients						
Money leads to rational decision-making	43	25	21	12	07	296
Enhances life satisfaction	41	26	19	13	09	694
Develops humanitarian instincts	85	04	05	11	05	109
Decreases day to day issues	87	04	05	10	04	741
Enhances self esteem	47	24	20	11	06	383
Provides hope of recovery	82	06	061	11	05	423
Leads to psychological stability	42	26	21	12	07	489

(Author's work)

**Table 10:** Participants in the age bracket (41-50) years old- 20 respondents

Participants age bracket (41-50) years old- 20 respondents						
Variables	DA	N	A	CA	CCA	Weight
	5	4	3	2	1	
QoL and physical health of blood cancer patients						
General health problems	10	03	03	02	02	124
Weakness	16	01	01	01	01	245
Insomnia	07	03	02	02	06	133
Irregular appetite	13	02	01	02	02	163
Require assistance while doing physical activities	15	01	02	01	01	203
Pain and aches	14	01	02	02	01	50
Fatigue	12	03	01	02	02	24
QoL and mental health of blood cancer patients						
Depression	14	02	02	01	01	123
Temper issues	07	05	02	04	02	115
Isolation	05	02	03	05	05	43
Personality disorder	03	05	03	05	05	28
Suicidal thoughts	16	01	01	01	01	175
Anxiety	12	03	03	01	01	80

QoL and socio-economic status of blood cancer patients						
Money leads to rational decision-making	03	06	04	03	02	32
Enhances life satisfaction	04	03	02	06	05	43
Develops humanitarian instincts	09	02	04	03	02	54
Decreases day to day issues	12	02	02	03	01	171
Enhances self esteem	02	05	02	07	04	99
Provides hope of recovery	07	04	04	02	03	62
Leads to psychological stability	05	05	04	03	03	91

(Author's work)

**Table 11:** Participants in the age bracket (51-60) years old- 10 respondents

Participants age bracket (51-60) years old- 10 respondents						
Variables	DA	N	A	CA	CCA	Weight
	5	4	3	2	1	
QoL and physical health of blood cancer patients						
General health problems	06	01	01	01	01	51
Weakness	05	01	02	01	01	62
Insomnia	04	02	01	01	02	49
Irregular appetite	02	01	02	03	02	75
Require assistance while doing physical activities	06	01	01	01	01	89
Pain and aches	05	02	01	01	01	63
Fatigue	04	01	02	02	01	26
QoL and mental health of blood cancer patients						
Depression	03	01	02	02	02	54
Temper issues	02	02	01	03	02	31
Isolation	02	03	02	02	01	73
Personality disorder	01	01	02	02	04	12
Suicidal thoughts	04	02	02	01	01	58
Anxiety	05	01	02	02	01	60
QoL and socio-economic status of blood cancer patients						
Money leads to rational decision-making	02	02	02	01	03	23
Enhances life satisfaction	03	02	02	02	01	34
Develops humanitarian instincts	05	01	01	01	02	61
Decreases day to day issues	06	01	01	01	01	86
Enhances self esteem	01	02	02	02	03	43

Provides hope of recovery	05	02	01	01	01	11
Leads to psychological stability	02	01	02	02	03	15

(Author's work)

Data analysis of each of the participant's age bracket in Tables 8, 9, 10, and 11 was used to calculate the above figures. It is concluded all the variables corresponding to QoL and physical health are related to blood cancer patients significantly and positively irrespective of age group.

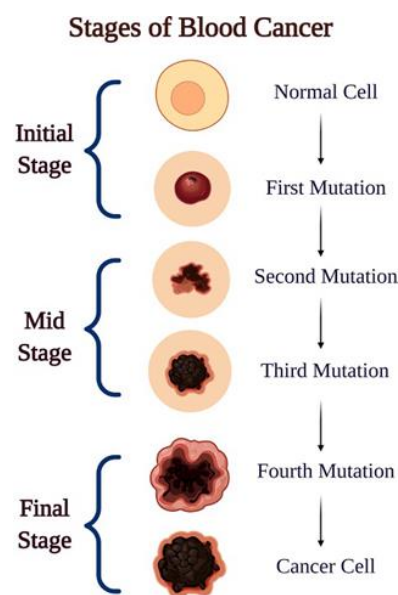
Similarly, in case of QoL and mental health, it is observed respondents from all age groups had 85%, 93%, 94%, and 96% of the actual weighted scores to the maximum possible score, respectively. It is suggested that all the variables corresponding to QoL and mental health share a

significant and positive connection with blood cancer patients irrespective of the age group.

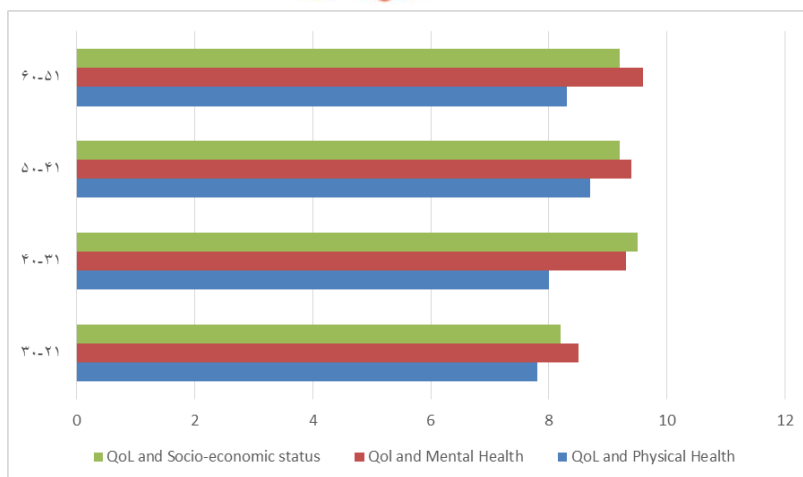
Regarding QoL and socio-economic status, it was found respondents from all age groups had 82%, 95%, 92%, and 91% of the actual weighted scores to the maximum possible score, respectively. Hence, QoL of blood cancer survivors is highly influenced by socio-economic status.

Figure 1 demonstrates various stages of cell mutation that ultimately results in a cancer cell. When this spreads further and other cells go through the same mutation, blood cancer is detected in an individual. Figure 2 is the graphical representation of Table 4.

**Figure 1:** Blood cancer stages and symptoms (Source: Researchgate-Ajay Kumar Shukla)



**Figure 2:** Total weight and weight upper limit comparison (Source: Table 4)



## Conclusion

QoL is a serious concern for blood cancer patients and their families. This research covers the physical health, mental health, and socio-economic status of blood cancer survivors. They influence their QoL with respect to three constructs. The study concluded that younger patients had a better QoL than their older counterparts. This is due to age, fitness, lifestyle, more income, and optimism. However, overall ground reality remains the same. We all should be empathetic towards the cause of cancer and lend a helping hand to the ones suffering from this deadly disease. Families of cancer victims also go through a lot of emotional and financial trauma in the process, more so in the case of death. They should also be paid equal attention and assistance should be provided for recovery. Blood cancer patients had no difference in opinion on QoL with respect to physical health, mental, and socio-economic status. Government should also implement healthcare policies to provide medical and financial support to patients suffering from diseases with extremely high cost of treatment. We cannot change destiny, but can ensure that life experience for an individual is pleasant.

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## Authors' Contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

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