Impact of chemotherapy upon quality of life for patients with chronic myeloid leukemia

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المستخلص

الهدف: معرفة تأثير العلاج الكيماوي على نوعية الحياة لمرضى إبيضاض الدم النقياني المزمن في مدينة بغداد.

المنهجية: أجريت دراسة وصفية التصميم إبتداءاً من ٣٠ كانون الثاني حتى بداية تشرين الأول ٢٠١١. أختيرت عينة غرضية "غير احتمالية" تكونت من (١٣٠) مريض من مرضى إبيضاض الدم النقياني المزمن. معايير شمول العينة هم المرضى من عمر (١٨) سنة فأكثر والمرضى المشخصين من ستة أشهر فأكثر وأستثي منهم المرضى المصابين بأمراضٍ نفسية أو المرضى الذين لديهم أمراض مزمنة. تمّ بناء وتطوير استمارة الاستبيان من مقياس نوعية الحياة الخاص بمنظمة الدول الأوربية لبحث وعلاجٍ السرطان مجموعة نوعية الحياة. تتألف استمارة الاستبيان من جزئيين: الجزء الأول يضمّ المعلومات الديموغرافية الاجتماعية والمعلومات المتعلقة بالحالة الصحية (البيانات الطبية) والجزء الثاني يضمّ مقياس نوعية الحياة لمرضى إبيضاض الدم النقياني المزمن ويتألف من ستة جوانب من نوعية الحياة. تمّ التحقق من مصداقية الاستبيان من خلال عرضها على مجموعة من ذوي الاختصاص وتمّ التحقق من الثبات من خلال دراسة إستطلاعية. تمّ تحليل البيانات من خلال إجراءات التحليل الوصفية التي تتضمن التكرار والنسبة المئوية، المتوسط الحسابي، الإنحراف المعياري، وأسلوب تحليل البيانات الإستنتاجية (اختبار تي، تحليل التباين). أشارت الدراسة إلى تحديد نوعية حياة مرضى إبيضاض الدم النقياني المزمن اعتمد على مستوى التأثير وذلك بالاعتماد على درجة الكفاءة النسبية، حيث وجد بأنّ المرض وعلاجه ذات العلاقة لا يؤثر على المرضى ذلك لأنّ مستوى درجة الكفاءة النسبية منخفض. حيث كلما ارتفع مستوى درجة الكفاءة ارتفع التأثير وهذا في جميع مجالات نوعية الحياة، عدا الرضا يكون العكس وبذلك لا يوجد تأثير للمرض وعلاجه ذات العلاقة على المرضى.

النتائج: أظهرت الدراسة بأنّ أعلى نسبة من العينة كانت تتراوح أعمارهم ما بين (٣١- ٤٠) سنة، كل المرضى يأخذون نوعاً واحداً من العلاج من المستشفى شهرياً. كان هناك ارتباط إحصائي مهم بين الجنس، مؤشر الزحمة، الحالة الزوجية، حالة العمل، مُدّة المرض، طور المرض والحالة الأدائية مع نوعية الحياة عموماً، في حين لم يكن هناك ارتباط إحصائي مهم بين العمر، مستوى التعليم، الحالة الاجتماعية الاقتصادية مع نوعية الحياة بشكلٍ عام.

التوصيات: أوصت الدراسة بإنشاء مراكز خاصة بأمراض الدم وزرع النخاع، وتوفير الفحص الجيني وفقاً للمقياس العالمي وبالسعر الرمزيّ، وتوفير الجيل الثاني من العلاج، وجعل عدد مراجعات المرضى أكثر من يومٍ واحدٍ بالأسبوع ليتسنى لملاك الطبيّ متابعتهم بالشكل الصحيح.

Abstract

Objective(s): To determine the impact of Chemotherapy upon the quality of life for patients with chronic myeloid leukemia in Baghdad city.

Methodology: A descriptive study design was carried out The study was initiated from 30 January 2011 to October 2011.A purposive (non–probability) sample consisted of (130) patients with a chronic myeloid leukemia ,Who attended to Baghdad Teaching Hospital and National Center for Research and Treatment of Hematology. The sample criteria was the patients who were 18 years old and above, excluding the patients who suffered from psychological problems and other chronic illnesses .A questionnaire was adopted and developed from European Organization Research and treatment of Cancer Quality of life group (EORTC- QoLG).The questionnaire was designed and composed of two parts: the first part deals with the sociodemographic clinical characteristics of CML patients, the second part includes six domains of the quality of life which are symptoms (disease and treatment-related) ,psychosocial ,infertility, satisfaction, adherence to therapy ,and body image .The reliability and validity of questionnaire were determined through a pilot study by correlation coefficient method, while the content validity of the questionnaire was determined through a panel of experts. The data was collected through the application of the questionnaire , the self-report ,interview technique and patient sheets. The data was analyzed through the descriptive data analysis approach, which included frequency, percentage, standard deviation, mean, mean of score and inferential data approach (T test, ANOVA).

Results: The present results revealed that the majority (33.84%), of the study sample were within the age groups (31 –40) years. The results showed that the mean score were low QoL with all domains except satisfaction aspect indicated high QoL. There was a statistically significant association between QoL as a general and sex, marital status, occupation, crowding index, duration of disease, phase of disease and performance status, while there was no statistically significant association between QoL as a general and age, socioeconomic status, and educational level. The revealed no effect of disease and treatment related on quality of life.

Recommendation: The study recommended the establishment of hematology center, bone marrow transplantation, the provision of genetic test, according to international standards and the second generation of treatment.

Keywords: Chemotherapy, Quality of Life, Chronic Myeloid Leukemia.

Introduction:

Chronic myeloid leukaemia (CML) (also known as chronic myelogenousleukaemia, chronic granulocytic leukaemia) is a clonal disease that results from an acquired genetic change in a pluripotential haemopoietic stem cell. This altered stem cell proliferates and generates a population of differentiated cells that gradually displaces normal haemopoiesis and leads to a greatly expanded total myeloid mass. One important landmark in the study of CML was the discovery of the Philadelphia (Ph) chromosome in 1960; another was the characterization in the 1980s of the breakpoint cluster region - Abelson murine leukemia (BCR–ABL) chimeric gene and associated oncoprotein and a third was the demonstration that introducing the BCR–ABL gene into murine stem cells in experimental animals caused a disease simulating human CML. Until the 1980s, CML was generally assumed to be incurable and was treated palliatively – in the early days with radiotherapy, and more recently with alkylating agents, notably busulphan. CML can be permanently eradicated in the majority of patients who survive after haemopoietic stem cell transplantation (HSCT), but the proportion of patients eligible for HSCT is still relatively small. The introduction of clinical practice of imatinib in 1998 was an important therapeutic advance, most patients achieve a complete cytogenetic response and prolongation of survival compared with other methods of treatment is expected (1).

In Asia, incidence rate of chronic myelogenous leukemia (CML) differs between 0.39 to 0.9 per 100,000, supported by data obtainable in eight states in Asia: China, Hong Kong, India, the Philippines, Singapore, South Korea, Taiwan and Thailand. These incidence rates are lesser than that occurrence in the US (1.13 -1.94 per 100,000), with the exclusion of India (0.6-2.2 per 100,000) which has incidence rates nearest that observed in the US. The average age of diagnosed is also younger, 36 -46 years as compared to 65 years in the United States. However, CML influences more man than woman in together Asia and Western populations (2) (M/F ratio 1.3-1.6:1 in Asia and 1.7:1 in United States and Thailand).

Methodology:

Descriptive design was carried out to assess the impact of chemotherapy on quality of life (QoL) for patients with chronic myeloid leukemia. The study was initiated on the 30th January, 2011 to 20th July 2011.

The present study was conducted in Baghdad City; Hematology department at Baghdad Teaching Hospital and the National Center for Research and Treatment of Hematology. A non-probability purposive sample of 130 patients was selected. All the patients diagnosed as Chronic Myeloid Leukemia (CML) and attended to Baghdad Teaching Hospital and National Center for Research &Treatment of Hematology to achieve the objectives of the study.

The questionnaire of the present study was adopted by the European Organization for Research and Treatment of Cancer Quality of Life group. (Provisional EORTC QoL-CML Questionnaire (Phase I-II development). The researcher contacted the Secretary of European organization for Research and Treatment Quality of Life Group for getting questionnaire. This questionnaire was evaluated by many experts in Health Care Providers (HCPs). Interviews have been conducted in several countries, ensuring cross-cultural “content validity”. In particular, they have involved 59 HCPs from Australia, Austria, Czech Republic, Germany, Greece, Italy, Netherlands, Norway, Russia, Switzerland, Taiwan and United Kingdom. , where the questionnaire for chronic myeloid leukemia was developed, and offer the researcher as a participant to develop the questionnaire for chronic myeloid leukemia under the title of (patients reported outcome in chronic myeloid leukemia), and the researcher translated the questionnaire into Arabic and was considered valid through the use of panel experts in the Medical nursing field, before giving to patients: Questionnaire consists of two parts 3. These parts were designed to measure the sample demographic characteristics which include: age, gender, and marital status, level of education, occupation and crowding index

Crowding index$(CI = \frac{Number\ of\ family member}{Number\ of\ house\ rooms})$4

Part I: Medical data are the term of period of disease, the present type of chemotherapy treatment, patients' group (defined as a first line of treatment, second line of treatment and others), patients who continued their treatment more than 5 years, phase of disease and Karnosfky performance status (The Karnofsky Performance Scale assesses patient/client functioning and performance and can be used to indicate prognosis. The Karnofsky is often used in determining prognosis/survival times)**.**

Part II: A comprehensive literature search of articles published between 1980 and 2009, dealing with patient reported outcome (PRO) issues in CML patients has been recently completed in the main electronic databases3

The present questionnaire is adopted by EORTC QOLG for chronic myeloid leukemia. It's composed of several particular domains of QOL. (Appendix E). These domains are:

1. Physical symptoms (disease and treatment related); which includes all signs and symptoms for disease and treatment related, which a CML patient may have. Such as (Dry mouth, fatigue, headaches, nausea, vomiting, joint pains, insomnia, diarrhea, abdominal pains or cramps, Muscular cramps, skin problems (e.g. Color changes, itchy, dry or flaking skin), problems of weight changing, hair loss, sweating problems, swelling in certain parts of the body (e.g. Ankles, legs or around the eyes), problems with eyes (e.g. Burning, watery, irritated or dry) and etc., It consists of 38 items.

2. Psychosocial domain: It includes all psychosocial domains, which a CML patient may have limitation in planning social activities because of the treatment. Feeling easily depressed and annoyed, emotional disturbance, feeling isolated from the other and etc. It consists of 17 items.

3. Infertility domain: It consists one item which is reveals effect disease and treatment related to the ability of having children.

4. Body image domain: It includes the effect of the disease and treatment on body image, such as feeling physically less attractive as a result of the illness or treatment, avoiding people because of appearance and etc. It consists of 4 items.

5. Adherence to therapy domain: It includes adherence, compliance and understanding of patients for treatment schedule, it consists of 9 items.

6. Satisfaction domain: It includes the extent satisfaction of patients with care received, relationship of doctors, information received about treatment schedule, information revealed about remedies to alleviate and the quality of family and social life, it consists of 5 items.

The Results:

Table 1. characteristics of the sample

Variables	Characteristic of sample	Frequency	Percent
Age	< 20	3	2.30
	21–30	25	19.23
	31–40	44	33.84
	41– 50	37	28.46
	51–60	11	8.46
	> 60	10	7.69
	Mean ±SD (39.6 ± 12.1)		
Sex	Male	76	58.3
	Female	54	41.3
Marital status	Single	23	17.7
	Married	96	73.8
	Divorced	4	3.1
	Widowed	7	5.4
Education level	Primary school	54	41.6
	Secondary school	40	30.8
	University	30	23.1
	postgraduate	6	4.6
Occupation status	Employed	43	33.1
	Unemployed	34	26.2
	Officer	37	28.5
	Retired	11	8.5
	Other(student)	5	3.8
Socioeconomic status	Lower level	9	6.9
	Middle level	76	58.5
	Higher level	45	34.6
Crowding index*	≥2.5	65	50
	<2.5	65	50
Supply of chemotherapy	From Hospital	130	100%
Receipt of chemotherapy	Monthly	130	100%
Type of Treatment	Imatinib	130	100%
Patients' group	1^{st} line chemotherapy	130	100%
Continuous on treatment more than 5 years	Yes	41	31.5
	No	89	68.5
Have you done genetic test	Yes	52	40
	No	78	60
Duration	< 1year	30	23.1
	1 – 3 years	34	26.2
	> 3years	66	50.5
M.S ± S.D of exposure to Chemotherapy (43.82 ± 35.04) respectively			
Current phase disease	Chronic phase	117	90%
	Advanced phase	13	10%
Performance status	0 – 40%**	4	3.1
	50% –70%***	89	68.5
	80% –100%****	37	28.5

***Crowding index =** $\frac{\text{no.of familymemmber}}{\text{no.of house rooms}}$ **, ≥ 2.5 mean high crowding index (who alive in small house), < 2.5 low crowding index (who live in large house)**

**** (0 – 40%) represented (Unable to care for self. Requires equivalent of institutional or hospital care**

***** (50%-70%) Unable to work. Able to live at home, care for most personal needs.**

****** (8o% - 100%) Able to carry on normal activity and to work. No special care is neede**d.

The above table shows that the vast majority (33.84%), of the study sample were within of age groups also the table shows that the majority of the study sample (58.3%) were male and the remaining were female. Regarding marital status, the majority (73.8%) of CML patients were married. Relative to subjects' level of education, the greater number (41.6%) were graduates of Primary school. With respect to the occupation status the results indicated that the highest (33.1%) percentage of the study sample was employees. The highest level of socioeconomic status was among the middle level where the percentage was (58.5%). And fifty percent of CML patients live in a small house. About Supply and receipt of medication (Chemotherapy) all the patients received and were supplied from Hospitals monthly. All patients on imagine were from the 1st line of medication.

The patients who continuous on treatment more than 5 years were (31.5%) of the sample and remaining were less than 5 years. Patients who underwent genetic test, were (40%) of the sample, and 60% of the sample who do not undergo the genetic test. Concerning duration of illness, (50.5%) of CML patients was more than 3 years. Regarding Karnosky performance status results indicated that the highest percentage (68.5%) of the study sample was (50% –70%).

Table 2. QoL Description of CML patients according to domains

QoL domains		**Min**	**Max**	**Cut-off-point**	**QoL as Mean ± SD**
Physical symptoms(disease and treatment related)		39	127	95	75.3±21.5
Psychosocial domains		19	68	42.5	40.7±11.9
Body image domains		4	16	10	8.01±3.3
Adherence to therapy domains		12	33	30	21.5±4.3
Satisfactions domains		5	20	12.5	14.9±3.9
Infertility domain		**Frequency**		**Percent**	
Not at all		60		46.9	
A little		10		7.7	
Quite a bit		20		15.4	
Very much		39		30.0	
QoL	Min	Max		Mean ±SD	
Score	89	253		162.7±36.9	

Min= Minimum; Max= Maximum; QoL=Quality of life, SD=Standard deviation

The table demonstrates the mean and stander deviation of QOL domains. The result revealed that the physical, psychosocial, body image, and adherence to therapy domains record mean less than cutoff point, while the satisfaction domain record high mean score. Regarding to Infertility domain data shows that a high percentage (46.9) was (not at all). Most patients were unaffected by the disease and treatment. Concerning QOL as a general the table reveals the mean score was less than cut-off-point.

Table 3. Quality of Life as a general among Patients with CML according demographic and clinical characteristics

Variables		Quality of Life in general		
		Frequency	χ^2- ±SD	
Age	≥30	102	162.8±37.7	T=0. 006 dt = 128 P = 0.9
	<30	28	162.2±34.6	
Sex	Male	76	155.7±38.1	T =2.6 df =128 P = 0.00
	Female	54	172.7±33.2	
Marital status	Single	23	176.6±39.3	F=2.9 df=3,129 P = 0.03
	Married	96	157.3±34.6	
	Divorce	4	188.5±31.3	
	Widowed	7	177.4±47.8	
Education level	Primary school	54	160.9±37.8	F=0.4 df =3,129 P = 0.7
	Secondary school	40	167.5±39.1	
	University	30	161.9±35.2	
	Other	6	151.8±23.1	
Table 3. Continued Occupation status	Employed	43	171.1±32.9	F=2.7 df=4,129 P = 0.03
	Unemployed	34	168.02±37.4	
	Officer	37	157.1±38.5	
	Retired	11	134.07±35.2	
	Other	5	161.2±33.2	
Socioeconomic status	Lower level	9	181.89±30.67	F=1.39 df =2,129 P = 0.25
	Middle level	76	162.46±38.03	
	Higher level	45	159.51±35.77	
Crowding index	≥2.5	65	169.3±35.6	T=2.04 df=128 P = 0.04
	<2.5	65	156.3±37.3	
Duration	<1year	30	150.9±31.9	F=2.9 df =2,129 P = 0.05
	1-3years	34	173.02±37.6	
	>3 years	66	162.9±37.6	
Phase of disease	Chronic phase	117	158.6±33.17	F=16.71 df= 1,129 P = 0.000
	Advanced phase	13	200.3±48.42	
Performance status	0 - 40%	4	112.2±14.0	F = 23.5 df =2129 P = 0.000
	50% - 70%	89	175.5±34.2	
	80% - 100%	37	137.7±26.3	

df= Degree of freedom; P= Level of probability at p ≤0.05; QoL=Quality of life, SD=Standard deviation; T= T-Test; χ^2 = Chi-square test

Table (3) shows no statistically significant differences between QoL as general and age, educational status and socioeconomic status. There are statistically significant differences have been found between, QoL as general and sex, marital status, occupation , Crowding index, Duration of disease, disease phase and Karnofsky Performance scale.

Discussion:

It has been found that the higher percentage (62.3) of the CML patients were male in the age group (31–40) and (41–50) years, where the mean, SD and median for age were (39.6, 12.1, 38.5) respectively, out of 130 patients, male/female (ratio) 76/54 (1.4). These findings were supported by Kiss and colleagues who indicated that the mean and Median for age of the patients were (32.6, 33.1) respectively, and out of 28 patients, male /female (ratio) 16/12 (1.3) 5. Au and colleagues who mentioned that the median age of diagnosis of CML patients in eight countries in Asia was younger, 36 – 46 years, as compared to 68 years in the United States. However, CML affects more males than females in both Asian and Western populations (M/F ratios 1.3–1.6: 1 in Asia and 1.7:1 in the United States and Thailand (2).

Regarding the marital status the result of the present study indicated that (73.8) of the sample were married, 17% were single, 3.1% were divorced and 5.4% were widowed. This result agrees with a study conducted by Chang and colleagues who indicated that 114 CML patients (70%) were married, 22% were single, and 7% were divorced and was 1% widowed (6).

According to the educational status the present study indicated that the majority of the study samples (41.6) were graduates of Primary school. This finding of the present study was supported by Noens, colleagues who reported that the educated level was lower or higher from secondary school level, where their percentage were (64.6%) (7).

The finding of the present study revealed that a high percentage (33.1%) of the CML patients were employees. Chang and co-workers who mentioned that the mean ± SD occupational score was 47 ±13; examples include a retail manager and a garage operator (score range, from 16 [e.g., House cleaner] to 78 [e.g., Physician]) (6).

In the present result the Socioeconomic status revealed that the highest (58.5%) of the sample was from the middle level of the Socioeconomic status, also the result indicated (50%) of CML patients live in a very small house. However, no study was found to supports and discusses the socioeconomic status and crowding index in CML patients.

Regarding the type of treatment the result of the present study indicated that all samples were taking the Imatinib drug. In a survey conducted by NCCN Trends, (2011) mentioned that most commonly utilize for newly diagnosed Ph+ chronic phase CML patients (n = 418) were 86% on unattainable, 7% on nilotinib, 5% Dasatinib and 2% on other drugs (8).

Regarding the genetic test the result of the present study indicated that (60%), of patients did not undergo the genetic test. Access to laboratories which perform molecular monitoring can be poor in many parts of the region. In countries such as India, Thailand and the Philippines, quantitatively molecular monitor is not widely available due to insufficient laboratories and high operating costs. In countries with more established healthcare system (e.g. Singapore, South Korea), molecular monitoring of imatinib response is being performed routinely. Instead, the key issue in these countries is standardization of procedures so that they are more coherent with international standards (2). NCCN Trends (2011) stated that the out of 417 patients were 48% with a lab standardized to International Scale, 23% not sure if the lab is standardized to International Scale, 18% not at this time and 11% with lab not standardized to the International Scale(8).

In Iraq, the genetic test is not available for a long time, for several reasons First, the lack of test instruments in hospitals, Second: the expensive cost of testing, so not all patients can be done this test. As patients mention.

According to the duration of disease in the present study, the majority of the study sample (50.5) were (> 3years), and the mean ± S.D of exposure to chemotherapy were (43.82 ± 35.04 months) respectively. This is in agreement with result of Noens, and co-workers (7) who stated that the median and mean times from diagnosis of CML patients were 41.9 months and 48.8 months (± 41.4 months), respectively.

Regarding the Kornofsky performance status scale: the result of the present study indicated that (68.5 %) of the sample their performance status was (50% –70%) (That means Unable to work. Able to live at home, care for most personal needs).This result is nearly similar to the finding of Hahn and co-workers Mentioned that Performance Status Scale: Eastern Cooperative Oncology Group (ECOG) were (78.7%) who within Normal activity9.

Feedback is most crucial in determining what the impact of disease and treatment related to physical symptoms and what was effected on the QOL of CML patients. The result demonstrated the symptoms of disease, according to mean of scores and relative sufficiency, the highest MS and RS among physical symptoms were fatigue and joint pain,, where MSs were 3.04, 3.03, and RSs were 76, 75.75 respectively.Hahn, and colleagues stated that patients taking imatinib reported better daily functioning and well-being, less fatigue, and milder emotional or cognitive complaints compared with patients in the IFN+LDAC arm. Physical side effects such as fever, chills, and nausea were not bothersome to unattainable patients compared with IFN+LDAC patients. The extent of pain, sweating, and feeling ill was comparable in the two treatment arms and was only experienced “a little bit” in both arms(9). Druker and co-workers Stated that the most commonly reported adverse events in CML patients treated with imatinib (IM) has shown that after a median follow up of 5 years, were edema (including peripheral and periorbital edema) (60%), muscle cramps (49%), diarrhea (45%), nausea (50%), musculoskeletal pain (47%), rash and other skin problems (40%), abdominal pain (37%), fatigue (39%), joint pain (31%), and headache (37%)10.

A high effect of drugs and disease on psychosocial domain of the CML patients. The finding of the present study indicated 3 out of 17 items were high and moderate effect of drugs and disease on the quality of life, Which were: Importance of social support (e.g. Family, friends and relatives) in coping with the disease, Worries and uncertainties about health conditions in the future, and Worries to get new symptoms of the illness, whereas the mean of score and (RS) were 3.42 , 3.01, 2.97 and 85.5,75.25, 74.25 respectively.Two studies Pavol and colleagues (11) ; Scheibel and colleagues (12) also highlighted that IFN-based therapies have detrimental effects mainly in terms of cognitive function and mood symptoms. The patients in these studies performed well below expectation on tests of cognitive processing speed, verbal memory, and executive functions. In addition to cognitive deficits, patients receiving IFN-alpha also showed signs of mood disturbance, with all patients having elevated levels of depressive symptoms while on treatment as well as many subjective complaints, particularly fatigue, slowed movements, irritability, and difficulty making decisions. These symptoms were often of sufficient severity to present problems for the patients in their daily lives, including difficulty returning to work. Depression can produce cognitive dysfunction, but self-reported mood disturbance was not highly related to tested cognitive decline, not to somatic complaints such as fatigue, raising the possibility of different underlying mechanisms for the depressive and cognitive symptoms of interferon neurotoxicity. Hayden and colleagues comparing long term HRQOL of 46 CML patients they found that the following areas to be significantly impaired: role functioning, cognitive functioning and dispense. Decreased sexual function was evident in 38% of patients (13).There is also consistent agreement that IFN has major detrimental effects regarding cognitive and mood outcomes (11-12).

The finding of the study showed that the mean of score and (RS) infertility were (2.28, 57), where (RS) was very low. This result is consistent with Homewood, et.al. (2003) who mentioned that the percentage of patients on IFN experiencing decreases in sexual function in respect of interest, activity and pleasure was higher than those not on IFN, and this effect remains significant after controlling for patient age and sex. Patients over 50 years are more likely to be adversely affected. Hayden and co-worker (13) who reported that Sexual activity of CML patients was the greatest decrease, with 38% of subjects reporting decreased activity. When asked about infertility, 59% reported that they were infertile, 26% did not know and 7% said they were not infertile. A total of 83% said they were aware of infertility being a consequence of treatment.

The result of the study revealed that all items of the body image domain were low and very low of (RS) and means of score were 2.51,2.24, 1.8 and 1.44, and (RS) were 26.57, 56, 45 and 36.

The outcome of study displayed that the adherence to therapy which is follows: Feeling dependent of the treatment schedule prescribed by the physician, was very high of (RS), and mean of score was 3.65 , the item, Level of help and support from family or friends to take medicine was high of (RS), and mean of score was 3.23, while 3 items were low of (RS) which are understanding of medications taken, Being stressed to manage the current treatment and Bother of taking all the daily prescribed pills, where men of score and (RS) were 2.71, 2.61 , 2.51 and 67.75, 65.25, 62.75 respectively. While remaining items were grade very low (RS). Nouns and colleagues7 investigated adherence to IM therapy in 169 CML patients. The majority of patients received previous treatment with IFN (64%) and HRQO L evaluation was performed at baseline and approximately 90 days after treatment. No statistically significant difference was found over time. However, addressed adherence to therapy and therefore few details were reported regarding HRQOL evaluation.

The result has shown that the mean scores & (RS) of the satisfaction domain for each item were moderate, only one item was high, which are (Satisfaction with relationship with doctors). Kiss and co-workers5 who reported that the areas of least satisfaction were physical strength, with six (23.1%) respondents, and how comfortable you feel, with seven (26.9%) respondents. However, 26 (100%) of the respondents were satisfied overall with their BMT. A high degree of satisfaction with interpersonal relationships with significant others was reported by 19 respondents and with other relatives or friends by (24). Twenty-three respondents (88.55) were satisfied with their QOL at the time of the study. Patients' age, sex, marital status or level of education did not influence the response to questionnaires.

The analysis of the data showed statistically significant differences between QoL as a general with sex, marital status, educational level, crowding index, duration of disease, phase of disease and performance status. Other characteristics no statistically significant differences between QoL as a general with age, educational status, and socioeconomic status.

The result showed that the age groups not effected in quality of life as a general, but the CML patients only had the adverse effect of an infertility domain which means that the patients' age < 30 years had an effect of the disease and treatment more than the patient age > 30 years. Homewood and colleagues (14) stated that there were no significant differences in age group of CML patients between treatment group. Kiss and colleagues (5) revealed that three domains scored lower as compared with an age-adjusted normative population at a level of (P < .05). These include physical functioning (P=025), role functioning-physical (P=.019), and general health (P= .0019). These domains describe mainly physical functions. Hahn co-workers (9) stated that there was no significantly associated between age of CML patients and Trial Outcome Index (TOI) scores.

Concerning sex, female evidenced the mean score higher than the male as a general QOL, that mean the female had an effect of the disease and treatment more than male, related the symptoms and psychosocial domains, while other domains which were (body image, adherence to therapy, infertility and satisfaction) revealed no significant differences between male and female.Some studies, albeit with small sample sizes, have also suggested that female patients might have worse outcomes in terms of psychosocial adjustment, anxiety and depression and other symptoms (15,16,17). Some poor outcomes in female patients have been often reported in the literature (18) however, these findings need further confirmation in future larger CML studies. Homewood and colleagues (14) stated that there were no significant differences in sex between treatment groups. Hahn and co-workers9 mentioned that the independence of treatment effects, patient sex was associated with Trial Outcome Index (TOI) scores; specifically, the average score for men was approximately (4) points higher (better) than the score for women.

Related the marital status, the QOL as a general revealed that the divorce and widowed patients more suffering from the disease and treatment from the single and married patients. Especially with the physical symptoms, body image and Infertility domain. Homewood and colleagues (14) stated that there was no significant difference marital status between treatment groups.

The outcome of the study indicated that no statically significant difference between QoL as a general and education level. As well as there is no significant difference in mean score with all domains.

Concerning occupational status the results of the present study shows that there is a significant difference between QoL as general and occupation. As well as being significant difference with psychosocial and infertility domain. Homewood and co-workers (14) stated comparison of occupational status before and after treatment showed an overall significant change ($\chi 2$, P< 0.001). After treatment, nor were retired, and a few had become unemployed, taken sick leave or reduced their hours of work. However, this was not related to IFN treatment as there were no significant differences between the IFN and non-IFN groups on occupational status either before (P=0. 73) Or after (P=0. 87) Treatment.

The result revealed that there is no significant difference between mean scores of QoL as general and socioeconomic status, only with the Body Image domain where there were significant differences of mean in socioeconomic levels. Homewood and co-workers (14) stated that there was no significant difference social class between treatment groups.

The application of t test revealed that the QOL as a general for CML patients who live in suitable house suffering from the disease and treatment less than the patients who live in a small house, where were statistically significant differences in means between Crowding index and physical symptoms, body image and adherence to therapy.

Related duration of illness, the ANOVA revealed that there was no statistical difference in mean score in all domains except physical symptom domain. The duration of illness indicated that duration < 1years and >3 had less than effect from the disease and treatment than those their durations less than 1-3 years related physical symptoms. Hahn and co-workers(9)stated that there were statistically significant (P < .001) differences between patients who continued to receive IFN+LDAC and those who crossed over to imatinib. In addition, mean Trial Outcome Index (TOI) scores at month 12 were comparable for patients randomly assigned to the imatinib arm and those who crossed over from IFN alpha plus low-dose cytarabine (IFN+LDAC) to imatinib (P=.088). Similar patterns were observed for SFWB and EWB. The result revealed a difference in mean score between performance statuses as a general QOL. There are highly statistically significant differences between performance status and general QOL. Where the majority of the patients had the middle functioning performance status rating.

References:

1. Hoffbrand, A., Catovsky, D. and Tuddenham, E.G.D: *Postgraduate haematology*, fifth edition, 2005, pp(603,604).

2. Au, W.Y., Caguioa, PB., Chuah, C. et al. Chronic myeloid leukemia in Asia. *Int J Hematol* 2009, 89: 14-23.

3. Italian Group for Adult Hematologic Diseases (GIMEMA). Patient Reported Outcomes in Chronic Myeloid Leukemia, *GIMEMA QoL* – CML0310, Version 1.0, 2010.

4. Tiwari, S. and Kumar, A. Development of standardization of the scale to measure socioeconomic status in urban and rural communication in India, *India J. Med* 2005; 122, 309–314.

5. Kiss, T.L., Abdolell, M., Jamal, N. et al. Long-term medical outcomes and quality-of-life assessment of patients with chronic myeloid leukemia followed at least 10 years after allogeneic bone marrow transplantation, *J Clin Oncol*, 2002; 20(9): 2334–43.

6. Chang, G. Orav, E.J., McNamara, T., Tong, M.Y. and Antin, J.H. Depression, cigarette smoking, and hematopoietic stem cell transplantation outcome, Cancer. 2004; 101(4): 782–9.

7. Noens, L., Van Lierde, M.A., De Bock, R. et al. Prevalence, determinants, and outcomes of non-adherence to imatinib therapy in patients with chronic myeloid leukemia: the ADAGIO study, *Blood* 2009; 113: 5401–11.

8. National Comprehensive Cancer Network (NCCN), *Survey NCCN trends for Chronic Myelogenous Leukemia patients* in March 2011.

9. Hahn, E.A., Glendenning, G.A., Sorensen, M.V. et al. Quality of life in patients with newly diagnosed chronic phase chronic myeloid leukemia on imatinib versus interferon alfa plus low-dose cytarabine: results from the IRIS Study, *J Clin Oncol* 2003; 21(11), 2138-46.

10. Druker, B.J., Guilhot, F., O'Brien, S. et al. Five-year follow-up of patients receiving imatinib for chronic myeloid leukemia, *N Engl J Med* 2006; 355, 2408-2417.

11. Pavol, M.A., Meyers, C.A., Rexer, J.L., Valentine, A.D., Mattis, P.J. and Talpaz, M. Pattern of neurobehavioral deficits associated with interferon alfa therapy for leukemia, *Neurology* 1995; 45(5): 947–50.

12. Scheibel, RS., Valentine, A.D., O'Brien, S. and Meyers, C.A. Cognitive dysfunction and depression during treatment with interferon-alpha and chemotherapy, *J Neuropsychiatry Clin Neurosci* 2004; 16(2): 185–91.

13. Hayden, P.J., Keogh, F., Ni, CM. et al. A single-center assessment of long-term quality of life status after sibling allogeneic stem cell trans- plantation for chronic myeloid leukemia in first chronic phase, *Bone Marrow Transplant* 2004; 34(6): 545–56.

14. Homewood, J., Watson, M., Richards, S.M., Halsey, J. and Shepherd, P.C. Treatment of CML using IFN-alpha: impact on quality of life, *Hematol J* 2003; 4(4): 253–62.

15. Kluin-Nelemans, H.C., Buck, G., Le Cessie, S. et al. Randomized comparison of low-dose versus high-dose interferon-alfa in chronic myeloid leukemia: prospective collaboration of 3 joint trials by the MRC and HOVON groups, *Blood* 2004; 103(12): 4408–15.

16. Molassiotis, A. and Morris, PJ. The meaning of quality of life and the effects of unrelated donor bone marrow transplants for chronic myeloid leukemia in adult long-term survivors, *Cancer Nurs* 1998; 21(3): 205–11.

17. Chang, G., Orav, E.J., McNamara, T.K.; Tong, M.Y. and Antin, J.H. Psychosocial function after hematopoietic stem cell transplantation. *Psychosomatics* 2005; 46(1): 34–40.

18. Wang, X.S., Cleeland, C.S., Mendoza, T.R. et al. Impact of cultural and linguistic factors on symptom reporting by patients with cancer, *J Natl Cancer Inst* 2010; 102(10): 732–8.