Needs of Patients with Leukemia Post Stem Cell Transplantation

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Abstract

Background: Stem cell transplantation is a lifesaving procedure which is used for the treatment of hematological malignancies or diseases as leukemia. **Aim:** The study aimed to identify the needs of patient with leukemia post stem cell transplantation through the following: 1- Assessing the bio psychosocial needs of patients with leukemia (physical, psychological, social needs) post stem cell transplantation.2-Assessing the educational needs of patients with leukemia post stem cell transplantation. **Design:** Descriptive exploratory design was utilized in this study. **Setting:** The study was conducted in the bone marrow transplantation out patients` Clinic at Nasser Institute Hospital. **Subjects:** A purposive sample of 52 patients with leukemia post stem cell transplantation were involved in the study. **Tools: I-** Patients' medical records **II-** A structure interview questionnaire for patient's bio psychosocial needs. **III-** Katz scale of independence in activities of daily living **IV-**A structure interview questionnaire about patient's knowledge. **Results:** The majority of the studied patients had unsatisfactory physical, psychological, social needs and total level of knowledge post stem cell transplantation. **Conclusion:** There was highly statistically significant relation between the patient's physical , social needs and total level of knowledge and their educational level .There was a highly significant relationship between the time of transplantation and patients' psychological and social needs. There was a significant positive correlation between patients' physical needs, social needs, daily living activities and their level of knowledge. **Recommendation:** Replication of the study on a larger probability sample in different setting for generalizing the findings.

Key words: Leukemia – Stem Cell Transplantation – Patients' needs.

Introduction

Leukemia is a form of cancer that targets the blood. Blood contains different types of cells as red blood cells (RBCs), white blood cells (WBCs) and platelets. The normal life cycle of these cells (formation, growth, function and death) is controlled by the bone marrow. When the control over the WBCs life cycle is disturbed, leukemia is the result. The number of WBCs become higher than other blood cells and immature. This immature blast cells (immature WBCs) are unable to carry out their function in the body as fighting infection and wound healing ***(Ostgard, Lund and Norgaara, 2018)***.

Leukemia not only affects the white blood cells, it also frequently affects other cells produced by the bone marrow through interfering with their production or crowding out the bone marrow. Patients may have a low red blood cell count (anemia). In addition to, the patients may suffer from a low platelets count (thrombocytopenia) *(Fayed, 2019).*

Treatment of leukemia depends on the type of leukemia, the patient's age and his general health status. It can involve some combination of chemotherapy, radiation therapy, targeted therapy, and stem cell transplant, in addition to supportive care and palliative care as needed. Certain types of leukemia may be managed with watchful waiting *(Felman, 2018).*

Stem cell transplantation (SCT) is a lifesaving procedure which is frequently used not only for the treatment of hematological malignancies or diseases, but also as a therapy for solid tumors. The SCT is type of treatment that includes the bone morrow, the peripheral blood, or the umbilical cord blood as a source of stem cells used for transplantation. SCT may be autologous (the patient's own stem cells are used), allogeneic (the stem cells come from a donor) or syngeneic (from an identical twin) *(Talati & Sweet, 2018).*

The most complications appeared after SCT is graft versus host disease (GVHD). SCT results in adverse effects include skin rash, bronchiolitis, nausea, emesis, diarrhea, and jaundice, which cause weakness. Later complications after SCT, such as infertility and secondary malignancies, may be consequences of the conditioning treatment. In addition, the transplant experience can include multiple hospital readmissions for acute complications, slow recovery and long term issues. These side effects have a negative impact on the patients' recovery and treatment success and can result in patient death *(Fox, Deeg & Lothian, 2018).*

Stem Cell Transplantation is an invasive therapeutic approach which can affect patients' physical, psychological, social, and emotional health. Patients with stem Cell Transplantation have special needs which influence their recovery. Patients post stem cell transplantation require assistance with symptoms control and for dealing with the side effects in order to avoid the negative effects of their physical condition, social, emotional and functional status on their life *(Jacobs, 2019).*

During the treatment process, many SCT recipients experience and display wide psychological disorders including distress, anxiety, and depression. Patient life post stem cell transplantation may be compromised by the abrupt disruption of daily life, withdrawal from studies, work, leisure activities, social and family life. There is a strong psychosocial impact on patients with incorporation of new routines resulting of the disease process and discipline required for treatment *(Amonoo et al., 2019).*

Significance of the Study

According to the **American Cancer Society in (2019)**, 61,780 people were diagnosed with leukemia in the united states (35%) of blood cancer cases (3.5% of all cancer cases) with deaths around 24,370 people died from leukemia (14,270 males and 10,100 females),that was about (4% of all cancer deaths).

Stem cell transplantation (SCT) is an aggressive therapeutic option for many malignant and nonmalignant diseases. The SCT is developed into a routine treatment that can cure more than 90% of patients with hematological malignancies and non-malignant disorders in the early stage of the disease when an optimal donor recipient combination is available. Today more than 50.000 transplants are carried out annually worldwide *(WHO, 2019)*. According to **the Nasser Institute Hospital Statistical** record, the incidence of stem cell transplantation during the period 2018 to 2019 were about 353 patients, patients with leukemia who admitted for SCT were about 158 patients.

Aim of the study

The present study aimed to identify the needs of patient with leukemia post stem cell transplantation through the following:

1- Assessing the bio psychosocial needs of patients with leukemia (physical, psychological, social needs) post stem cell transplantation.
2-Assessing the educational needs of patients with leukemia post stem cell Transplantation.

Research questions:

1-What are the bio psychosocial needs of patients with leukemia post stem cell transplantation?

2-What are the educational needs of patients with leukemia post stem cell transplantation?

Operational definitions:

- **Needs of patient:** mean the bio psychosocial needs and educational needs.

• Post stem cell transplantation:

Within the first six months after patient discharge from the hospital.

Subject and Methods

The study was portrayed under the four main designs as follows:-

- Technical design.
- Operational design.
- Administrative design.
- Statistical design

1) Technical design:

The technical design includes the research design, setting, subjects and tools for data collection.

Research design:

Descriptive exploratory design was utilized to achieve the aim of the study.

Setting:

The study was conducted in the Bone Marrow Transplantation Out patients` Clinic at Nasser Institute Hospital. The clinic is one room consists of physician office and one bed for the patient.

Subjects:

A purposive sample of 52 patients with leukemia post stem cell transplantion were involved in the study, from the above mentioned setting. The sample size was calculated by adjusting the power of the test using the following equation based on the number analysis of patients admitted in year 2017-2018 and performed stem cell transplantation in the outpatients clinic at Nasser Institute hospital:

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times (d^2 \div z^2)\right] + p(1-p)\right]}$$

N= Community size

z= Class standard corresponding to the level of significance equal to 0.95 and 1.96

d= The error rate is equal to 0.05

p= Ratio provides a neutral property = 0.125

Inclusion criteria:

Patients age was more than 18 years old. The involved patients with leukemia were within three months up to six months post stem cell transplantation. Both sex were involved**.**

Exclusion Criteria: Patients with other chronic diseases as Diabetes Mellitus, or hypertension.

Tools for data collection: -

I- Patients' medical records

II- A structure interview questionnaire for patient's bio psychosocial needs

III-Katz Index of Independence in activities of daily living

IV- A structure interview questionnaire to assess patient's level of knowledge

I- Patients' medical records:

This tool was adopted from R*amadan (2013) and Khalifa, (2016)* and modified by the researcher after reviewing the recent related literature *Shysh, (2018)*. It was collected from patients' files (Retrospectively from the date of admission). It was divided into two parts:

The first part:

It was used to assess patient's demographic characteristics which included: age, gender, marital status, level of education, occupations, and habits as smoking or substance abuse.

The second part:

It was used to assess past and present medical and surgical history of the patients included in the study. It included family history for any blood diseases or cancer. The past history also included previous hospital admission, previous surgery and presence of any allergy, patients' present history as the duration of disease, onset of the disease, signs &symptoms appeared, complications from the disease, time of stem cell transplant, medications used post stem cell transplantation, the side effects appeared post transplantation and investigation done.

II- A structure interview questionnaire for patient's bio psychosocial needs: -

This tool was adopted from *Ramadan, (2013) and Williamson, Owean & Branne, (2015)* and modified by the researcher after reviewing the recent related literature. It was written in simple Arabic language and concerning the bio psychosocial needs of those group of patients which included.

A-Physical needs: (30 questions) to assess patients' respiratory system alterations (3 questions), cardiovascular system alterations (2 questions), gastrointestinal system alterations (9 questions), nervous system alterations (4 questions), and integumentary system alterations (5 questions), In addition to elimination (4 questions), sleep pattern (2 questions) and sexuality (1 question).

❖ **Scoring system:**

The total score of physical needs was 30 questions, if the answer is (yes), it was given one grade. If the answer is (no), It was given zero.

The total score of each patient was categorized as the following:

- Satisfactory level if total grade ≥70% equal 21 grade or more
- Unsatisfactory level if total grade <70%

B-Psychological needs: patients' psychological needs were assessed by using anxiety, depression and stress scale (DASS). It is standardized scale. It includes 21 items self-report questionnaire designed to measure severity common to both depression and anxiety. In completing the DASS, the patient is

required to indicate the presence of symptoms. Each item is scored from 0 to 3.The scale to which each item belongs was indicated by the letter D (depression), A (anxiety) and S (stress). Each of the three scales contain 7 items. The depression scale assesses dysphoria, hopelessness, devaluation if life, self deprecation, lack of interest or involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety and subjective experience of anxious effect. The stress scale assesses difficulty relaxing, nervous arousal, and being easily upset or agitated, irritable or over reactive and impatient. For each scale (D, A and S) sum the scores of identified items.

❖ **Scoring system:**

The total score of each item was categorized as the following:

		De pression	A nxiety	S tress
N ormal		0-4	0-3	0-7
M ild		5-6	4-5	8-9
M oderate		7-10	6-7	0-12
Se vere		11-13	8-9	3-16
E xtremely severe		14+	1 0+	1 7+

C-Social needs: (12 questions) were used to assess patient's social activities (1 question), social relation (4 questions), social role (2 questions), social support (2 questions), nature of work (1 question) and financial effect (2 questions).

❖ **Scoring system:**

The total score of social needs was 12 questions, if the answer is (yes), it was given one grade. If the answer is (no), it was given zero.

The total score of each patient was categorized as the following:

- Satisfactory level if total grade ≥70% equal 8 grade or more
- Unsatisfactory level if total grade <70%

III- Katz Index of Independence in activities of daily living (Katz scale): This tool was adopted from *Williamson, Owean & Branne, (2015).* It was used to assess activity of daily living alteration (6 questions). The Index ranked adequacy of performance in the six functions of bathing, dressing, toileting, transferring, feeding, and continence.

❖ **Scoring system:**

Patients were scored yes or no for independence in each of the six functions. If the answer is independence (no), it was given one grade. If the answer is dependence (yes), it was given zero. A score of 6 indicates full function, 4 indicates moderate impairment, and 2 or less indicates severe functional impairment (completely independence).

IV- A structure interview questionnaire to assess patient's level of knowledge:

This tool was developed by the researcher after reviewing the recent related literature *Albrecht, (2014); Khalifa, (2016) ; Jeevani, (2016) ; and Pidala, Anasetti & Jim, (2017)* to assess: a- patients general knowledge regarding: definition of leukemia (2 questions), causes of leukemia (1 questions), sign &

symptoms of leukemia (2 questions), complications of leukemia (1 question), stem cell definition (1 question), sites of stem cell (1 question), signs and symptoms related to chemotherapy (2 questions), investigations needed (2 questions), and complications of stem cell transplantation (1question) .

b- Patients Self-care responsibilities (46 questions) were used to assess the following precautions: the healthy diet (4 questions), the hygiene (3 questions), the life style (6 questions), preventing or reducing bleeding (6 questions), reducing mucositis (3 questions), reducing skin problems (4 questions), reducing gastrointestinal complications (6 questions), reducing fatigue (5 questions), control pain (4 questions), and control anemia (5 questions).

❖ **Scoring system:**

The total score of educational needs was 59 questions, each correct answer was given one grade and incorrect answer given zero.

The total score of each patient was categorized as the following:

- Satisfactory level of knowledge ≥70% which equal 41.3 grade or more
- Un satisfactory level of knowledge <70%

Face and content validity and reliability:

Face and content validity aimed to inspect the items to determine whether the tool measure what it supposed to measure. The validity was ascertained by a jury of expertise (5 members) categorized two professors, two assistant

professors and one lecturer from medical and nursing staff to review the tools for clarity, relevance, comprehensiveness, understanding and applicability.

Reliability was estimated statistically for the developed tools by Crombach's alpha coefficient. It was calculated to assess reliability of developed tool through their internal consistency. The reliability score of tool was (0.797, 0.836, and 0.733) for biopyschosocial needs assessment, Katz index of independence in activities of daily living (ADL) and Knowledge respectively.

2) Operational design:

It included the preparatory phase, pilot study, field work and ethical considerations.

The Preparatory phase:

It included reviewing of the recent related literature and theoretical knowledge of various aspects of the study using articles, internet, periodicals , magazines and books to develop tools for data collection.

Pilot study:

A pilot study was carried out on 10% of the sample (6 patients) under study to test applicability, clarity and efficiency of the tools, and estimated time needed to answer the tools, then the modifications were done according to the results of the pilot study. The patients included in the study are excluded from study sample and another 6 patients with the same criteria were included in the study sample.

Field Work:

Data were collected from the beginning of April 2019 to the end of September 2019. An approval was taken from the faculty of Nursing, Ain Shams University, the manager of Bone Marrow Transplantation Unit in Nasser institute Hospital and the patients involved in the study. Purpose of the study was simply explained to the patients who agree to participate in the study prior to any data collection. The researcher started to collect data from patients with leukemia post stem cell transplantation. Data collection was done 2 days /week, Saturday and Tuesday from 8:30 am to 2 pm.

The following study tools was filled in and completed by the researcher. Patients' medical records was used to obtain demographic data, the past and present medical history and treatment. It took 10 minutes from each file. But some files were not completed and the answers of some questions were collected from patients themselves. An interview questionnaire assessed the bio psychosocial needs of patients with leukemia (physical, psychological, and social) post stem cell transplantation. It took 20 minutes. An interview questionnaire assessed the educational needs of patients with leukemia post stem cell transplantation. It took from 20 -30 minutes according to patient's condition.

Ethical considerations:

Ethical approval was obtained from the scientific ethical committee of Ain Shams University. In addition oral informed consent was obtained from each participant prior to data collection. They were assured that anonymity and confidentiality would be guaranteed and the right to withdraw from the study at

any time. Ethics, values, culture and beliefs were respected.

3) Administrative design:

An approval to carry out this study was obtained from the manger of Bone Marrow Transplantation Unit at Nasser institute Hospital.

4) Statistical design:

The obtained data were synthesized, analyzed, and Presented in numbers, percentage, tables, figures and diagrams as required and suitable statistical tests were used to test significance of the results. Data were presented using descriptive statistics in the form of frequencies and percentages
Results:

Table (1): This table showed that the mean age of the studied subjects was 31.8±7.45 years old, and 67.31% of them were males. While 51.92% of the patients included in the study were married, 55.77% had basic education. Also, 57.69% of patients included in the study live in rural areas, and 61.54% of patients were working.

Figure (1): Total physical needs of patients under the study (n =52).

Figure (2): This figure showed that 94.23% of the patients under the study experienced unsatisfactory level of their physical needs.

for qualitative variables, and mean and standard deviation for quantitative variables. The statistical analysis was done using percentage, mean, standard deviation, t- Test and correlation coefficient (r).

The observed differences and associations were considered as the following:

Not significant   (NS) P > 0.05
Significant   (S) p≤0.05
Highly significant   (HS) P≤0.01

Correlation values (r) and p value represent either:

* Significant   (S) p≤0.05
** Highly significant   P≤0.01
  Not significant   (No) P > 0.05.

Figure (3): This figure showed that 59.62% of patients could perform full function, while only 11.54% of patients had severed function impairment.

Table (2): This table showed that, 36.54% of patients had mild depression, while 25% of patients had no depression. Regarding anxiety 28.85% of patients had moderate anxiety, while 26.92% of them had mild anxiety, and 19.23% of them suffered severe anxiety. While 34.62% of patients developed severe stress, and 23.08% of them suffered mild stress.

Table (3) a: This table showed that, 94.23% of patients under the study had unsatisfactory level of knowledge about signs and symptoms of leukemia, while 90.38% of them had unsatisfactory level of knowledge about definition of

stem cells used in transplant, and 88.46% of them had unsatisfactory level of knowledge for complications post stem cell transplant.

Table (3) b: This table showed that, all patients (100 %) had unsatisfactory level of knowledge about precautions for avoiding bleeding, also 96.15% of them had unsatisfactory level of knowledge about precautions for control fatigability, and 92.31% had unsatisfactory level of knowledge for following healthy lifestyle.

Table (4): This table showed highly significant relationships between the time of stem cell transplantation and patients psychological needs (depression and anxiety) and social needs, while a significant statistical relationship between the time of transplantation and patients daily living activities.

Table (5): This table showed that there was a significant positive correlation between the studied subjects physical needs, social needs, daily living activities and patients' knowledge, while a negative correlation between patients psychological needs and knowledge.

Table (1): Frequency and percentage distribution of the studied subjects according to their characteristics (n=52).

| Patient demographic characteristics	N	%
Age		
-From 18 to < 30	24	46.16%
- From 30 to <45	27	51.92%
- ≥ 45 years	1	1.92%
Mean age **31.8 ±7.45**		
Gender		
- Male	**35**	67.31%
-Female	17	32.69%
Marital status		
-Married	**27**	51.92%
-Not married	25	48.08%
Educational level		
-Illiterate	9	17.31%
-Basic education	**29**	55.77%
-Higher education	14	26.92%
Residence		
- Rural	**30**	57.69%
-Urban	22	42.31%
Work		
-Working	**32**	61.54%
-Not working	20	38.46%
Habits		
Smoking		
- yes	**11**	21.15%
-no	41	78.85%

| Substance abuse		
-yes	**1**	1.92%
-no	51	98.08%
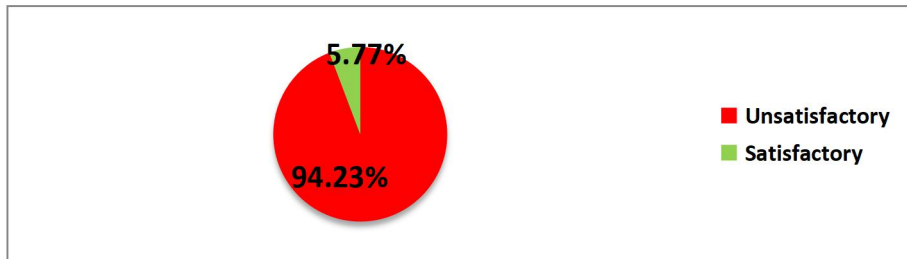
Figure (1): Regarding to habits, this study showed that about 21.15% from the sample were smoker and only 1.92% was substance abuser.

Table (2): Frequency and percentage distribution of the psychological needs of the studied subjects (n=52).

Items	Normal		Mild		Moderate		Severs		Extremely severe	
	N	%	N	%	N	%	N	%	N	%
Depression	13	25.00	19	36.53	12	23.08	5	9.62	3	5.77
Anxiety	8	15.38	14	26.92	15	28.85	10	19.23	5	9.62
Stress	10	19.23	12	23.08	11	21.15	18	34.62	1	1.92
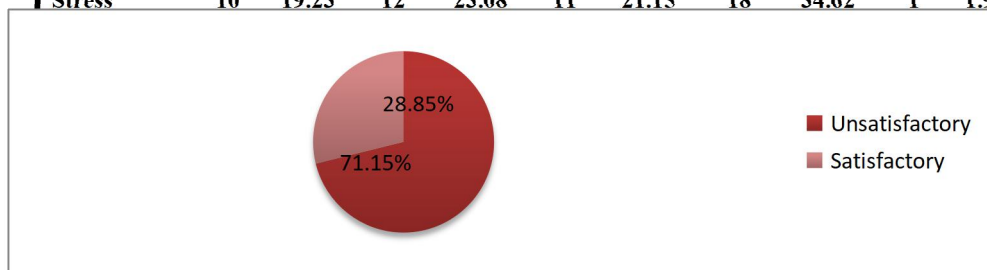
Figure (2): Total social needs of the studied subjects.
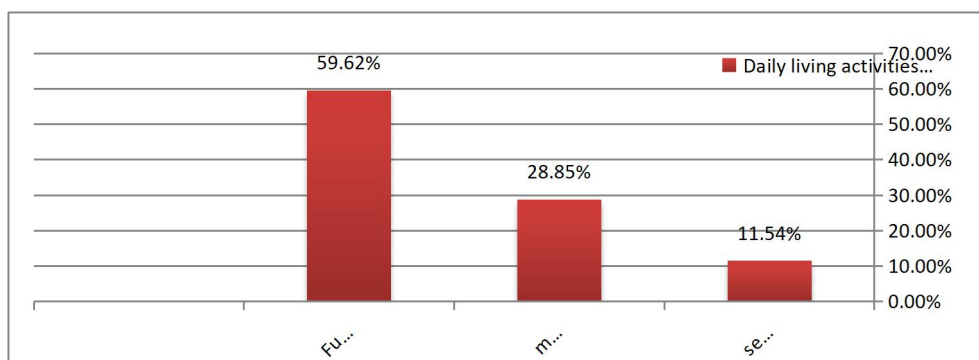
Figure (3): Total score of daily living activities for patients under the study (n=52).

   Table (3) a: Frequency and percentage distribution of patients general knowledge about leukemia (n=52).

Patients general knowledge about leukemia	Unsatisfactory		Satisfactory	
	N	%	N	%
General knowledge				
-Definition of leukemia	40	76.92	12	23.08
-Causes of leukemia	22	42.31	30	57.69
-Sign and symptoms of leukemia	**49**	94.23	3	5.77
-Complications of leukemia	5	9.62	47	90.38
-Definition of stem cell used in transplant	**47**	90.38	5	9.62
-Sites of stem cells in the body	23	44.23	29	55.77
-Investigations needed before transplant	43	82.69	9	17.31
-Side effects of chemotherapy	18	34.62	34	65.38
-Complications post stem cell transplant	**46**	88.46	6	11.54
Total general knowledge	46	88.46	6	11.54

   Table (3) b: Frequency and percentage distribution of patients knowledge about post stem cell transplant precautions (n=52).

Patients knowledge about post stem cell transplant precautions	Unsatisfactory		Satisfactory	
	N	%	N	%
-The healthy diet	34	65.38	18	34.62
-Hygienic care	39	75.00	13	25.00
- Life style	**48**	92.31	4	7.69
- Avoid bleeding	**52**	100.00	0	0.00
-Control mucositis	42	80.77	10	19.23
-Control skin problems	26	50.00	26	50.00
-Control GIT complications	43	82.69	9	17.31
-Control fatigability	**50**	96.15	2	3.85
- Control pain	46	88.46	6	11.54
- Avoid or control anemia	45	86.54	7	13.46
Total post stem cell transplant precautions knowledge	47	90.38	5	9.62

Table (4): Relation between time of stem cell transplantation and the patients needs, level of dependency and knowledge (n=52).

Patients' needs		Time of stem cell transplantation in months				
		N	Mean	SD	T	P Value
Physical needs	less than 3	21	48.88	9.92	0.22	0.82834
	three or more	31	49.67	14.44		
Psychological needs(depression)	less than 3	21	46.27	18.26	5.20	0.00000**
	three or more	31	25.95	9.84		
Psychological needs(anxiety)	less than 3	21	38.32	13.76	3.05	0.00369**
	three or more	31	28.26	10.07		
Psychological needs(stress)	less than 3	21	52.39	17.03	0.74	0.46263
	three or more	31	48.85	16.86		
social needs	less than 3	21	68.40	18.75	3.08	0.00332**
	three or more	31	52.79	17.31		
Daily living activities	less than 3	21	32.53	22.64	2.28	0.02686*
	three or more	31	16.67	25.82		
Total Knowledge	less than 3	21	40.82	20.66	1.00	0.32170
	three or more	31	45.82	15.36		

Significant p≤0.05*   High significant p≤ 0.01**

Table (5): Correlation between total bio pyschosocial needs of patients under study and knowledge (n=52).

Items	Total level of knowledge	
	r	P value
Total physical needs	.274	.049
Total psychological needs	-.370	.007
Total social needs	.985	0.00
Total daily living activities	.300	.031

Discussion

The present study revealed that the mean age of the study group was (31.8 ±7.45). This might be due to that most of the patients with stem cell transplantation had the acute form of leukemia (AML) which could appear in the middle age of those patients. Those patients had severe signs and symptoms of the disease. Stem cell transplantation in such patients was considered the chosen type of treatment in addition to other treatments as chemotherapy.

This result is in an agreement with **Dhedin et al. (2015)** in a study titled "Role of allogenic stem cell transplantation in adult patients with ph negative acute lymphoblastic leukemia" in which they mentioned that the mean age of allogenic SCT among adult patients with acute lymphoblastic leukemia in their study was (35±9.8).

Finding of this study revealed that the total physical needs of majority of the study sample were affected negatively due to various severe post stem cell transplantation complications which affect all patients body systems function and influence patients' physical condition.

This result is similar to **Yasar and Akin, (2016)** in their study titled " Evaluation of quality of life and care needs of Turkish patients undergoing hematopoietic stem cell transplantation" as they reported that physical wellbeing was mostly affected negatively in their study subjects.

Regarding the psychological needs of the patients, the present study illustrated that slightly more than one third of patients included in the study developed mild depression and more than one fourth of them develop moderate to severe depression post stem cell transplantation correlated to physical symptoms appeared and patients' general health status. The permanent thinking about the disease and its complications which could affect the psychological state of such group of patients and cause depression.

This result is consistent with **Posluszny, Bovbjerg, Syrjala, Agha and Dew**, **(2019)** in their study titled "Correlates of anxiety and depression symptoms among patients and their family caregivers prior to allogeneic hematopoietic cell transplant for hematological malignancies" as mentioned that approximately from one fourth to slightly more than one third of patients included in the study reported moderate to severe depressive symptoms during the first year following HSCT. These depressive symptoms had a relative to their general health controls before transplant and from 6 to 12 months after transplant.

This finding is in the same line with **Artherholt, Hong, Berry and Fann, (2014)** in their study titled " Risk factors for depression in patients undergoing hematopoietic cell transplantation" as

they supported that the estimated prevalence of depression across patients with cancer ranged from minor number to less than half of them, depending on the timing and method used to measure the symptoms. Their study indicated that depression was prevalent in patients undergoing HCT, with an estimated one-quarter to one-third of HCT recipients experiencing mild depression during the first 100 days post transplantation or during recovery from transplantation.

The current study showed that slightly more than two fifths of the patients under study developed moderate to severe anxiety post SCT due to decreased their knowledge and deteriorated their physical health status. This findings is consistent with **Kuba et al. (2017)** in their study titled "Depression and anxiety following hematopoietic stem cell transplantation: a prospective population based study in Germany" as they reported that the studied patients had a high prevalence of anxiety before transplantation and decrease post HSCT. Almost one third of patients experienced increased levels of anxiety after HSCT.

This finding is inconsistent with **Hoodin, Zhao, Carey, Levine and Kitko, (2013)** in their study titled "Impact of psychosocial screening on routine outpatient care of hematopoietic cell transplantation survivors" as they determined in their study that depression appeared in about one fifth of the studied patients, whereas the anxiety frequency was appeared in a minor number of studied patients.

The present study revealed that more than one third of the studied patients developed severe stress. This finding might be due to due to lack of

guidance and instructions from the health care members to such group of patients, disturbed body image, fear from further complications that they may have and fear of death.

This result is in an agreement with **Çuhadar , Tanriverdi, Pehlivan, Kurnaz, and Alkan, (2016)** in their study titled "Determination of the psychiatric symptoms and psychological resilience levels of hematopoietic stem cell transplant patients and their relatives" as they reported that a patient with transplantation had to face the suitability evaluation. This evaluation generally could lead to high amounts of psychological stress. The bigger issue and source of stress was GVHD. GVHD was one of the common complications after allogeneic HCST.

Findings of the study supported also with the finding of **Jeon, Yoo, Kim and Lee, (2015)** in their study titled "Post traumatic growth in survivors of allogeneic hematopoietic stem cell transplantation" as they reported that patients after HSCT survivors had a high level of stress.

The current study revealed that most of the studied patients of the study sample had unsatisfactory level for their social needs. This finding might be due to limited social activities, isolation, financial insecurity and psychological problems as depression and anxiety that developed and affected the social function of such group of patients.

This result is similar to **Brister, Baer, Lazarus, Weiman and Mazanec, (2017)** finding in their study titled "Assessing needs and concerns of autologous and allogeneic stem cell transplant survivors " as they reported

that transplant survivors expressed patients concerns regarding the long term physical, social, psychological and spiritual effects of SCT, which had an impact on the patients life and their reentry into their personal and social lives. Patients' social domain concerns were most prevalent and reported by more than three fifths of them.

Regarding to daily life activities, the present study showed that more than half of the studied patients performed full function post SCT. This might be due to that most patients reported a good health status compared with pre transplant that made them able to perform most of their daily living activities independently.

This result is similar to **Mosher, et al. (2015)** in their study titled "Quality of life concerns and depression among hematopoietic stem cell transplant survivors" as they mentioned that most of patients were able to carry out their daily activities post SCT.

According to patients' level of knowledge, the current study illustrated that the majority of studied patients had unsatisfactory level of general knowledge regarding to signs and symptoms of disease, definition of stem cells used in transplant, and complications of SCT. This may be related to their educational level, psychological disorders as depression that keep the person has no desire to know anything about his disease, and lack of guidance form the health care members.

This result is similar to **Khalifa, (2016)** in her study titled "Effect of self care guide lines on quality of life for patient with leukemia after stem cell transplantation "as she mentioned that none of patients had satisfactory level of

knowledge about the disease, stem cells or possible complications of SCT.

The present study showed that regarding to post SCT precautions, all patients had unsatisfactory level of knowledge for the precautions that should be followed to prevent bleeding and majority of them had unsatisfactory level of knowledge for precautions to control fatigue and healthy life style. This might be due to lack of receiving teaching instructions regarding self-care precautions from the health care members to such group of patients.

This result is in an agreement with **Ali, Ali, Elsawi, Hashem, and Mohammed, (2018)** in their study titled "Effect of discharge plan on patients' readiness to discharge after allogeneic stem cells transplantation " as they mentioned that the majority of the studied patients had incorrect answer before conducting discharge plan about questions related to (sun exposure, not to sit in a room with walls panted with oil or plastic paints, signs of infection, infection control measures, using of face mask when going outside home, presence of pets at home, living with children, exercises, nutrition and teeth cleaning).

According to relation between time of stem cell transplantation and the patients' needs, the present study showed that a highly significant relationship was found between the time of stem cell transplantation and patients psychological needs as; depression and anxiety and patients social needs. It also showed a significant relationship between the time of transplantation and patients daily living activities. So time consider an essential factor that has an influence on the patients' psychological health, social wellbeing and also improve the patients'

ability for performing their daily living activities.

This result is consistent with **Kuba, et al. (2017)** in their study titled "Depression and anxiety following hematopoietic stem cell transplantation: a prospective population-based study in Germany" as they reported that the growth curve models in their study revealed that individual depression levels significantly increased, whereas anxiety levels significantly decreased over a time period post transplantation.

This result consistent also with **Marques et al. (2017)** in their study titled "Quality of life in the first six months post hematopoietic stem cell transplantation" as they reported that patients in their study showed gradual improvement in their physical and functional well-being over the six months post transplantation period.

This result is in consistent with **Kroemeke, Kruszelnicka and Gajewska, (2018)** in their study titled "Everyday life following hematopoietic stem cell transplantation: decline in physical symptoms within the first month and change related predictors" as they reported that patients had improvements in their physical health but the regression of treatment-related side effects occurred shortly after HSCT.

Regarding to Correlation between total bio psychosocial needs of the patients under study and their level of knowledge, the present study showed that there is a significant positive correlation between patients' physical needs, social needs, and daily living activities and patients' level of knowledge. While a negative correlation was shown between patients psychological needs and their

level of knowledge. Patient's knowledge helps the patients to identify their physical and social needs, maintain and improve their physical health status as possible, perform more positive health behaviors, and enhance their social wellbeing. While patients with a high level of knowledge, their anxiety and stress level may decrease.

This finding is supported by **Hashem & Abd El-Naby, (2016)** in their study titled " Effect of an instructional program on knowledge and anxiety level among patients undergoing hematopoietic stem cell transplantation" when they reported that patient level of knowledge would be helpful in reducing anxiety and depression during HSCT as that occurred in patients with oncology problems generally. Decreasing the level of anxiety increased the survival rate and patient's cooperation which resulted in the success of treatment in addition to improving the individual, physical and social performance.

conclusion

Based on the findings of the current study, it can be concluded that the majority of the studied patients had unsatisfactory physical, psychological, social needs and also total level of knowledge post stem cell transplantation. The results revealed that there was highly statistically significant relation between patients' physical, social needs and the total level of knowledge and the patients' level of education. There was statistically significant relation between patients' daily activities and gender. Also there was a highly significant relationship between the time of stem cell transplantation and patients' psychological needs as level of depression and anxiety, and social needs.

Moreover, there was a significant positive correlation between patients' physical needs, social needs, and daily living activities and patients' level of knowledge, while there was a negative correlation between patients' psychological needs and their level of knowledge.

Recommendations:

Based on the finding of the current study, the following recommendations are formulated:

Educational

1- Patients should receive continuous one to one instructional sessions along with written materials instructions pre, post stem cell transplantation, and during the follow up visits.
2- A psychological health program should be planned by specialists for stem cell transplant recipients and their families to facilitate dealing with stress and anxiety and to help the patients to adapt with changes that might occur post stem cell transplantation.

Practice

1-Family and social support should be considered as an important factor that can affect patient physical and psychological wellbeing post stem cell transplantation.
2- Encourage the patients' involvement in rehabilitation programs post stem cell transplantation.

Research

1- Replicate the study on a larger probability sample in different settings for generalizing the findings.

2- Further research studies for the factors affecting the needs of the patients post stem cell transplantation.

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