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Abstract

Aim: This study aimed to evaluate the effect of multimodal preparation package on patients' needs and satisfaction with bone marrow transplantation . **Subjects and Method:** A quasi-experimental design was utilized for the conduction of this study in the Bone Marrow Transplantation Unite and Outpatients' Clinics at Nasser Institute Hospital. A purposive sample composed of 70 adults and old age patients, from both genders undergoing bone marrow transplantation were recruited from the above mentioned settings. **Tools :** 1) Patients' needs assessment sheet (pre / post and follow- up tests) to assess studied patients' health needs : physical , psychological , social , spiritual and educational . 2) Patients' satisfaction assessment sheet (post test) to assess the satisfaction level . **Results:** More than three fifths of the studied patients had the age of 18 - <35 yrs. and were male . The health needs were higher in pre test added to elevated anxiety , pain and fatigue levels . **Conclusion:** The current study concluded that, the multimodal preparation package had a positive effect on meeting the health needs (physical, social, psychological, spiritual and educational) , added to significant improvement of satisfaction level in post test among the studied patients undergoing bone marrow transplantation procedure . **Recommendations:** Further studies should be carried out on a large number of such groups of patients for supporting of the results and generalization .

Key words: Bone Marrow Transplantation - Patients' Needs - Satisfaction - Multimodal preparation package

Introduction:

Bone marrow transplantation (hematopoietic cell or stem cell transplantation) is a procedure that can restore marrow function for patients with severe marrow injury (due to primary failure, destruction , intensive chemical / radiation exposure) or abnormalities of immune system due to : oncological diseases, hematologic, oncohematological, metabolic disorders e.g leukemia, lymphoma, myeloma , aplastic anemia, myelofibrosis , myelodysplastic syndromes , thalassemia , immunodeficiency and germinative cell tumor among other potentially lethal diseases . Bone marrow is the soft, spongy area in center of some large bones of the body and produces millions of different cells every hour (Schmitz et al., 2018 & Lewis et al., 2014). The marrow produces all different cells from a cell type called hematopoietic stem cell that make up the blood such as red / white blood cells and platelets added to cells of immune system . Most of the stem cells stay in the marrow until they are transformed into mature blood cells, which are released into the blood stream where they perform specific functions such as carrying oxygen, providing protection from infection and helping blood clot (Hashmi et al., 2017 & Larsen et al., 2013) .

Types of transplantation are: Allogeneic, stem cells are acquired from a donor (related family member). The Benefit of this type is not only eradication of tumor cells with high dose therapy, but also the potential stimulation of the graft – versus tumor effect in which donor WBCs identify and attack malignant cells in the recipient. Common indications for allogenic transplant are certain types of leukemia, multiple myeloma, lymphoma. Syngeneic is a type of allogenic transplant that obtain stem cells from one identical twin that have a same human leukocyte antigen HLA type and no graft versus host occurs. Autogenic, patient receives their own stem cells after myeloablative (destroy bone marrow by chemotherapy). Restoration usually takes 4 to 6 week depending on particular conditioning regimen administered (Ozdemir et al., 2018 & Ford et al., 2013) .

Bone marrow administrated (hematopoietic stem cell) transplantation involves the intravenous infusion of autologous or allogeneic stem cells collected from bone marrow, peripheral blood, or umbilical cord blood to reestablish hematopoietic function in patients whose bone marrow or immune system is damaged or defective . In transplantation process , patients are given very high doses of chemo or radio therapy then healthy supply of stem cells is reintroduced or transplanted to reestablish the blood cell production process in bone marrow called engraftment that measured daily by blood cell counts and used to determine when it is safe to discharge /or reduce isolation procedures . Medications that stimulate the bone marrow to produce white / red cells may be used routinely or when engraftment is slower than expected (Tiren-Verbeet et al., 2018 & Adewumi et al., 2016). Moreover, cells that will be transplanted can be taken from bone marrow (called bone marrow harvest), from bloodstream (called peripheral blood stem cell collection) or from umbilical cord after birth (which are stored in umbilical cord blood banks). Side – effects of transplantation includes : mucositis , abdominal pain , diarrhea , nausea and vomiting , Loss of hair , Infertility , Organ toxicity , Secondary cancers and graft-versus-host disease (Howida , 2016 & Abd - Elmoniem , 2012) .

Multimodal preparation package consists of patients' instructions, educational pamphlet and film , orientation round in the BMT Unit that could be effective in improving health ' condition . Patients' education and appropriate preparation would positively affect health promotion, awareness, attitudes, skills and behaviors. Education can reduce patients' anxiety, increase coping with health condition and decrease length of hospital stay (Elsaay et al., 2016 , Moradi & Hajbaghery , 2015 and Hajbaghery et al., 2014) .

The needs were defined as 'the requirements of individuals to enable them to achieve, maintain or restore an acceptable level of social independence or quality of life .

Health is defined as a “state of complete physical, mental and social wellbeing not merely absence of the disease or infirmity”. The needs include physical, psychological, social, spiritual, and educational aspects (Dewit et al., 2016 & Lewis et al., 2014).

Satisfaction of patients referred to an expression of overall judgment on quality of care particularly in the interpersonal process aspect. It was defined as patients' opinions of care received from staff of nurses during hospitalization period. Patients satisfaction with medical treatment and nursing management has been reported as the most important predictor of the overall satisfaction with hospital care and an important goal of any health care organization (Smeltezer & Bare, 2015 and Kleefstra et al., 2012).

Significance of the study:

Bone marrow or hematopoietic stem cell transplantation is an aggressive therapeutic option for many malignant and non malignant diseases thus, there is a need to initiate update and reinforce patients' teaching to affects on their experiences and recovery. In addition, transplantation process involves actions that are highly complex and requires a multidisciplinary team to assist. Patients have six basic stages: decision to undergo transplant, waiting for admission, conditioning regimen, transplantation, immunosuppression and hospital discharge. The occurrence of pancytopenia, gradual proliferation of cells (successful infusion of stem cells) and complications of various kinds can lead to death or affect the quality of life generate anxiety, tension for patient, family and health team that participates in the procedure. Bone marrow transplantation is performed worldwide, about 40,000 each year and around 40% of patients may have a fatal clinical outcome (Schmitz et al., 2018, Hashmi et al., 2017 & Bashir et al., 2014). In Egypt according to statistical record, the incidence of bone marrow transplantation in Nasser institute Hospital during the period of 2016 to 2017 was approximately 600 patients. Multimodal preparation package can help them to self-care, prevent complications, carry out prescribed therapy and solve problems.

Aim of the study:

This study aimed to evaluate the effect of multimodal preparation package on patients' needs and satisfaction with bone marrow transplantation procedure (pre / post and in follow – up period). This aim was achieved as follows:

- Assess health needs (physical, psychological, social spiritual and educational) for the studied patients.
- Identify patients' satisfaction level with bone marrow transplantation
- Develop and implement the multimodal preparation package for the studied patients.
- Evaluate its effect on their health needs, added to satisfaction level.

Hypothesis:

It was hypothesized that, the multimodal preparation package had a positive effect on health needs

and satisfaction among patients undergoing bone marrow transplantation.

Operational definitions:

Patient's health needs: means physical, psychological, social, spiritual and educational dimensions.

Bone marrow transplantation BMT: means procedure that need hospital admission of the patient prior to the intervention.

Multimodal preparation package: means individualized face-to-face patient education, provision of an educational pamphlet, presenting a video, and performing a round in the bone marrow transplantation unit.

Subjects and Methods:

Research design:

A quasi-experimental design was utilized to conduct this study

Setting:

The study was carried out in the Bone Marrow Transplantation Unite and Outpatients' Clinics at Nasser Institute Hospital.

Subjects:

A purposive sample of (70) adult patients from both genders having bone marrow transplantation from the above mentioned settings. They were selected according to the sensitive analysis in relation to the number of patients with bone marrow transplantation within the year 2017 in Nasser Institute Hospital, according to the statistical department affiliated to the same setting with the following criteria:

Inclusion criteria:

- Conscious adult patients
- Patients who agree to participate in the study.
- Patients with no co-morbid conditions

Tools of data collection:

Tool I:

Patients' needs assessment sheet (pre / post and follow up tests). It was designed by the researchers after reviewing the related literature and consulting the experts to assess studied patients' health needs about bone marrow transplantation. It was written in simple Arabic language and divided into the following parts:

Characteristics of the studied patients such as: age, gender, marital status, income, educational level and smoking.

Patients' medical records to identify past, present medical and surgical history, diagnosis, diagnostic measures and management.

Patients' needs included:

Physical needs such as (control of blood sugar level, vital signs, fluids chart, therapeutic diet, prescribed drugs, hygienic measures and exercises, relief of the side effects of immunosuppressive drugs, assessment of fatigue level, skin and oral condition). The following scales were assist:

Numerical pain scale: It was based on Jacques (2011) to measure pain severity and formed of a line divided by

numbered points from (0-10) . Patients' answers were sorted as follows : no (zero), mild (0 - less than 4), moderate (4-less than 7) and severe (7 - 10).

Fatigue Severity Scale : It was adapted from Krupp (1989), to measure fatigue level and consisted of nine statements with score ranged from 1-5, where 1 indicates strongly disagree (low fatigue level) and 5 indicates strongly agree (high fatigue level). The total score ranged from 9 – 45, mild fatigue with (13.5 - 22.5) , moderate fatigue (23-31.5) and severe fatigue (more than 31.5 - 45) . Testing reliability of the scale items using alpha cronbach test = 0.95.

Psychological needs such as (Decrease feeling of worthiness , anxiety and dispelling of preconceived image , depression , fear from complications , family worries , improve awareness and positive adjustment of the health condition . The following scale was assist :

Hamilton Anxiety Rating Scale :It was developed by Hamilton (1959) , modified by the researchers to assess anxiety level and consisted of thirteen variables : anxious mood, tension , insomnia , cognitive changes, depression, somatic(sensory), cardiovascular, respiration, gastrointestinal , genitourinary, autonomic symptoms, somatic (muscular) and the behavior at the interview. Testing reliability of the scale items using alpha cronbach test = 0.83.

Patients` responses were (0-3) scores and total score ranged from 0-39 . They categorized anxiety level as follows : no (zero) , mild (0 - less than 23) , moderate (23 - less than 29) and sever (29 - 39).

Social needs such as (decrease financial burden , assistance with activities of daily living , awareness with sexual activity , job adjustment and improve social support) .

Spiritual needs such as (Enhance spiritual activities , positive vision for the future , sense of using fullness , safety and security) .

5- **Educational needs** such as : Anatomy and physiology of bone marrow, definition , types , causes and advantages of transplantation, definition of immune system, types of stem cell , donation criteria of bone marrow , indications of chemo / radio therapy . Pre procedure preparations such as : investigations , informed consent , drugs administrations , fasting pre procedure , site preparation and smoking . Post procedure care such as : early ambulation , pain relief , position , diet , deep breathing , coughing and extremity exercises . Discharge instructions such as : wound care , hygiene , infection control , skin and oral mucosal care , medications , diet , follow up visits , immediate physician calling , work , daily living activities , self care activities , life style changes , exercises technique , daily life activities , safety precaution , complications (pain , nausea and vomiting , bleeding , infection , impaired oral mucosa , graft versus host disease , veno-occlusive disease , renal insufficiency) .

Scoring system of patients` needs:

Patients' responses regarding the presence of health needs (scored as two marks) or absence (scored as one mark), were categorized into either yes or no. Total items of health

needs = 41 items, whereas needs absence were considered from less than 50% and needs presence from 50% & more

Tool II:

Patients` satisfaction assessment sheet (post test) . It was based on Kleefstra et al. (2012) and composed of a core questionnaire for the assessment of patient ` satisfaction for general day care (COPS-D). It consisted of six dimensions:

Admission procedure (Pre-admission visit: reception, personal attention, expertise, information and instruction. Admission : rapidity of being able to speak to and degree of support) , Operative room (reception , personal attention and expertise operative staff) .

Nursing care (personal attention, expertise, day of surgery) .

Medical care (personal attention and expertise).

Information (information by nurses, doctors and rapidity of research results).

Autonomy (self-sufficient, participation in treatment decisions and privacy).

Discharge and aftercare (Information about further treatment, transfer of information to external professionals and discharge procedure) .

The COPS-D contains 17 questions. The answer was sorted by a 5 - point Likert-scale (1□=□unsatisfied, 2□=□somewhat satisfied, 3□=□rather satisfied, 4□=□quite satisfied and 5□=□very satisfied) .

Total = 17 questions × 5 point Likert-scale = 85

High satisfaction (51 - 85) and

Low satisfaction (Less than 51) .

Content validity:

It was ascertained by a group of experts from Oncology , Hematology and Bone Marrow Transplantation and Medical– Surgical Nursing . Their opinions were elicited regarding to the tools format layout, consistency and scoring system. Contents of the tools were assessed regarding to the knowledge accuracy, relevance and competence.

Ethical considerations:

In the planning stage, an ethical approval was obtained from the directors of the above mentioned settings. All patients were informed about the study and their rights according to medical research ethics that they were free to decide whether or not they would participate in the study. Then a written informed consent was obtained from each patient who agreed to participate in the study.

Pilot study:

A pilot trial was carried out on 10% of the total sample to test practicability and clarity of study tools, added to sample and settings . Pilot sample was later involved in the study as there were no radical modifications in the study tools.

Procedures:

- Sampling was started and completed within 8 months.
- Purpose of the study was explained to the patients who agreed to participate in the study prior to any data collection.

- The researchers started to collect the data from the studied patients using the pre - constructed tools as follows:
- On the same day of diagnosis when patients came to Outpatients' Clinics of Bone Marrow Transplantation Unit
- On the first follow – up visits when the patients came to Outpatients' Clinics, then after two months later.
- Filling in the tools was done by the researchers according to the patients' understanding and health condition.
- The data were collected by the researchers 2 days/ week at the morning and afternoon shifts .
- The preparation package was designed based on analysis of actual patients' needs assessment through the pre constructed tools. Content of multimodal preparation package was consistent with the related literatures (national and international), included theoretical and practical sessions.
- Patients were divided into small groups included 5 – 6 in each group and underwent 4 sessions (2 theories and 2 practice). At the beginning simple written instructions were distributed and orientation about the objective and outline was done .
- The theoretical part was implemented through face-to-face patient education with lectures and group discussions using data show and poster as a media. In addition to provision of an educational booklet , It was taken in 2 sessions (each session for 45 minutes) . During this session, bone marrow transplantation procedure was explained to patients and an educational pamphlet about the procedure

which included : general assessment , care pre , on the morning and immediately post procedure , discharge guidelines , home care and follow – up visits . In addition , pictures of different parts of Bone Marrow Transplantation Unit and a 10-minute video describing the environment , transplantation procedure , pre / post procedure care and experiences of another patients with the same procedure was shown to studied patients . Lastly, researchers answered any questions about the bone marrow transplantation procedure at the end.

- The practical part was implemented through demonstration, re- demonstration, video and performing a round in BMT Unit. It was taken in 2 sessions (each session for one hour) and covered the following items: The first session included wound care and infection control measures. Second session included correct position, daily activities, ambulation, breathing and leg exercises.
- Patients were informed to be in contact with the researchers by telephone for any question.
- Patients were assessed either individually or in groups that entail 5-6
- Evaluation for the effect of multimodal preparation package on the studied patients using the pre constructed tools as follows:
 - Post test was done after one month from the intervention guidelines and BMT procedure (on first follow – up visit) .
 - Follow up test after two months later using the same tools.

Results:

Table (1): Characteristics of the studied patients (n = 70)

Items	Studied patients	
	No	%
Age (years)		
18 - <35	54	77.1
35 & more	16	22.9
Gender		
Male	45	64.3
Female	25	35.7
Education		
Illiterate/ Primary	13	18.6
Secondary	35	50.0
University	22	31.4
Occupation		
Employee	40	57.1
Not employee	30	42.9
Residence		
Urban	41	58.6
Rural	29	41.4
Income		
Not enough	32	45.7
Enough	38	54.3
BMI		
Under weight (Less than 18.5)	12	17.1
Normal weight (18.5 – 25)	20	28.6
Over weight (More than 25)		

Table (1): Presents characteristics of the studied patients'. As indicated more than three fifths (77.1) of them had the age of 18 - <35 yrs b and were male (64.3). In relation to residence, occupation and BMI , more than half of them were from urban area, work and underweight (58.6 , 57.1 & 54.3 respectively). Concerning income and education, nearly half of them had enough income and secondary education (54.3 & 50.0 respectively).

Table (2): Presentation of studied patients` physical needs in pre/post tests (n=70)

Items	Studied patients		
	Pre	Post	Follow- up
	No %	No%	No%
Maintain blood sugar level	52 (74.3)	33 (47.1)	10 (14.3)
Regular fluids chart	51 (72.9)	38 (54.3)	8 (11.4)
Monitoring of vital signs	58 (82.9)	29 (41.4)	11(15.7)
Compliance with prescribed drugs	53 (75.7)	36 (51.4)	9 (12.9)
Perform hygienic measures	55 (78.6)	26 (37.1)	6 (8.6)
Implement prescribed exercises			
Relief of the side effects of immunosuppressiv drugs	45 (64.3)	35 (50.0)	10 (14.3)
Regular assessment of fatigue , skin and oral condition	48 (68.6)	30 (42.9)	7 (10.0)
Maintain therapeutic diet	46 (65.7)	47 (67.1)	12 (17.1)
Regular follow up visits	55 (78.6)	42 (60.0)	11(15.7)
Mean No ± SD	51.4 ± 4.4	35.1 ± 6.6	9.3 ± 2.0
T – value	T1 between pre & post tests = 17.2*		
	T2 between post & follow- up tests = 31.5*		

*Significant at $p < 0.05$

Table (2): Shows a statistically significant difference between the studied patients` physical needs in pre/post tests . More improvement was indicated in post test compared to pre (mean = 35.1 ± 6.6 & 51.4 ± 4.4 respectively) with $t = 17.2$, $p < 0.05$. In addition , significant difference was noticed in follow up test compared to post (mean = 9.3 ± 2.0 & 35.1 ± 6.6 respectively) with $t = 31.5$, $p < 0.05$.

Table (3): Presentation of studied patients ` psychological needs in pre/post tests (n=70)

Items	Studied patients		
	Pre	Post	Follow- up
	No %	No %	No %
Decrease feeling of worthiness	55 (78.6)	32 (45.7)	12 (17.1)
Relieve dispelling of preconceived image	51 (72.9)	21 (30.0)	7 (10 .0)
Manage anxiety / depression	56 (80.0)	33 (47.1)	13 (18.6)
Relief of fear from complications	49(70.0)	26 (37.1)	5 (7.1)
Improve awareness	51 (72.9)	21 (30.0)	6 (8.6)
Relieve family worries	52 (74.3)	22 (31.4)	9 (12.8)
Positive adjustment with health condition	49 (70.0)	27(38.6)	5 (7.1)
Mean No ± SD	51.9 ± 2.7	26.0 ± 5.0	8.1 ± 3.3
T – value	T1 between pre & post tests = 38.1*		
	T2 between post & follow- up tests = 25.0*		

*Significant at $p < 0.05$

Table (3) : Reveals a statistically significant difference between the studied patients` physical needs in pre/post tests . More improvement was indicated in post test compared to pre (mean = 26.0 ± 5.0 & 51.9 ± 2.7 respectively) with $t = 38.1$, $p < 0.05$. In addition , significant difference was noticed in follow up test compared to post (mean = 8.1 ± 3.3 & 26.0 ± 5.0 respectively) with $t = 25.0$, $p < 0.05$.

Table (4): Presentation of studied patients` social needs in pre/post tests (n=70)

Items	Studied patients		
	Pre	Post	Follow- up
	No %	No %	No %
Decrease financial burden	45 (64.3)	21 (30.0)	7 (10.0)
Assistance with activities of daily living	43 (61.4)	27 (38.6)	9 (12.9)
Awareness about sexual activity	39 (55.7)	23 (32.9)	10 (14.3)
Job adjustment	52 (74.3)	34 (48.6)	20 (28.6)
Improve social support	44 (62.9)	28 (40.0)	9 (12.9)
Recreational activities	39 (55.7)	22 (31.4)	11 (15.7)
Mean No ± SD	43.7 ± 4.8	25.8 ± 4.9	11.0 ± 4.6
T – value	T1 between pre & post tests = 21.9*		
	T2 between post & follow- up tests = 18.4*		

Table (4): Reports a statistically significant difference between the studied patients` social needs in pre/post tests. More improvement was indicated in post test compared to pre (mean = 25.8 ± 4.9 & 43.7 ± 4.8 respectively) with $t=21.9$, $p < 0.05$. In addition, significant difference was noticed in follow up test compared to post (mean = 11.0 ± 4.6 & 25.8 ± 4.9 respectively) with $t= 18.4$, $p < 0.05$.

Table (5): Presentation of studied patients` spiritual needs in pre/post tests (n=70)

Items	Studied patients		
	Pre	Post	Follow- up
	No %	No %	No %
Positive vision for the future	33 (47.1)	19 (27.1)	5 (7.1)
Enhance spiritual activities	28 (40.0)	13 (18.6)	4 (5.7)
Sense of using fullness	42 (60.0)	18 (25.7)	7 (10.0)
Sense of safety and security	44 (62.9)	25 (35.7)	9 (12.9)
Mean No ± SD	36.8 ± 7.5	18.8 ± 4.9	12.5 ± 7.6
T – value	T1 between pre & post tests = 16.8 *		
	T2 between post & follow- up tests = 5.8*		

Table (5): Clarifies a statistically significant difference between the studied patients` spiritual needs in pre/post tests. More improvement was indicated in post test compared to pre (mean = 18.8 ± 4.9 & 36.8 ± 7.5 respectively) with $t= 16.8$, $p < 0.05$. In addition, significant difference was noticed in follow up test compared to post (mean = 12.5 ± 7.6 & 18.8 ± 4.9 respectively) with $t= 5.8$, $p < 0.05$.

Table (6): Presentation of studied patients` educational needs in pre/post tests (n=70)

Items	Studied patients		
	Pre	Post	Follow- up
	No %	No %	No %
Anatomy and physiology of bone marrow	51 (72.9)	15 (21.4)	5 (7.1)
Definition / Causes of bone marrow transplantation	45 (64.3)	22 (31.2)	11 (15.7)
Advantages of bone marrow transplantation	43 (61.4)	17 (24.3)	6 (8.6)
Definition of immune system	52 (74.3)	21 (30.0)	7 (10.0)
Types of stem cell	46 (65.7)	25 (35.7)	11 (15.7)
Donation criteria of bone marrow	47 (67.1)	19 (27.1)	5 (7.1)
Indications of chemo / radio therapy	42 (60.0)	25 (35.7)	10 (14.3)
Pre procedure preparations	52 (74.3)	18 (25.7)	7 (10.0)
Post procedure care	56 (80.0)	26 (37.1)	6 (8.6)
Discharge instructions	60 (85.7)	21 (30.0)	11 (15.7)
Mean No ± SD	49.4 ± 5.8	20.9 ± 3.7	7.9 ± 2.6
T – value	T1 between pre & post tests = 34.7 *		
	T2 between post & follow- up tests = 24.1*		

Table (6): Shows a statistically significant difference between the studied patients` educational needs in pre/post tests. More improvement was indicated in post test compared to pre (mean = 20.9 ± 3.7 & 49.4 ± 5.8 respectively) with $t=$

34.7, $p < 0.05$. In addition, significant difference was noticed in follow up test compared to post (mean = 7.9 ± 2.6 & 20.9 ± 3.7 respectively) with $t = 24.1$, $p < 0.05$.

Table 7: Presentation of pain, anxiety and fatigue levels among the studied patients in pre/post tests (n=70)

Items	Patients		
	Pre %	Post %	Follow – Up %
Pain Level			
Mild	11.0	25.8	70.1
Moderate	20.6	55.9	21.6
Sever	68.4	18.3	8.3
Anxiety Level			
Mild	8.0	25.0	83.0
Moderate	9.0	65.0	12.0
Sever	83.0	10.0	5.0
Fatigue Level			
Mild	3.6	15.0	25.0
Moderate	10.1	35.0	30.5
Sever	86.3	50.0	44.5

Table (7): Reveals studied patients level of pain, anxiety and fatigue in pre/post tests. As noticed more than two thirds of them had sever fatigue, anxiety and pain levels in pre test (86.3, 83.0 & 68.4 respectively). In addition, significant improvement was indicated in post and follow – up tests compared by pre.

Table (8): Presentation of studied patients' satisfaction level post Bone marrow transplantation (n=70)

Items	High patients' satisfaction (n=60)	
	No	%
Pre-admission period	54	77.1
Admission preparation	46	65.7
Operative room	55	78.6
Nursing management	46	76.7
Medical treatment	59	84.3
Information	54	77.1
Autonomy	51	72.9
Discharge instructions	56	80.0
Mean No \pm SD	52.6 \pm 4.7	
% of Mean	75.1%	

Table (8): Reports studied patients' satisfaction level post BMT procedure. As observed more than three fourths of them were satisfied for the following : Pre-admission period , admission preparations , operative room , nursing management , information and autonomy . In addition , majority of them for medical treatment and discharge instructions with mean number = 52.6 ± 4.7 , percent of mean (75.1%) .

Table (9): Correlation between studied patients' health needs and satisfaction level

Patients' Needs	High satisfaction level	
	P	P
Physical needs	< 0.001*	< 0.001*
Psychological needs	< 0.001*	< 0.001*
Social needs	< 0.001*	< 0.001*
Spiritual needs	< 0.001*	< 0.001*
Educational needs	< 0.001*	< 0.001*

R = Pearson correlation

* Highly positive correlation ≤ 0.001

Table (9): Correlation between studied patients' health needs and satisfaction level. Results indicated that, there was a highly positive statistical relation between studied patients' health needs (physical, psychological, social, spiritual and educational) and high satisfaction level.

Discussion:

Bone marrow transplantation (BMT) is the process of replacing diseased or damaged bone marrow with normal function. It is the treatment modality for a variety of malignant and nonmalignant disease (Schmitz et al., 2018). Patients with BMT are affected physiologically, psychologically and socially by the negative way so it is important to meet their needs for improving the quality of life (Adewumi et al., 2016). The present study aimed to evaluate the outcomes of multimodal preparation package on patients' needs and satisfaction with bone marrow transplantation.

Concerning studied patient's age and gender. Results indicated that three fifths of them had the age of 18 - <35 yrs and were male. Bashir et al. (2014) reported that, male patients with middle age were most of the study sample in another study about BMT procedure. In relation to educational level nearly one third of them had university level of education. Ahmed (2011) reported that, more than one fifth of the study patients had university level of education.

As regards residence, occupation and BMI, more than half of them were from urban area, with work, enough income and under weight. Abd - Elmoniem (2012) stated that geographic location influence on the incidence of bone marrow transplantation. Moreover, enough income may be interpreted as Ministry of Health give treatment decisions for patients without work because the employed patients had health insurance.

In relation to physical needs among the studied patients, results revealed significant difference between pre / post tests whereas more improvement was observed in post test. The previous findings were interpreted as patients' information were obtained from physician and nurses such as: keep of blood sugar level, vital signs, fluids chart, therapeutic diet, prescribed drugs, hygienic measures and exercises, relieve side effects of immunosuppressive drugs, assessment of fatigue level, skin and oral condition. Dewit et al., 2016 & Bashir et al. (2014) recognized that more than half of the studied patients had physical complaints e.g: maintain follow up visits, doing investigations, awareness with immediate physician call post transplantation.

Regarding psychological needs among the studied patients, results revealed significant difference between pre / post tests whereas more improvement was observed in post test. The previous findings were interpreted as the physician, nurse and family should have a positive role to meet such psychological needs which include: Decrease feeling of worthiness, anxiety and dispelling of preconceived image, depression, fear from complications, family worries, improve awareness and positive adjustment with health condition. Linton & Maebius (2015) & Seloma (2010) mentioned that patients with BMT procedure were anxious about drugs side effects and procedure complications. Moreover, patients with BMT procedure need for more information about their management and follow-up visits, added to lack of psychological support that increase their worries.

In relation to social needs among studied patients. Results revealed significant difference between pre / post tests whereas more improvement was observed in post

test. The previous findings were interpreted as the physician, nurse and family should have a positive role to meet such social needs which include decrease financial burden, assistance with activities of daily living, coping with sexual activity, job adjustment and improve social support. Howida (2016) and Smeltezer & Bare (2015) stated that patients with BMT had home and job disturbances due to change of their routine life as a result of the disease. In addition, some patients in another study were exposed to social problems and others were change or leave their job post disease onset that affect financial condition so the disease-related costs increase and lead to further financial burden.

As regards spiritual needs among studied patients. Results revealed significant difference between pre / post tests whereas more improvement was observed in post test. The previous findings were interpreted as the physician, nurse and family should have a positive role to meet such spiritual needs which include: Enhance spiritual activities, positive vision for the future, sense of using fullness, safety and security. Hashmi et al. (2017) mentioned that in one study about BMT, majority of study subjects were satisfied and had positive expectation for the future post BMT procedure.

Considering educational needs among studied patients. Results revealed significant difference between pre / post tests whereas more improvement was observed in post test. The previous findings were interpreted as the physician and nurse should have a positive role to meet such educational needs which include: Pre procedure preparations, post procedure care and discharge instructions. In addition, majority of patients did not have enough information about post BMT precautions, hospitalization period, infection control and discharge instructions, therefore patients should be provided with more interpretations pre procedure. Taylor & Lemone (2013) reported that patients need for more knowledge about BMT procedure such as: Routine follow-up and management.

In addition, Tiren-Verbeet et al. (2018) & Ahmed (2011) reported that Post discharge restriction (day 0-100) are: Patient should avoid crowds, use mask in public places, visit doctor 1-3 times a week for the first 4 weeks with blood tests to check blood counts, renal and liver function, use caregiver for transplantation, shopping, cooking and avoid contact with small children and pets. Post discharge restrictions (3-6 months) are: patient must keep doctor visit, optimal monitor for chronic graft-versus-host disease (GVHD) and take as prescribed prophylactic, or other immunosuppressive drugs. Post-discharge restriction (6-12 months) are: Lastly inform patient to stop immunosuppressive drugs if there is no GVHD. Teaching must involve infection prevention, medications, follow-up for about at least one year because the immune system is still immature for the first year post BMT.

As regards pain, anxiety and fatigue assessment among studied patients. Results revealed that more than two thirds of them had sever fatigue, anxiety and pain levels in pre test compared to post. This findings may be related to lack of psychological preparation, fear from procedural

complications, added to disease manifestations for pain and fatigue. Elsaay et al. (2016) and Moradi & Hajbaghery (2015) stressed on value of the preparations preoperatively in reducing anxiety that results when patients are unable fully to comprehend the world around as regards the procedure. Moreover, medications plus the BMT procedure help to relieve pain as a result and fatigue was relieved post procedure.

In relation to satisfaction level among studied patients. Results indicated that more than half of them were satisfied for the following: pre-admission visit, admission, operative room, nursing/medical care, information, autonomy and discharge. The highest satisfaction was related to medical care followed by discharge information and pre-admission period. Kleefstra et al. (2012) stated that there is a high level of patients' satisfaction after intervention of BMT procedure added to, medical and nursing management.

Conclusion:

On light of the present study results, it can be concluded that the multimodal preparation package had a positive effect on meeting the health needs (physical, psychological, social, spiritual and educational) and improving satisfaction level among the studied patients undergoing bone marrow transplantation procedure. In addition, significant improvement was observed in post and follow-up tests regarding anxiety, pain and fatigue levels among the studied patients.

Recommendations:

- An awareness program should be held for patients with bone marrow transplantation procedure.
- Patients are in need to a simplified illustrated and comprehensive Arabic booklet including information about bone marrow transplantation procedure.
- Continuous assessment for health needs of patients with bone marrow transplantation procedure.
- Further studies should be carried out on a large number of such groups of patients for evidence of the results and generalization.

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