

## Effect of Educational Program on Symptom Burden, Body Image Dissatisfaction and Psychological Distress among Patients with Multiple Myeloma

Arzak Mohamed Khalifa<sup>1</sup>, Asmaa Mohamed Khalifa<sup>2</sup> and Sayed Ahmed Elwakeel<sup>3</sup>

<sup>1</sup>Lecturer of Medical Surgical Nursing,<sup>2</sup> Lecturer Psychiatric Nursing and Mental Health Faculty of Nursing Ain Shams University, and <sup>3</sup> Professor of Clinical Psychology Fayoum University.

### Abstract

**Background:** Multiple myeloma (MM) is incurable plasma cells malignancy characterized by bone destruction, end organ failure and immunodeficiency. Cancer-related fatigue and insomnia are common distressing symptom and affect patient's mood and psychological status. **Aim:** This study aimed to evaluate the effect of educational program on symptom burden, body image dissatisfaction and psychological distress among patients with multiple myeloma. **Study design:** A quasi experimental design was used to achieve the aim of the study. **Subject:** A purposive sample consisted of 60 patients with multiple myeloma. The patients were divided into two groups study and control groups. **Setting:** this study was conducted at hematology outpatient clinic at Ain Shams university hospital. **Data collection tools:** 1) Patient's demographic characteristics tool, 2) Patient's clinical data tool, 3) knowledge assessment questionnaire, 4) Symptom burden assessment tool, 5) body image assessment scale and 5) psychological distress assessment tool. **Results:** there were no statistically significant difference ( $P>0.05$ ) between study and control groups regarding pain, fatigue, insomnia, body image dissatisfaction, anxiety and depression before the educational program implementation. While, there were statistically significant differences ( $P<0.001$ ) between them post and follow implementation of educational program. **Conclusion:** Implementation of educational program has statistically significant positive effect on symptom burden, body image dissatisfaction and psychological distress among patients with multiple myeloma **Recommendations:** Further researches are recommended regarding symptoms management among patients with multiple myeloma to evaluate its effect on patients' outcomes.

**Key words:** Multiple myeloma, symptom Burden, body image dissatisfaction, psychological distress, educational program, Nursing

### Introduction

Multiple myeloma (MM) is an incurable and progressive form of blood cancer. It is a neoplasm of plasma cell that is a type of white blood cell, develops in the bone marrow and can spread throughout the body. Plasma cells become cancerous and grow out of control resulting in secondary organs defects including renal, bone, bone marrow, metabolic changes, anemia,

neurological and immune dysfunction (American Cancer Society, 2018).

Patients with MM suffer from a wide range of symptom in terms of disease related symptom, increasing complications and the cumulative side effects from prolonged treatment that result on huge burden. Symptom burden regarding MM is considered physiologic problems affecting patients and producing multiple negative, physical, and

emotional patient responses (**Cormican & Dowling, 2018**). Patient often experience significant features of MM including fatigue, pain, bacterial infections, insomnia, breathlessness, muscle weakness, hypercalcemia and peripheral neuropathy (**Zaleta et al., 2020**).

Despite the advanced treatment using stem cell transplantation and other therapies, none of the current agents is significant free of toxicity. Systemic therapy for myeloma may improve some of the disease-related symptom but sometimes at the cost of toxicities that tend to have a high symptom burden; chemotherapy-induced neuropathic pain, chronic fatigue, and other symptom related to MM (**Nanda et al., 2020**). The MM disease burden along with treatment associated toxicity is known to increase morbidity, cause memory problems and even psychosis among patients (**Zaleta et al., 2020**).

Cancer-related pain, fatigue and insomnia are common distressing symptoms and may affect performance status of the patients. The majority of people with MM experience some pain related to the disease. The pain may be the result of a tumor pressing against a nerve and fatigue related to anemia. Sleep-wake disturbances are common among people with MM and insomnia is frequently related to fatigue in patients. Inadequate sleep may contribute to the development of mood disorders and depressive symptoms (**Baptiste et al 2020**). Patients with MM report high symptom burden that affecting functional disabilities and resulting in poor quality of life (**Nielsen et al., 2021**).

Body image is a product of psychological experiences and is shaped by the person's impression and sense of his/her physical appearance. Body image dissatisfaction has a direct relationship with low self-confidence, sexual functioning, loss of attractiveness and depression (**Bahrani et al., 2017**). Multiple myeloma and MM

related therapy can result in destructive changes in the physical appearance, integrity, and function of the body such as alopecia, scarring, decreased physical activities, tumor affecting the neck, eye, head, skin changes, weight gain and change in body composition due to chemotherapy, radiotherapy and continuous high-dose corticosteroid. Each and every one of these changes would expose body image to the threat (**Shapiro et al., 2021**).

Psychological distress is an important indicator of patients' health and is characterized by symptoms of anxiety and depression that lead to impaired functioning (**Ongeri et al., 2022**). Psychological distress is common among cancer patients because it is a para-normative event that interferes with a person's life trajectory. Patient is faced with accumulation of distressing sources such as diagnosis of a life-threatening disease, unknown progression and recurrence, aggressive medical treatments, modifications in lifestyle that interfere with his psychological wellbeing. Patients who experienced psychological distress may manifest depressed mood, hopelessness, fear and elevated anxiety relating to prognosis, disability, and death (**Almigbal et al., 2019**).

The effective nursing management for patients with MM is an important element in positive patients' outcomes. The main goals for effective management include pain assessment and control; educating patients on the need for adequate hydration; prompt recognition of the signs of spinal-cord compression and hypercalcemia; management of fatigue, prevention of complication, psychosocial support of the patient and family and provision of relevant, high-quality, up-to-date information at all stages of their disease (**Cormican & Dowling, 2018**).

Patient's educational program can be defined as the process of influencing patient behavior and producing the changes in knowledge, attitudes and skills necessary to maintain or improve health. Educating MM

patients improve knowledge and understanding of disease process, symptoms management and complications prevention (Mińko et al., 2021).

### **Significance of the study:**

Multiple myeloma accounts 10% of hematological malignancies worldwide and the incidence of MM is 160.000 and the mortality represent 106.000 (Siegel et al., 2020). Symptom burden among patients with MM producing multiple evolving negative, physical, and emotional consequences.

The educational program will help the patient to control the disease by handling associated symptoms including pain, fatigue, insomnia, functional disability, body image disturbance and emotional through providing the necessary knowledge and skills needed to alleviate these symptoms, improve body image and reducing psychological distress (Benyon, 2021).

### **Working definition:**

**Symptom burden** is a dynamic, multidimensional and physiological symptom that affect MM patients and producing multiple negative, physical, responses. It includes pain, fatigue and insomnia and functional disability.

**Body image dissatisfaction** is a negative attitude towards one's own body resulting from a perceived discrepancy between the actual body image.

**Psychological distress** is unpleasant feelings or emotions that impact level of functioning and ability to cope. In this study, psychological distress is limited to anxiety and depression.

### **Aim of the Study:**

This study aimed to evaluate the effect of educational program on symptom

burden, body image dissatisfaction and psychological distress among patients with MM through the following:

1- Assess the symptom burden, body image dissatisfaction and psychological distress among patients with MM.

2- Develop and implement educational program for patients based on need assessment.

3- Evaluate the effect of the educational program on symptom burden body image dissatisfaction and psychological distress among patients with MM.

### **Research Hypothesis**

The current study hypothesized that:

The educational program will decrease symptom burden, body image dissatisfaction and psychological distress among patients with multiple myeloma.

### **Subjects and Methods**

#### **A- Research design:**

This study was conducted through using a quasi experimental design.

#### **B- Setting:**

The study was conducted at hematology outpatient clinic at Ain Shams university hospital.

#### **C- Subject:**

A purposive sample of 60 patients with multiple myeloma was selected according to a predetermined inclusion criteria. The study sample was divided into two groups: study group who had the educational program and routine instructions and control group who had only the routine instructions. The sample size was calculated statistically by power.

- Type I error has significant level  $\alpha= 99\%$
- Type II error with power analysis  $\beta= 95\%$

#### **Inclusion Criteria:**

The study subject was selected according to the following criteria:

- Adult patients (age  $\geq 20$  years) regardless their gender or educational level.
- Free from other chronic diseases.
- Able to comprehend program instructions.
- Agree to participate in the study.

**Exclusion criteria:**

- Patients suffering from mental or psychiatric disorders.

- Patients who were exposed previously to any educational programs regarding multiple myeloma management.

**D-Tools of data collection**

Data were collected through using the following tools:

**I-Patient's demographic characteristics tool:** It was designed by the researchers and written in simple Arabic language to assess demographic characteristics of the studied patients as age, educational level, marital status.... etc.

**II-Patient's clinical data tool:** It was designed by the researchers and written in English language after reviewing related literatures (Cormican & Dowling, 2018; Ravi et al., 2018). It was used to assess of patients' clinical data as initial symptom, type of MM, presence of anemia etc...

**III-Patients' knowledge assessment questionnaire tool:** It was designed by the researchers and written in Arabic language after reviewing the related literatures (Ewees et al., 2016; Kumar et al., 2018; Cormican & Dowling, 2021) to assess patients' knowledge regarding multiple myeloma. It composed of 38 multiple choice questions (10 questions regarding basic knowledge about MM and 28 questions regarding symptom management include pain, fatigue, sleep disorders, functional disability, body image dissatisfaction, anxiety and depression).

**Scoring system**

The correct answer for each item took one grade and incorrect answer was zero. The total score of patients' knowledge were 38 grades.

Total score was considered:

•  $\geq 70\%$  ( $\geq 27$  grades) was considered satisfactory level of knowledge.

•  $< 70\%$  ( $< 27$  grades) was considered unsatisfactory level of knowledge.

**IV-Symptom burden assessment tool:**

It was classified as the following.

a- **Pain assessment scale:** 10-points Numerical Pain Scale adopted from Levy et al., (2018). It was used to assess the pain severity; it was classified into three classes of pain according to the levels of pain severity.

**Scoring system:** Mild pain (1–4), moderate pain (5–6), and severe pain (7–10), the patients were asked to select the number.

**b-Fatigue assessment scale:**

This tool was adopted from Ozyemisci et al., (2019), it was translated into Arabic and back translation was done, it was composed 9 statements each statement had responses from 1 to 7.

**Scoring system:** Patients were asked to choose a number through the past week from 1 to 7 that indicates their degree of agreement with each statement where 1 indicates strongly disagree (less fatigue) and 7, strongly agree (more fatigue).

**c- Functional ability assessment tool:**

It was adopted from Andries et al., (2021). It was translated into Arabic then back translation was done, and composed of 10 items such as feeding, bathing, toileting...etc, each item had 3 responses independent (1), need assistant (2) and dependent (3).

**d- Insomnia Severity scale:**

This tool was adopted from Lin et al., (2020). It was translated into Arabic then back translation was done, and composed of 7 statements each statement had 5 responses to

assess the severity, and impact of insomnia at the last month, such as severity of sleep onset, sleep maintenance, and early morning awakening problems.

**Scoring system:** The Likert scale that used considered 0 = no problem; 4 = very severe problem), so a total score ranged from 0 to 28.

0–7 absence of insomnia; mild insomnia 8–14; moderate insomnia 15–21; and severe insomnia 22–28.

#### **V-Body image dissatisfaction scale:**

This tool was developed by researchers based on related literature (McDermott et al., 2014; El-Wakiel, 2021). It was used to assess body image perceptions among MM patients. It composed of 9 statements each one had 4 responses.

#### **Scoring system:**

1 = not at all; 2 = quite a bit; 3=very much. It was considered the high the score is, the high level of body image dissatisfaction

**VI-Psychological distress assessment tool:** It was composed of the following:

**a-Anxiety disorder scale:** it was adopted from Spitzer et al., (2006). It was modified and translated into simple Arabic language by the researchers. It was used to assess the level of anxiety among MM patients within the last week. The scale included 7 items as difficulty in relaxing, being so restless that it is hard to sit still, becoming easily angry or irritable and feeling afraid as if something unpleasant might occur.

#### **Scoring system:**

Each item had 4 responses ranging from 0-3 as the following: (0) never, (1) sometimes, (2) often and (3) always.

#### **b- Depression scale:**

This tool was adapted from El-Wakiel (2021), It was written in Arabic language to assess depressive symptom among MM patients, it composed of 16 items such as sadness, guilt feeling, negative thoughts...etc.

#### **Scoring system:**

Each item had 4 responses ranging from 0-3 as the following: (0) not at all, (1) several days, (2) more than half the days and (3) nearly every day.

**Educational program:** it was designed by the researchers and written in simple Arabic language using pictures based on related recent literatures (Cormican & Dowling, 2018, Ravi , 2018).and included over view about bone marrow and blood anatomy and physiology, multiple myeloma description as definition, causes, signs and symptom, complications, MM management and biopsychosocial problems management. The educational program sessions plan and contents were revised by a group of five experts assistant professors (three in nursing and two in medicine) for content validity and no modifications were needed.

The educational program composed of 11 sessions included teaching basic knowledge regarding MM, and symptoms management including non-pharmacological pain management, fatigue management, sleep hygiene, independency improvement. Also, teaching relaxation technique, thought catching, cognitive reconstruction, motivation sharpening, psychological support, positive support, optimism skills development, cultivating hope and positive thinking. The researchers used many teaching methods and media such as; open discussion, brain storming, demonstration, videos, real materials, and handouts.

#### **Tools validity and reliability**

The study tools were tested and evaluated for their face and content validity by five experts from faculty members in the

Medical Surgical Nursing and Psychiatric Nursing fields from Faculty of Nursing, Ain Shams University (two professors and three assistant professors). The aim was to assess relevance, clarity, and comprehensiveness, simplicity and applicability of the study tools, experts elicited responses were either agreed or disagreed or agreed with modifications and no modifications were required. Testing reliability of the proposed tools was done statistically by Alpha Cronbach test to measure the internal consistency of the study tools (alpha = 0.794 for knowledge questionnaire & alpha = 0.735 for pain scale, alpha = 0.811 for fatigue scale, alpha=0.880 for insomnia, alpha=0.862 for functional ability, alpha = 0.933 for body image dissatisfaction, alpha=0.899 for anxiety scale and alpha= 0.923 for depression scale) which indicated that the tools was reliable.

#### • Pilot Study:

Testing study tools was carried out before initiate the data collection. It was done on a group of ten patients to test the applicability of the tools. The patients included in the pilot study were included in the sample because no modifications were done to the study tools.

#### Field Work:

Field work included three phases: Assessment phase, implementation phase and evaluation phase.

#### I-Assessment phase:

Extensive reviewing of recent related literatures and theoretical knowledge of various aspects of the study using books, articles, periodicals, magazines and internet was done to prepare data collection tools.

#### II- Implementation phase

Data collection took about 8 months, started from beginning of May 2021 to end of December 2021. Data was collected first from the control group from May to July 2021, then from August 2021 to December 2021 to

the study group. Data were collected three days/week in the Hematology clinic (Saturday, Monday and Wednesday). For both groups, first, the researchers greeted the patients, introduced their self and explained the aim of the study.

The researchers took the patients' telephone number at the first time to regulate the next appointments. Pre assessment involved assessment of demographic characteristics, clinical data, knowledge, symptom burden assessment, body image dissatisfaction and psychological distress tools. Filling the tools were required about 40-50 minutes which distributed as the following: patient's demographic characteristics tool took about five minutes, patient's clinical data took about five minutes, patients' knowledge assessment tool took about 15 minutes, symptom burden assessment tool took about 10 minutes, body image and psychological distress took about 15 minutes. Regarding study group, the pre assessment was done also as control group and took approximately same time for all data collection tools, after that educational program was implemented for each patient separately.

Educational program was implemented to the patients by the researchers individually though out 11 sessions each session was spent approximately 30-40 minutes after explanation of the aim of each session. The researchers discussed the knowledge and practice regarding MM. It included teaching basic knowledge regarding MM, and symptoms management including non-pharmacological pain management, fatigue management, sleep hygiene, independency improvement. Also, teaching relaxation technique, thought catching, cognitive reconstruction, motivation improving, psychological support, positive support, optimism skills development, cultivating hope and positive thinking. The researchers used many teaching methods and media such as; open discussion, brain storming,

demonstration, videos, real materials, and handouts.

### **Contents of educational program:**

**1-The theoretical part** was composed of overview about MM, avoiding MM complications.

**2-The practical part** was composed of symptoms burden management of MM as pain and fatigue management, improving sleep quality, managing anger, practicing problem solving techniques and performing different relaxation techniques.

**Session (1):** The researchers clarified the aim of the program, its objectives and meeting time.

**Session (2):** The researchers filled in the data collection tools.

**Session (3):** Overview about MM and related complications as definition of MM, its cause and types etc.....

**Session (4):** Caring of symptoms related MM included non-pharmacological pain management as relaxation technique, meditation, etc.....

**Session (5&6):** Caring of symptoms related MM included fatigue management and functional performance improvement.

**Session (7):** Dealing with body image as definition of body image and instructions for improving body image.

**Session (8&9): anxiety and depression management** thought catching, cognitive reconstruction, motivation sharpening, psychological support, positive support, optimism skills development, cultivating hope and positive thinking.

### **Evaluation phase:**

Session (10 & 11): closure and data collection session (post assessment): It included evaluation the effect of educational program by comparing symptom burden, body image and psychological distress results post and follow up the educational program implementation through using the same tools of data collection which were done to study and control groups after one month (post) and 3 months (follow up) of educational program.

### **Administrative Design:**

The official approval to implement this study was obtained from the director of the El Demerdash hospital Ain Shams University after explanation the aim of the study to get the agreement to implement the study.

### **Ethical Considerations:**

The approval to implement this study was obtained from the director of the El Demerdash hospital Ain Shams University. The researchers-maintained anonymity and privacy of the patient's data. Patients were informed that; they are allowed to choose to participate or not in the study and that they had the freedom to withdraw from the study at any time without giving any explanations.

### **Statistical Design:**

The collected data were organized, analyzed using appropriate statistically significant tests. The data were collected, coded and entered to a personal computer. The data were analyzed with the program the statistical package for social science (SPSS) under windows version 11.0.1. Data were presented in tables and graph. The statistical analysis included percentage, mean, standard deviation (SD), t test, Z test and Alpha Cronbach test for testing tools reliability.

## Results

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Regarding demographic characteristics, table (1) shows that mean age of the study group was **54.8±6.8**, while the mean age of control group was **51.9±7.8**. Regarding patients' gender, it was found that, **56.7%** and **63.3%** of patients in the study and control groups were males respectively. As regards their educational level, 36.7% of the study group and 33.3 % of control group were able to read and write. In relation to marital status, it was found that 60% of patients in the study group and 66.7% of control group were married. In relation to monthly income, this table shows that 66.7% and 83.3% respectively of study and control groups had insufficient monthly income for the cost of treatment.

Considering clinical data of the study and control groups, table 2 shows that 73.3 % and 80% of patients in the study and control groups respectively had bone pain as an initial symptom. Regarding primary treatment of MM 43.3% and 40% of study and control groups were treated by chemotherapy respectively, while 63.3% and 70% of them had anemia, also, there were no statistically significance differences between study and control groups ( $P>0.05$ ). Figure 1 shows that, 6.7% of patients in the study and control groups had satisfactory level of knowledge

pre implementation of educational program, while, 86.7 % of patients in the study group had satisfactory level of knowledge regarding MM post implementation of educational program with a statistically significant difference between them ( $p=0.00$ ). As well, 80% of the study group had satisfactory level of knowledge while, 10+% of control group had satisfactory levels of knowledge regarding MM follow up implementation of educational program with a statistically significant difference between them ( $p=0.00$ )

Table (3): Regarding patients' symptoms burden pre educational program implementation, this table shows that, there were no statistically significant difference ( $P>0.05$ ) between study and control groups regarding pain, fatigue, insomnia, body image dissatisfaction, anxiety and depression. While, there were statistically significant differences ( $P<0.001$ ) between them post and follow implementation of educational program.

Table (4) reveals that there was statistically significant negative correlation between pain and patients' knowledge in the follow up, while there were no statistically significant correlation between patients knowledge and fatigue, insomnia, functional ability, body image, and psychological distress pre, post and follow up of the program in both of study and control groups.



Table (1): Comparison between study and control groups regarding their demographic characteristics:(n=30)

Items	Groups				X <sup>2</sup>	P value
	Study(n=30)		Control (n=30)			
	No	%	No	%		
<b>Age</b>						
• 20-<40	10	33.3	8	26.7		
• 40-<60	12	40.0	13	43.3		
• 60 -	8	26.7	9	30.0	<b>1.90</b>	<b>0.07</b>
<b>mean± standard deviation</b>	<b>54.8±6.8</b>		<b>51.9±7.8</b>		<b>t=1.904</b>	<b>0.07</b>
<b>Sex</b>						
• Male	17	<b>56.7</b>	19	<b>63.3</b>		
• Female	13	43.3	11	36.7	0.701	0.489
<b>Education</b>						
• Illiterate	8	26.7	10	33.3		
• Read and write	11	<b>36.7</b>	10	<b>33.3</b>		
• Secondary education level	5	16.6	4	13.4	0.648	0.522
• High educational level	6	20	6	20		
<b>Marital status</b>						
• Married	18	<b>60</b>	20	<b>66.7</b>		
• Not married	12	40	10	33.3	1.00	0.326
<b>Residence</b>						
• Rural	10	33.3	13	43.3		
• Urban	20	66.7	17	56.7	-1.80	0.083
<b>Occupation</b>						
• Has work	4	13.3	5	16.7		
• No work	11	36.7	10	33.3	0.722	0.476
• Temporary lost work	8	26.7	10	33.3		
• Retired	7	23.3	5	16.7		
<b>Monthly income</b>						
• Sufficient	10	33.3	5	16.7	-1.148	0.118
• Insufficient	20	<b>66.7</b>	25	<b>83.3</b>		

Non-significant P&gt;0.05

Table (2): Comparison between study and control group regarding their clinical data: (n=30)

Variables	Items	Patient' clinical data				z	P-value
		Study (n=30)		Control(n=30)			
		No.	%	No.	%		
Initial symptom	Bone pain	22	73.3	24	80	1.010	0.121
	Anemia	3	10	2	6.6	-1.150	0.112
	Infection	4	13.3	3	10	-1.150	0.107
	Renal insufficiency	1	3.4	1	3.4	0.000	1.000
Type of multiple myeloma	IgG	17	56.7	16	53.3	-1.215	0.085
	IgA	9	30	8	26.7	-0.990	0.909
	Other	4	13.3	6	20	1.020	0.456
Years since diagnosis	less than 2 year	18	60	19	63.3	1.131	0.412
	2-5 years	8	26.7	7	23.3	1.110	0.459
	5-10	4	13.3	4	13.4	0.000	1.000
Primary treatment	Radiation therapy only	2	6.7	3	10	1.120	0.112
	Chemotherapy only	13	43.3	12	40	-1.101	0.123
	Chemotherapy and radiation Immunotherapy	5	16.7	6	20	1.012	0.116
Anemia	Immunotherapy	10	33.3	9	30	-0.990	0.909
	Present	19	63.3	21	70	1.121	.091
	Not present	8	26.7	8	26.7	0.000	1.000
	Unknown	3	10	1	3.3	0.000	1.000

Non-significant P>0.05

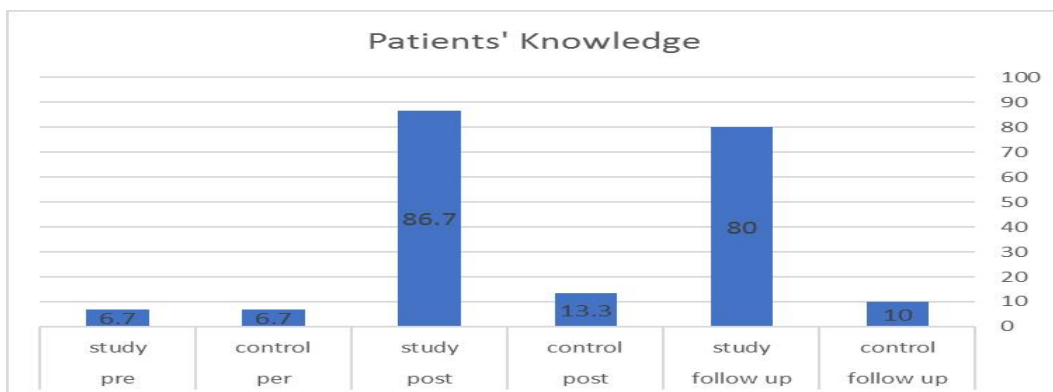


Figure 1: Comparison between study and control groups regarding total knowledge regarding MM pre, post and follow up implementation of educational program. (n=30)

**Table 3: Comparison between study and control groups regarding their symptoms burden, body image dissatisfaction and psychological distress pre, post and follow up implementation of educational program. (n=30)**

Items	Pre				Post				Follow up									
	Study		Control		t test	P-value	Study		Control		t test	P-value	Study		Control		t test	P-value
	mean	SD	mean	SD			mean	SD	Mean	SD			mean	SD	mean	SD		
Pain	3.40	2.25	3.60	2.46	-0.528	0.698	2.13	1.07	3.40	2.25	3.21	0.003	1.23	0.774	3.40	2.25	5.560	0.000
Fatigue	33.83	5.31	33.80	5.27	0.158	0.875	24.23	7.58	33.92	5.31	5.562	0.001	19.23	4.13	33.93	5.31	12.090	0.000
Functional ability	1.47	0.507	1.53	0.507	-1.439	0.161	1.90	0.305	1.47	0.705	-4.709	0.000	1.80	0.407	1.47	0.705	-3.340	0.002
Insomnia	31.80	5.31	30.18	4.90	-0.190	0.875	11.77	4.35	14.20	4.66	2.159	0.039	9.77	2.39	14.20	4.66	4.66	0.000
Body image dissatisfaction	21.07	2.05	21.33	2.43	0.859	0.397	16.57	4.29	21.07	2.05	4.549	0.000	13.93	2.43	21.07	2.05	9.750	0.000
Anxiety	22.50	6.29	22.97	5.52	0.461	0.648	17.90	4.82	22.50	6.29	3.018	0.005	13.90	3.06	22.50	6.29	6.910	0.000
Depression	50.13	11.70	51.77	11.05	0.950	0.350	30.80	7.91	50.13	11.70	6.276	0.000	23.43	5.91	50.13	11.70	10.34	0.000

Non-significant P>0.05

P < 0.05 significant

**Table 4: Correlation between total knowledge symptoms burden, body image, and psychological distress among study and control group pre, post and follow up implementation of educational program.**

Items	Pre				Post				Follow up									
	Study		Control		t test	P-value	Study		Control		t test	P-value	Study		Control		t test	P-value
	mean	SD	mean	SD			mean	SD	Mean	SD			mean	SD	mean	SD		
Pain	3.40	2.25	3.60	2.46	-0.528	0.698	2.13	1.07	3.40	2.25	3.21	0.003	1.23	0.774	3.40	2.25	5.560	0.000
Fatigue	33.83	5.31	33.80	5.27	0.158	0.875	24.23	7.58	33.92	5.31	5.562	0.001	19.23	4.13	33.93	5.31	12.090	0.000
Functional ability	1.47	0.507	1.53	0.507	-1.439	0.161	1.90	0.305	1.47	0.705	-4.709	0.000	1.80	0.407	1.47	0.705	-3.340	0.002
Insomnia	31.80	5.31	30.18	4.90	-0.190	0.875	11.77	4.35	14.20	4.66	2.159	0.039	9.77	2.39	14.20	4.66	4.66	0.000
Body image dissatisfaction	21.07	2.05	21.33	2.43	0.859	0.397	16.57	4.29	21.07	2.05	4.549	0.000	13.93	2.43	21.07	2.05	9.750	0.000
Anxiety	22.50	6.29	22.97	5.52	0.461	0.648	17.90	4.82	22.50	6.29	3.018	0.005	13.90	3.06	22.50	6.29	6.910	0.000
Depression	50.13	11.70	51.77	11.05	0.950	0.350	30.80	7.91	50.13	11.70	6.276	0.000	23.43	5.91	50.13	11.70	10.34	0.000

Non-significant P>0.05

P < 0.05 significant

**Discussion**

Multiple myeloma is malignant plasma cells that proliferate unregulated in the bone marrow causing debilitated bones, pain, hypercalcemia, anemia, and renal disease. This study aimed to evaluate the effect of educational program on symptom burden, body image dissatisfaction and psychological

distress among patients with MM Regarding age and gender, the results of present study revealed that male patients, and mean age **54.8±6.8 and 51.9±7.8** were constitute the highest percentage among both study and control groups of patients with multiple myeloma respectively with no statistically significant differences between them. This result is supported by **LeBlanc et al. (2021)** who revealed that mean age of study group

was  $63.7 \pm 11.5$  and near two thirds of them were males.

In the current study the result showed that slightly more than one third of study group and one third of control group were read and write with no statistically significant difference between them. This result is contradicted by **Evans et al., (2021)** who revealed that 75% of study group had low education level .

As regards income, the current study result revealed that two thirds of study group and majority of control group had insufficient income with no statistically significant difference between them. This could be due to the poor socioeconomic class of most of Egyptian people. These results are correspondent with **Evans et al., (2021)** who revealed that 68% of study group lived in areas of low income.

Considering clinical data of the study and control groups, near three fourths and majority of patients in the study and control groups respectively had bone pain as an initial symptom. This result is contradicted by **Baptiste et al., (2020)** who stated that the commonly reported symptom related to the smoldering myeloma diagnosis was tiredness. The current study results showed that, less than two thirds of study and more than two thirds of control groups suffered from anemia with no statistically significance differences between them ( $P > 0.05$ ). This result is in agreement with **Ocio, et al., (2021)** who stated that slightly less than two thirds of their study group suffered from bone lesion.

Regarding total knowledge pre, post and follow up implementation of educational program, current study clarified that the level of knowledge among study group had increased post the implementation of the educational program; majority of them had satisfactory level of knowledge with statistically significant difference with control group ( $p = 0.00$ ). who found that, the minority of them had satisfactory level of knowledge

pre, post or follow up implementation of educational program.

As well, slightly less than three fourths of the study group had satisfactory level of knowledge during follow up evaluation of the educational program with a statistically significant difference between study and control groups ( $p = 0.00$ ). This result may be due to the effect of the program.

This result is consistent with **Farag et al., (2019)** who stated that none of patients in the study and control groups had satisfactory level of knowledge pre implementation of self-care guidelines while, 28% of control group and 84% of the study group got total satisfactory level of knowledge post implementation of self-care guidelines with highly statistical significant between them at  $P \text{ value} < 0.01$ .

Regarding symptom burden among study and control groups, there were no statistically significant difference ( $P > 0.05$ ) between them regarding pain pre implementation of educational program. While, there were statistically significant differences ( $P < 0.001$ ) between study and control groups post and follow implementation of educational program. This result may be due to the effect of education program that focus non pharmacological measures to deal with pain. This result is contradicted by **Nielsen et al., (2021)** who stated that there were no statistically significant differences between study group regarding pain and the participants reported no change in HRQoL after the 12-week rehabilitation program.

Regarding fatigue, there were no statistically significant difference ( $P > 0.05$ ) between study and control groups regarding fatigue pre implementation of educational program. This result may be due to that fatigue is considered as a major concern and extreme exhaustion interfered with many aspects of daily living such as concentrating on tasks and going to work. However, there

were statistically significant differences ( $P < 0.001$ ) between study and control groups regarding fatigue post and follow implementation of educational program.

This result is supported by **Ewees, (2016)** who stated that, there were statistically significant differences ( $P < 0.001$ ) between study and control groups regarding fatigue post and follow implementation of self-care guidelines.

As regards, insomnia, there were no statistically significant difference ( $P > 0.05$ ) between study and control groups regarding insomnia pre implementation of educational program. This result is supported by **Harrold et al. (2020)** who stated that 62% of study group reported sleep disturbance after their diagnosis. While, there were statistically significant differences ( $P < 0.001$ ) between study and control groups regarding fatigue post and follow implementation of educational program. This result may be due to improving mean of pain and fatigue from (3.40 and 33.83) pre- post implementation of the program to (2.13 and 24.23) respectively among the study group.

Regarding body image dissatisfaction, there were no statistically significant difference ( $P > 0.05$ ) between study and control groups regarding their body image pre implementation of educational program. This result is supported by **Bahrami et al., (2017)** who stated that 63% of study group of cancer patients had negative appearance evaluation regardless type of cancer or the used treatment. However, there were statistically significant differences ( $P < 0.001$ ) between study and control groups regarding their body image post and follow implementation of educational program. This result may be due to improving pain, fatigue and sleep pattern among study group and the effect of the educational program.

Concerning, psychological distress there were no statistically significant difference ( $P > 0.05$ ) between study and

control groups regarding anxiety and depression pre implementation of educational program. This result may be due to highly symptom burden in terms of pain, fatigue and insomnia among study and control groups that contribute to psychological upset.

This result is the same line with **O'Donnell et al., (2022)** who stated that Patients with MM undergoing treatment experience impaired QOL and elevated anxiety and depression across the disease continuum, regardless of line of therapy. While, there were statistically significant differences ( $P < 0.001$ ) between study and control groups regarding anxiety and depression post and follow implementation of educational program. This result may be due to alleviating pain and fatigue, improving sleep quality and improving body image among study group. Beside the effect of the educational program that focused on enhancing coping ability, this result is supported by **Ewees (2016)**, who stated that there were statistically significant difference between study and control groups regarding psychological dimension of QOL after implementation of self-care guidelines.

## Conclusion

**The results of this study concluded that:**

Implementation of educational program has statistically significant positive effect on symptom burden, body image dissatisfaction and psychological distress among patients with multiple myeloma. There was no statistically significant difference ( $P > 0.05$ ) between study and control groups regarding pain, fatigue, insomnia, body image dissatisfaction, anxiety and depression. While, there were statistically significant differences ( $P < 0.001$ ) between them post and follow implementation of educational program.

## Recommendations

▪ Implementation of educational program for all MM patients' is needed to help patients with multiple myeloma to manage their daily life and associated symptom burden including fatigue, pain, physical functioning, psychological distress, body image dissatisfaction, and long-term health outcomes .

▪ A simplified, comprehensive and illustrated booklet including symptoms management should be introduced to the patients with MM

▪ Replication of the present study on a larger probability sample to achieve generalization of the results and wider application of the educational program.

▪ Further researches are recommended regarding symptoms management among patients with multiple myeloma to evaluate its effect on patients' outcomes.

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