RESULTS

The present study was applied on 60 nurses caring for patients with bone marrow transplantation working in Cairo university hospital (EL-Manial hospital), Ain shams university hospital, Nasser institute for research and treatment and Dar El-fouad hospital. The aim of the present study was to assess nurse's performance in caring for patients with bone marrow transplantation.

The results of the present study will be presented under the following parts:

- **Part I:**
  Sociodemographic characteristics of the studied sample presented in (Table 1).

- **Part II:**
  Nurses` knowledge regarding bone marrow transplantation presented in tables (2- 6).

- **Part III:**
  Nurses' practice regarding caring of patients with bone marrow transplantation presented in tables (7-12).

- **Part IV:**
  Nurses' attitude toward patients with bone marrow transplantation presented in tables (13).

- **Part V:**
  Comparison between nurses` knowledge, practice and attitude in relation to their socio-demographic characteristics represented in tables(14-16).

- **Part VI:**
  Correlation coefficient between nurses` knowledge, practice and attitude represented in table(17).

- **Part VII:**
  Face validity and reliability of tool represented in tables(18-23).

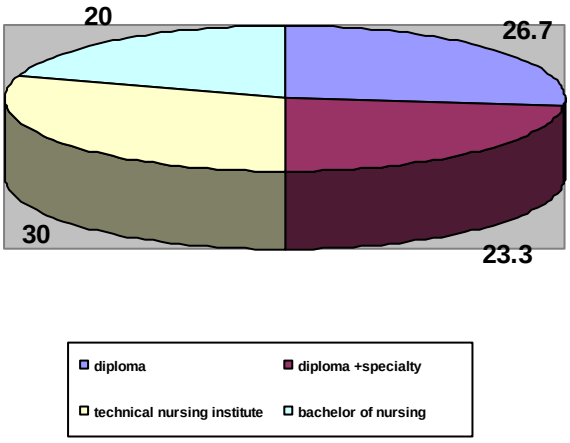
Part (I) : Characteristics of the studied subjects

Table (1) : Distribution of the studied nurses according to their socio demographic characteristics (no =60)

Frequency / Socio demographic data	No	%
Age (years)		
18 < 20	12	20.0
20 < 25	20	33.3
25 < 30	18	30.0
≥ 30	10	16.7
Mean ± SD	**25.47 ± 5.68**	
Martial status		
Single	23	38.3
Married	31	51.7
Widowed	2	3.3
Divorced	4	6.7
Qualification		
Diploma	16	26.7
Diploma + specialty	14	23.3
Technical Nursing Institute	18	30.0
Bachelor of nursing	12	20.0
Experience years at bone marrow transplantation units		
<2	18	30.0
2 <5	23	38.4
5 <10	11	18.3
≥ 10	8	13.3
Mean ± SD	**4.52± 3.20**	
Attendance of training courses about bone marrow transplantation.		
Yes	33	55.0
No	27	45.0

Table (1) showed that more than one third (33.3 %) of the studied sample were within age group of (20 < 25) years with mean age of 25.47 ± 5.68 years. Concerning marital status, nearly one half (51.7%) of the studied group were married, Regarding nurses qualifications and years of experience, it was found that, one third (30.0%) of them had technical nursing institute and more than one third (38.4%) of them had years of experience ranged from (2 < 5) years. As far as, more than one half (55.0%) of nurses had attended training courses about bone marrow transplantation.

Figure (1) Distribution of studied nurses according to their qualification.



This figure (1) clarified that (30.0%) of nurses had technical nursing institute and (26.7%) of them had diploma of nursing. But there were only (20.0%) of nurses had bachelor of nursing.

Figure (2) Distribution of nurses according to their marital status.

This figure (2) showed that more than one third (38.3%) of nurses were single and one half of them (51.7) were married .

PART(II): Nurses' knowledge regarding bone marrow transplantation

Table (2) Distribution of the studied nurses according to their knowledge related to bone marrow transplantation (no =60).

Items	Nurses' knowledge					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	p value
Definition of bone marrow	39	65.0	21	35.0	5.400	< 0.05*
Function of bone marrow	41	68.3	19	31.7	8.067	< 0.001**
Function of yellow bone marrow	40	66.7	20	33.3	6.667	<0.05*
Types of bone marrow	38	63.3	22	36.7	4.267	< 0.05 *
Definition of bone marrow transplantation	43	71.7	17	28.3	11.267	<0.001**
Types of bone marrow transplantation	35	58.3	25	41.7	1.667	>0.05
Indications of bone marrow transplantation	36	60.0	24	40.0	2.400	>0.05
Definition of immune system	45	75.0	15	25.0	15.00	< 0.001**
Components of blood cells in body	37	61.7	23	38.3	3.267	>0.05
Signs and symptoms before bone marrow transplantation	40	66.7	20	33.3	6.667	<0.05*
Donation criteria of bone marrow	41	68.3	19	31.7	8.067	<0.005 *
Laboratory investigations needed for transplantation	44	73.3	16	26.7	13.067	< 0.001**
Simple complications of bone marrow transplantation	39	65.0	21	35.0	5.400	<0.05*
Major complications of bone marrow transplantation	36	60.0	24	40.0	2.400	>0.05
Drugs for complication treatment of bone marrow transplantation	40	66.7	20	33.3	6.667	<0.05*

***(S) Statistical significant difference (P ≤ 0.05).**

****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (2) showed that, Regarding nurses` knowledge related to bone marrow transplantation, more than two third of studied nurses had satisfactory knowledge regarding function of bone marrow, definition of bone marrow transplantation and immune system, and laboratory investigation needed for transplantation (68.3%, 71.7%, 75.0% and 73.3%) respectively with highly statistically significant differences (P <0.001) .

Continue Table (2) Distribution of the studied nurses according to their knowledge related to bone marrow transplantation (no=60)

Items	Nurses' knowledge					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	P value
Classification of BMT complications	37	61.7	23	38.3	3.267	>0.05
Success rates of bone marrow transplantations	40	66.7	20	33.3	6.667	<0.05**
Period of patient preparation for bone marrow transplantation	36	60.0	24	40.0	2.400	>0.05
Signs of cure after BMT	46	76.7	14	23.3	17.067	< 0.001**
Hospitalization period after bone marrow transplantation	35	58.3	25	42.7	1.667	>0.05
The function of immune system of patient with bone marrow transplantation	34	56.7	36	43.3	1.067	>0.05
Immunosuppressant drugs for patients with BMT	44	73.3	16	26.7	13.067	< 0.001**
Restricted diet for BMT patients	41	68.3	19	31.7	8.067	< 0.001**
Rejection period of bone marrow	43	71.7	17	28.3	11.267	< 0.001**
Treatment of marrow rejection	38	63.3	22	36.7	4.267	<0.05*
Determining of organs &tissues transplantation	34	56.7	26	43.3	1.067	>0.05
Risk after BMT	41	68.3	19	31.7	8.067	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (2) showed that, more than two third of nurses had satisfactory knowledge regarding to classification of BMT complications, success rates of bone marrow transplantations, signs of cure after BMT and immunosuppressant drugs for patients with BMT (61.7%, 66.7%, 76.7 and 73.3%) respectively with highly statistical significant difference ($P \leq 0.001$). While more than one third of them had unsatisfactory knowledge regarding period of patient preparation for BMT and the function of the immune system and determining of organs &tissues transplantation (40.0%, 43.3% and 43.3%) respectively with statistically insignificant differences **(P** >0.05**).**

Table (3) Distribution of the studied nurses according to their knowledge related to nursing care for patients with bone marrow transplantation(no =60)

Items	Nurses' knowledge					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	P value
Nursing activities for reducing the incidence of bleeding for BMT patients	37	61.7	23	38.3	3.267	>0.05
Patient actions to prevent bleeding	42	70.0	18	30.0	9.600	< 0.001**
Monitoring of S&S after BMT	43	71.7	17	28.3	11.267	< 0.001**
Steps of oral care for patients with BMT	38	63.3	22	36.7	4.267	<0.05*
Nurses actions for managing complications of BMT	45	75.0	15	25.0	15.000	< 0.001**
Methods of drugs calculation	33	55.0	27	45.0	0.600	>0.05
Separation routs of the stem cells from the patient & the donor	34	56.7	26	43.3	1.067	>0.05
Giving the immunosuppressive drugs	42	70.0	18	30.0	9.600	< 0.001**
Function of chemotherapy in BMT	46	76.7	14	23.3	17.067	< 0.001**
Medication should be giving before& after BMT	45	75.0	15	25.0	15.000	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (3) showed that more than two third of nurses had satisfactory knowledge regarding monitoring S&S after BMT, function of chemotherapy and knowledge about medication should be given before and after BMT(71.7%, 76,7% and 75,0%) respectively with highly statistical significant difference (P ≤ 0.001).

Table (4) Distribution of the studied nurses according to their knowledge related to implementation of infection control policies in caring of patients with bone marrow transplantation (no=60)

Items	Nurses' knowledge					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	P value
Causes of infection in bone marrow transplantation units.	47	78.3	13	21.7	19.267	< 0.001**
Signs and symptoms of infection in bone marrow transplantation units.	38	63.3	22	36.7	4.267	< 0.05 *
Aim of isolation of patients with bone marrow transplantation.	43	71.7	17	28.3	11.267	< 0.001**
Visiting policies bone marrow transplantation units.	42	70.0	18	30.0	9.600	< 0.001 **
Basics of surgical sterilization at bone marrow transplantation units	40	66.7	20	33.3	6.667	< 0.05 *
Characteristics of isolation room for patients with BMT.	48	80.0	12	20.0	21.600	< 0.001 **
Maintaining hand washing between medical staff	45	75.0	15	25.0	15.000	< 0.001**
Nurses role in prevention of cross infection in BMT units	43	71.7	17	28.3	11.267	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**

****(HS) Highly statistical significant difference (P ≤ 0.001).**

This Table(4) Illustrated that, More than two third of nurses had satisfactory knowledge regarding causes of infection in bone marrow transplantation units, basics of surgical sterilization and maintaining hand washing between medical staff (78.3%, 66.7% and 75.0 %) respectively with highly statistical significant difference ($P \leq 0.001$). While less than one third of the studied sample had unsatisfactory knowledge related to nurses role in prevention of cross infection in BMT units and characteristics of isolation room for patients with BMT (28.3 % and 20.0 %) respectively with also highly statistical significant difference ($P \leq 0.001$).

Table (5) Distribution of the studied nurses according to knowledge related to health education for patients with bone marrow transplantation (no =60)

Items	Nurses' knowledge					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	p value
Health education about visiting policies after patient discharge.	52	86.7	8	13.3	32.267	< 0.001**
Health education about avoidance crowding	49	81.7	11	18.3	24.067	< 0.001**
Health education about diet for patients after BMT.	51	85.0	9	15.0	29.400	< 0.001**
Health education about isolating patient after BMT.	50	83.3	10	16.7	26.667	<0.001 **
Health education about Exercises needed for patients after BMT.	34	56.7	26	43.3	1.067	>0.05

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (5) clarified that more than three quarters of nurses had satisfactory knowledge related to health education about visiting policies after patient discharge, health education about avoidance crowding, health education about diet and health education about isolating patient after BMT. (86.7%, 81.7%, 85.0% and 83.3%) respectively with highly statistically differences($P \leq 0.001$).

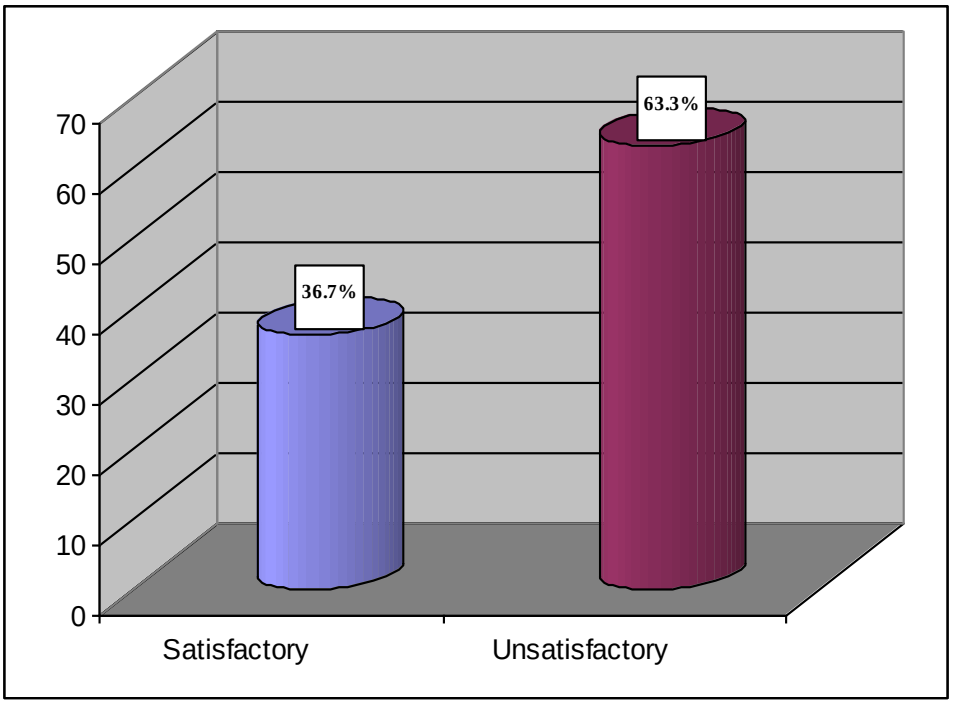
Table (6) Distribution of studied nurses according to their total scores of each knowledge items (no=60)

Items	Nurses ` knowledge					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X2	P value
Nurses` knowledge about BMT	15	25.0	45	75.0	15.000	<0.001**
Nurses` knowledge related to nursing care for patients with BMT	19	31.7	41	68.3	8.067	<0.001**
Nurses` knowledge related to infection control policies in caring for patients with BMT	32	53.3	28	46.7	0.267	>0.05
Nurses` knowledge related to health education for patients with BMT	44	73.3	16	26.7	13.067	<0.001**
Total	22	36.7	38	63.3	4.267	<0.05*

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**
(NS) No Statistical significant differences (P >0.05).

According to this table, More than two third of nurses had satisfactory knowledge regarding infection control policies in caring for patients with BMT and health education (**X2** = 0.267, 13.067) respectively. While more than one third of nurses had unsatisfactory knowledge regarding the knowledge about BMT and knowledge about nursing care for patients with BMT, (**X2** = 15.000, 8.067) respectively with highly statistical significant difference (P ≤ 0.001).

Figure (3) Distribution of the studied nurses according to their total knowledge score



(Figure 3) illustrated that, as regards total nurses` knowledge related to caring for patients with bone marrow transplantation, there more than one third of nurses (36.7%) had satisfactory knowledge and more than two thirds of them (63.3 %) had unsatisfactory knowledge (X^2= 4.267)with Statistical significant difference ($P \leq 0.05$).

PART(III) : Nurses' practice regarding caring of patients with bone marrow transplantation

Table (7) Distribution of the studied nurses ' practices regarding assessment of patients with bone marrow transplantation (no=60)

Items	Nurses ` practice					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X2	P value
Respiratory assessment	41	68.3	19	31.7	8.067	<0.001**
Cardiovascular assessment	4	6.7	56	93.3	45.067	<0.001**
Gastrointestinal assessment	12	20.0	48	80.0	21.600	<0.001**
Renal assessment	27	45.0	33	55.0	0.600	> 0.05

(NS) No Statistical significant differences (P >0.05).
***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

As regards to the nurses` practice about assessment of patients with bone marrow transplantation , more than two third (68.3 %) of nurses had satisfactory practice regarding respiratory assessment with highly statistical significant difference (P ≤ 0.001). While the majority of them (93. 3% and 80.0%) had unsatisfactory practice related to cardiovascular assessment and Gastrointestinal assessment with highly statistical significant difference (P ≤ 0.001).

Table (8) Distribution of the studied nurses' practices regarding nursing intervention for patients with BMT. (no=60).

Items	Nurses` practice					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X2	p value
Measuring vital signs	7	11.7	53	88.3	35.267	< 0.001**
Monitoring central venous pressure	5	8.3	55	91.7	41.667	< 0.001**
Caring central venous catheter	9	15.0	51	85.0	29.400	< 0.001**
Removing central venous catheter	3	5.0	57	95.0	48.400	< 0.001**
Starting an intravenous infusion	12	20.0	48	80.0	21.600	< 0.001**
Discontinuing an intravenous infusion	11	18.3	49	81.7	24.067	< 0.001**
Wound care	10	16.7	50	83.3	26.667	< 0.001**
Blood transfusion	6	10.0	54	90.0	38.400	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

This table revealed that majority of nurses (88.3%, 91.7%, 95.0% and 90.0%) had unsatisfactory practice regards measuring vital signs, monitoring central venous pressure, removing central venous catheter and blood transfusion respectively with highly statistical significant difference (P ≤ 0.001).

Table (9) Distribution of the studied nurses' practices about immediately hygienic and psychological care for patients with bone marrow transplantation (no=60).

Items	Nurses` practice					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X2	P value
Mouth care	6	10.0	54	90.0	38.400	< 0.001**
Skin care	5	8.3	55	91.7	41.667	< 0.001**
Eye care	7	11.7	53	88.3	35.267	< 0.001**
Perineal care	2	3.3	58	96.7	52.267	< 0.001**
Psychological and emotional care	3	5.0	57	95.0	48.600	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (9) showed that, The majority of the nurses had unsatisfactory practice regarding mouth care, skin care, eye care, perineal care and psychological and emotional care (90.0%, 91.7%, 88.3%, 96.7% and 95.0%) respectively with highly statistical significant differences (P ≤ 0.001).

Table (10) Distribution of the studied nurses' practices about maintaining medical asepsis for patients with bone marrow transplantation (no =60)

Items	Nurses` practice					
	Satisfactory		Unsatisfactory		Test of significance	
	No	%	No	%	X^2	P value
Hand wash	13	21.7	47	78.3	19.267	< 0.001**
Wearing sterile gloves	6	10.0	54	90.0	38.400	< 0.001**
Removing sterile gloves	9	15.0	51	85.0	29.400	< 0.001**
Personal grooming	10	16.7	50	83.3	26.667	< 0.001**
Keeping protective isolation room	12	20.0	48	80.0	21.600	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (10) showed that the majority of nurses (had unsatisfactory practice regarding wearing sterile gloves, removing sterile gloves and personal grooming (90.0% , 85.0% and 83.3%) respectively with highly statistical significant**(P ≤ 0.001).** While less than one quarter of nurses had satisfactory practice regarding hand washing and keeping protective isolation room (21.7 % and 20.0 %) respectively with highly statistical significant difference(P ≤ 0.001).

Table (11) Distribution of the studied nurses' practices regarding monitoring and managing potential complications of bone marrow transplantation. (no=60)

Items	Nurses` practice					
	Satisfactory		Unsatisfactory		Test of significant	
	No	%	No	%	X^2	P value
Pain	13	21.7	47	78.3	19.267	< 0.001**
Nausea and vomiting	5	8.3	55	91.7	41.667	< 0.001**
Bleeding	6	10.0	54	90.0	38.400	< 0.001**
Infection	9	15.0	51	85.0	29.400	< 0.001**
Impaired oral mucosa	29	48.3	31	51.7	0.067	> 0.05
Graft versus host disease	11	18.3	49	81.7	24.067	< 0.001**
Veno- occulsive disease	9	15.0	51	85.0	29.400	< 0.001**
Renal insufficiency	47	78.3	13	21.7	19.267	< 0.001**

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**
(NS) No Statistical significant differences (P >0.05).

Regarding monitoring and managing potential complications of bone marrow transplantation. **Table (11) illustrates that**, less than one half (48.4%) of nurses had satisfactory practice in managing impaired oral mucosa with no statistical significant difference (P >0.05). More than two third of nurses (78.3%) had satisfactory practice regarding managing renal insufficiency with highly statistical significant difference (P ≤ 0.001). While more than three quarters of nurses had unsatisfactory practice regarding managing nausea and vomiting , pain, infection and veno- occulsive disease (91.7% , 90.0% and 85.0 %) respectively with highly statistically difference **(P ≤ 0.001).**

Table(12) Distribution of nurses according to the total scores of nurses` practice (no=60).

Items	Nurses` practice					
	Satisfactory		Unsatisfactory		Test of significant	
	No	%	No	%	X^2	P value
Nurses` practice regarding assessment of patient with BMT.	9	15.0	51	85.0	29.400	< 0.001**
Nurses` practice regarding nursing intervention for patients with BMT.	5	8.3	55	91.7	41.667	< 0.001**
Nurses` practice regarding hygienic care.	4	6.7	56	93.3	45.067	< 0.001**
Nurses` practice regarding maintaining medical asepsis	2	3.3	58	96.7	52.267	< 0.001**
Nurses` practice regarding managing potential complications after BMT	2	3.3	58	96.7	52.267	< 0.001**

****(HS) Highly statistical significant difference (P ≤ 0.001).**

Table (12) showed that the majority of nurses had unsatisfactory practice in almost all items of nursing care of patients with BMT , including nursing practice regarding assessment of patient, nursing intervention, hygienic care and managing potential complications after BMT ($\mathbf{X^2}$ = 29.400, 41.667, 45.067, 52.267 and 52.267) respectively with highly statistical significant difference (P ≤ 0.001)

Figure (4) Distribution of the studied nurses' practices regarding providing health education for patients with bone marrow transplantation (no.=60)

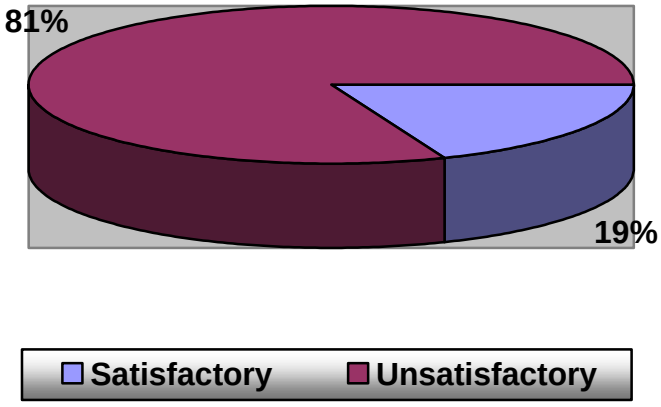


Figure (4) illustrate that Less than two thirds of nurses (81.0%) had unsatisfactory practice regarding providing health education for patients with bone marrow transplantation .While (19%) of them had satisfactory practice.

Figure (5) Distribution of the studied nurses according to their total practice score .

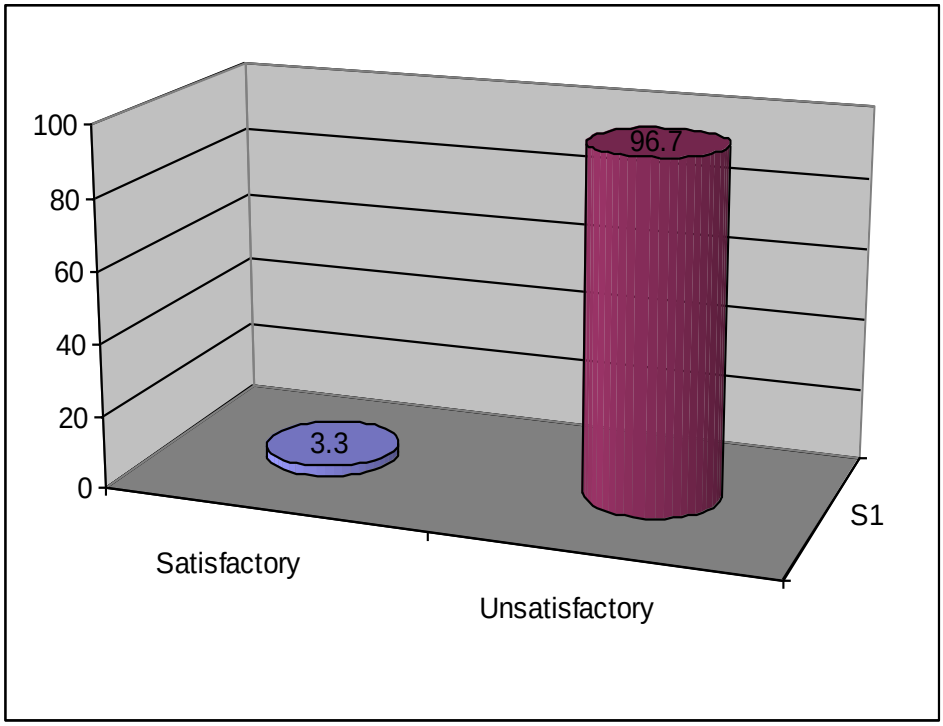


figure (5) showed that majority of nurses had unsatisfactory practice (96.7%) related to caring for patients with bone marrow transplantation while only (3.3%) of them had satisfactory practice with highly statistical significant difference ($P \leq 0.001$).

PART (IV) : Nurses' attitude toward patients with bone marrow transplantation

Table (13) Distribution of the studied nurses according to their attitude toward bone marrow transplantation (no.=60)

Items	Nurses` attitude					
	Positive		Negative		Test of significant	
	No	%	No	%	X^2	P value
1-Feel that the nursing care provided to BMT patientS have a direct biological effect on his health and psychological condition.	43	71.1	17	28.3	39.700	**< 0.001
2-Think that the explanation of nursing procedures for BMT patients is important and necessary.	53	88.3	7	11.7	81.700	**< 0.001
3- Think that setting of nursing care plan for patients with BMT will avoided them fear and disturbance during sleep	41	68.3	19	31.7	34.300	**< 0.001
4- See that the care provided to patient with BMT should be enough to speed the cure.	35	58.3	25	41.7	17.100	**< 0.001
5- Think that talking in front the patient with using medical terms and expressions will increase anxiety.	40	66.7	20	33.4	33.600	**< 0.001
6- think that the patients with BMT always feels fear and anxiety when take the treatment.	42	70.0	18	30.0	38.800	**< 0.001
7- See that repeated daily listening to the patient's complaint don't causing disturbance.	46	76.7	14	23.4	54.300	**< 0.001
8- Think that the presence of the patient in isolated room has negative impact on his psychologicalal state and health.	35	58.3	25	41.7	19.900	**< 0.001
9- Think that the explaining of patient's condition to his family may lead to the speed of their participation in the plan of treatment.	37	61.7	23	38.3	21.700	**< 0.001
10- Think that the patients with BMT will feel reassured during occurrence of medical team beside him all the time.	41	68.3	19	31.7	37.300	**< 0.001
11- See that the health education for patients with BMT will affect positively on the improvement of health .	48	80.0	12	20.0	59.200	**< 0.001
12-Think that follow up to everything new about bone marrow transplant will increase knowledge and improve the performance of nursing.	49	81.7	11	18.3	63.100	**< 0.001
13- Think that encouraging the patient to discuss with anther patient with the same health problems is necessary and important.	37	61.7	23	38.3	22.300	**< 0.001

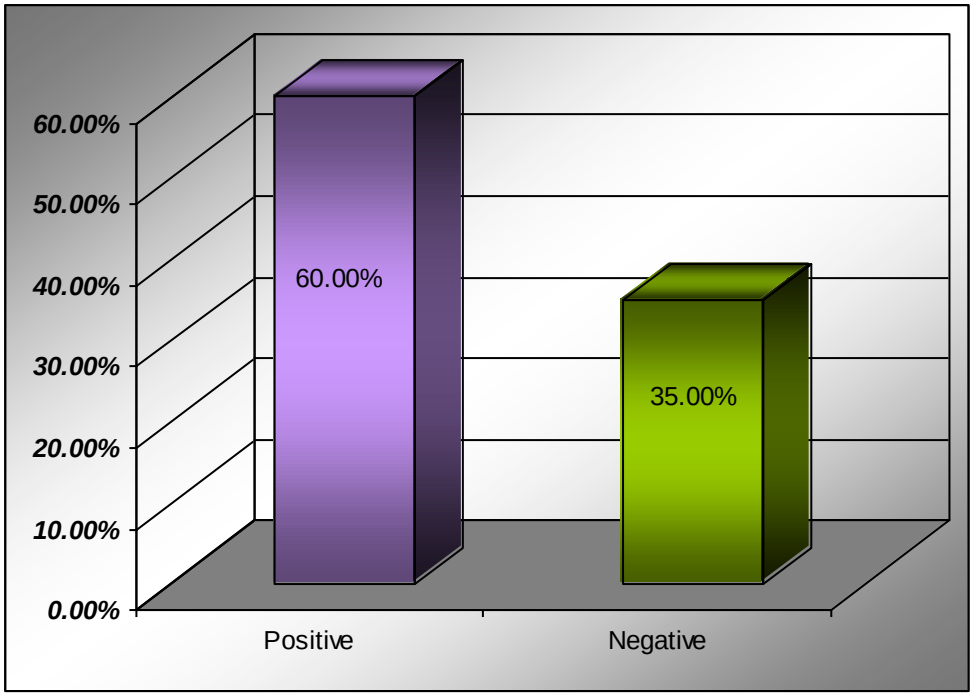
Conti. Table (13) Distribution of the studied nurses according to their attitude toward bone marrow transplantation (no.=60)

Items	Nurses` attitude					
	Positive		Negative		Test of significant	
	No	%	No	%	X^2	P value
14- Think that it is easy for any trained nurse to work BMT units.	37	61.7	23	38.3	22.900	**< 0.001
15-Think that the nurse who responsible for care of patients isn't the only one that have right to know the patient's condition as the other members of the medical team.	46	76.7	14	23.4	51.600	**< 0.001
16-Think that it is essential for all employees in BMT units to have the team spirit to raise their level of performance.	50	83.3	10	16.6	68.400	**< 0.001
17-Think that the improvement in the BMT patient psychological status reflected significantly on the progress of their health.	44	73.3	16	26.7	43.600	**< 0.001
18- See that it easy to make balance between the different responsibilities although difficulty of nursing care.	31	51.7	29	48.3	10.300	**< 0.001
19-Think that the patient maintaince of doctors and nurses orders will help in cure quickly. .	48	80.0	12	20.0	59.200	**< 0.001
20-Think that it should not be hard on the patient when make mistake.	43	71.7	17	28.3	42.700	**< 0.001
21-Think that the nursing care in bone marrow transplantation unit is sufficient and achieve high degree of patient satisfaction.	38	63.3	22	36.7	24.700	**< 0.001
22- Sometimes feels boring due to daily listening to the same patients` complaints	44	73.3	16	26.6	46.800	**< 0.001
23- Think it is necessary to train nurses in BMT units before the work to be able to raise the level of their performance.	45	75.0	15	25.0	47.500	**< 0.001
24- Think that training the patient with BMT to talk about their fears is important and essential.	39	65.0	21	35.0	28.300	**< 0.001
25- Think that periodic follow-up after full treatment will be important and effective for patients with BMT.	43	71.7	17	28.4	39.900	**< 0.001
Total	39	65.0	21	35.0	29.100	**< 0.001

****(HS) Highly statistical significant difference (P ≤ 0.001).**

Regarding the nurses` attitude toward caring for patients with bone marrow transplantation; **This table (13)** showed that more than two third of nurses (65.0%) had positive attitude, (35.0%) of them had negative attitude toward caring for patients with bone marrow transplantation **(X^2 = 29.100)** with highly statistical significant difference ($P \leq 0.001$).

Figure (6) Distribution of the studied nurses according to their total attitude toward patients with bone marrow transplantation.



It is evident from figure (6) There was more than two third of nurses (65.0%) had positive attitude, (35.0%) of them had negative attitude toward caring for patients with bone marrow transplantation with highly statistical significant difference ($P \leq 0.001$).

PART (V) : Comparison between nurses` knowledge, practice and attitude in relation to their socio-demographic characteristics

Table (14): Comparison between nurses` knowledge in relation to their socio-demographic characteristics. (no =60).

Nurses' characteristics	n=60						X^2	P value
	Knowledge							
	Satisfactory		Unsatisfactory		Total			
	No	%	No	%	No	%		
Age in years								
18 < 20	1	1.7	11	18.3	12	20.0	10.072	<0.05*
20 < 25	8	13.3	12	20.0	20	33.3		
25 < 30	11	18.3	7	11.7	18	30.0		
≥ 30	2	3.4	8	13.3	10	16.7		
Qualification								
Diploma	2	3.4	14	23.3	16	26.7	8.718	<0.05*
Diploma + specialty	5	8.3	9	15.0	14	23.3		
Technical Nursing Institute	7	11.7	11	18.3	18	30.0		
Bachelor of nursing	8	13.3	4	6.7	12	20.0		
Experience years at bone marrow transplantation units								
<2	3	5.0	15	25.0	18	30.0	7.474	<0.05*
5 < 2	10	16.7	13	21.7	23	38.3		
10 < 5	7	11.7	4	6.7	11	18.3		
≥ 10	2	3.4	6	10.0	8	13.4		
Attendance of training courses about bone marrow transplantation								
Yes	14	23.3	19	31.7	33	55.0	1.047	>0.05
No	8	13.3	19	31.7	27	45.0		

***(S) Statistical significant difference (P ≤ 0.05).**

This table showed that there was statistically significant difference between nurses` knowledge in relation to their age, qualification and their experience years at bone marrow transplantation ($\mathbf{X^2}$ = 10.072, 8.718 and 7.474) respectively at ($P \leq 0.05$). Meanwhile there was statistically insignificant difference between nurses` knowledge in relation to attendance of training courses ($\mathbf{X^2} = 1.047$) at ($p>0.05$).

Table (15): Comparison between nurses` practice in relation to their socio-demographic characteristics. (no =60).

Nurses' characteristics	n=60						X^2	P value
	Practice							
	Satisfactory		Unsatisfactory		Total			
	No	%	No	%	No	%		
Age in years							1.207	>0.05
18 < 20	0	0.0	12	20.0	12	20.0		
20 < 25	1	1.7	19	31.6	20	33.3		
25 < 30	1	1.7	17	28.3	18	30.0		
≥ 30	0	0.0	10	16.7	10	16.7		
Qualification							2.087	>0.05
Diploma	1	1.7	15	25.0	16	26.7		
Diploma + specialty	1	1.7	13	21.7	14	23.3		
Technical Nursing Institute	0	0.0	18	30.0	18	30.0		
Bachelor of nursing	0	0.0	12	20.0	12	20.0		
Experience years at bone marrow transplantation units								
<2	0	0.0	18	30.0	18	30.0	9.216	<0.05*
2 <5	0	0.0	23	38.3	23	38.3		
5 <10	2	3.3	9	15.0	11	18.3		
≥ 10	0	0.0	8	13.4	8	13.4		
Attendance of training courses about bone marrow transplantation								
Yes	2	3.3	31	51.7	33	55.0	1.693	>0.05
No	0	0.0	27	45.0	27	45.0		

***(S) Statistical significant difference (P ≤ 0.05).**

Table (15) showed that, there was statistically significant differences ($p < 0.05$) ($X^2 = 9.216$, $P < 0.05$) between nurses` practice in relation to their experience years in BMT units. While there was statistical insignificant differences ($P > 0.05$) between nurses` practice in relation to age, qualification and the attendance of training courses about BMT ($X^2 = 1.207$, 2.087 and 1.693) respectively.

Table (16): Comparison between nurses` attitude in relation to their socio-demographic characteristics. (no =60)

Nurses' characteristics	n=60						X^2	P value
	Attitude							
	Positive		Negative		Total			
	No	%	No	%	No	%		
Age in years							18.403	**<0.001****
20 <18	1	1.7	11	18.3	12	20.0		
25<20	6	10.0	14	23.3	20	33.3		
30<25	7	11.6	11	18.4	18	30.0		
≥ 30	1	1.7	9	15.0	10	16.7		
Qualification							16.170	<0.05*
Diploma	1	1.7	15	25.1	16	26.7		
Diploma + specialty	8	13.3	6	10.0	14	23.3		
Technical Nursing Institute	4	6.7	14	23.3	18	30.0		
Bachelor of nursing	2	3.4	10	16.6	12	20.0		
Experience years at bone marrow transplantation units								
<2	3	5.0	15	25.0	18	30.0	19.933	**<0.001****
2 <5	4	6.7	19	31.7	23	38.4		
5 <10	7	11.6	4	6.7	11	18.3		
≥ 10	1	1.7	7	11.7	8	13.3		
Attendance of training courses about bone marrow transplantation								
Yes	11	18.3	22	36.7	33	55.0	6.035	<0.05*
No	4	6.7	23	38.3	27	45.0		

***(S) Statistical significant difference (P ≤ 0.05).**
****(HS) Highly statistical significant difference (P ≤ 0.001).**

As clear from table (16), There was highly statistical significant difference ($P \leq 0.001$) between nurses attitude in relation to their age and experience years at bone marrow transplantation units ($X^{2=}$ 18.403 , 19.933) respectively. Meanwhile there was statistical significant ($P \leq 0.05$) between nurses` attitude in relation to their qualification and attendance of training courses about BMT ($X^{2 =}$ 16.170, 6.035) respectively.

PART (VI): Correlation coefficient between sociodemographic characteristics & total knowledge, practice and attitude

Table (17) Correlation coefficient between total score regarding knowledge, practice and Attitude. (no =60)

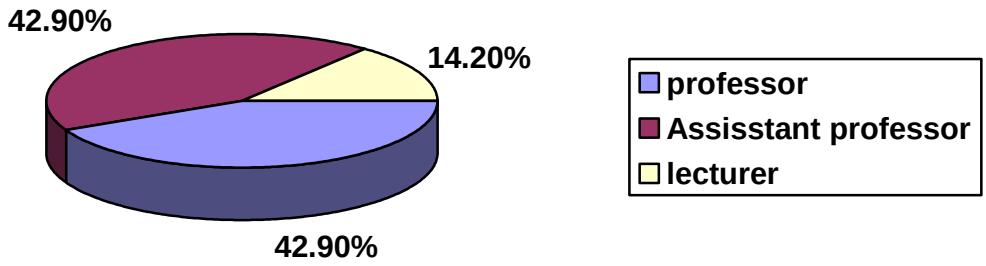
Variable	knowledge				Practice	
	r	p	r	p	r	p
Practice	0.061	>0.05				
Attitude			0.046	>0.05	0.161	>0.05

Correlation is significant at (P ≤ 0.05)

This table illustrated that, There was positive correlation (1) between nurses` knowledge and their practice, (2) between nurses` knowledge and their attitude and (3) between their practice and attitude (r = 0.061, 0.046 and 0.161) respectively. with no statistically significant difference (P >0.05).

Part(VII):- A - Face and content of validity of the tools:

Figure (7) Job title of the expertise regarding face and content validity of the study tool.



- Professor =42.90%
- Assistant professor = 42.90%
- Lecturer = 14.20%

Figure (7) Job title of the expertise. (No = 11)

Figure (7) shows that more than one third (42.9 %) of the expertise were professor. while (14.2 %) were lecturers. The expertise group members were from Nursing faculties, Ain shams university and Benha university.

B-Reliability of the assessment tool according "Alpha-cronbach" reliability analysis

Table (18): Alpha cronbach reliability analysis for the study tool (As general).

(No. of experts =11)

Item	Number
Total number of expertise	11
Number of variables	116
Alpha cronbach	0.8681
F	352.47
P	<0.001**

This table shows that Alpha cronbach test which is used to measure the internal consistence (reliability of the used tool or instrument). The reliability score of the tool as above is (0.8681) = (0.9) which indicates high total internal consistency of the used tool.

Table (19): Alpha cronbach reliability analysis for the study tool (as specific to each tool)

Tool	No. of variables	Alpha-cronbach	F	P
1-Questionnaire sheet	60	0.8338	84.86	<0.001**
2-Observational checklist	25	0.7799	24.57	<0.001**
3- Likert scale	31	0.8870	109.78	<0.001**

*** p >0.05 not significant**
****p < 0.05 significant**
F : ANOVA test

This table show that, Alpha cronbach for questionnaire sheet as above was (0.8338) for observational checklist is (0.7799) and for likert scale is (0.8870). which indicates high total reliability of the used tool with highly statistically significant difference (P < 0.001).

Table (20): Expertise judgment regarding face validity of the study tool (n = 11).

Tool	agree	Disagree	Agree with modification
1- Questionnaire sheet	100 %	-	-
2- Observational checklist	95 %	-	5 %
3- Likert scale	100%	-	-

This table shows that agreement of the entire group (100%) of expertise members regarding the questionnaire sheet and likert scale, that the tool covers all relevant items, the tool was free from any redundant items and it can be used in assessing nurses` performance in caring for patients with bone marrow transplantation.

In addition most of expertise members (95%) agree regarding the observational checklist, The tool was scientific, appropriate, there was balance among its various sections and there was a logical.

Table (21) Expertise judgment regarding general evaluation of content validity of questionnaire sheet related to nurses` knowledge about BMT (no=11)

Tool characteristics	agree	Disagree	Agree with modification
1-Content is related to objective	100%	-	-
2-Content is comprehensive	100%	-	-
3-Representative	100%	-	-
4- Questions are in a logic consequence.	90%	-	10%
5- Appropriate	100%	-	-
6-Accurate	90%	-	10%
7- Clear	100%	-	-

This table shows that, the majority of expertise (100%) had agreement regarding general evaluation of content validity of questionnaire sheet as it was related to objective, comprehensive , representative, appropriate and clear.

Table (22) Expertise judgment regarding general evaluation of content validity of Likert scale related to nurses` attitude in caring for patients with BMT (no=11).

Tool characteristics	agree	Disagree	Agree with modification
1-Content is related to objective	100%	-	-
2-Content is comprehensive	100%	-	-
3-Representative	95%	-	5%
4- Questions are in a logic consequence.	90%	-	10%
5- Appropriate	90%	-	10%
6-Accurate	100%	-	-
7- Clear	100%	-	-

This table shows that, the majority of expertise (100%) had agreement regarding general evaluation of content validity of likert scale as it was related to objective, comprehensive , accurate and clear. While the minority of them were agreed with modification (5%, 10% and 10%) respectively.

Table (23) Expertise judgment regarding general evaluation of content validity of Observational checklist related to nurses` practice in caring for patients with BMT (no=11).

Tool characteristics	agree	Disagree	Agree with modification
1-Content is related to objective	95%	-	5%
2-Content is comprehensive	100%	-	-
3-Representative	100%	-	-
4- Questions are in a logic consequence.	90%	-	10%
5- Appropriate	100%	-	-
6-Accurate	100%	-	-
7- Clear	90%	-	10%

This table shows that, the majority of expertise (100%) had agreement regarding general evaluation of content validity of observational checklist related to nurses` practice in caring for patients with BMT, as it was comprehensive , representative, appropriate and accurate.