Results

Results of the study will be presented in the following Section:

Section I: 1- Characteristics of the studied subjects (Tables 1a, 1b).

2-Medical history of subjects (Tables, 2, 3) and figure (1, 2, 3)

Section (II): 1- Nutritional status of mechanically ventilated patients in intensive care unit at Benha university hospital (Table 4)

2-Laboratory values&fluid balance (Tables 5, 6) and figure (4)

3-Related health problems of the studied patients (Table 7)

Section (III): Anthropometric measurements of the studied patients (table 8)

Section (IV): Relation and correlation coefficient (Tables from 9-15)

Section (V): - opinions of dietitian specialist regarding their role in determining suitable nutritional plan according to needs of patients (Table 16).

Section I: -Characteristics of the studied subjects

Table (1a) Distribution of the Studied Patients According to Their Sociodemographic Characteristics (n= 60)

Sociodemographic characteristics	n= 60	
	No	**%**
Age (years)		
30-	12	20.0
40-	6	10.0
50-	17	28.3
≥ 61	25	41.7
Mean ± SD	56.95 ± 13.71	
Sex		
Male	34	56.7
Female	26	43.3
Residency		
Rural	35	58.3
Urban	25	41.7
Marital status		
Married	30	50
Single	10	16.7
Widow	20	33.3

This table show that more than one third of sample (41.7%) were aged 61 years and above with mean of age was (56.95 ± 13.71) .More than half of the studied patients were males (56.7%) and most of them live in rural areas, and half of subjects were married.

Table (1b) Distribution of the dietitian specialist according to their sociodemographic characteristics (n= 10)

Sociodemographic characteristics	n= 10	
	No	%
Age (years)		
20 -	2	20.0
30-	0	0.0
40-	5	50.0
50-	3	30.0
Mean ± SD	44.20 ± 10.30	
Experience years (years)		
< 10	3	30.0
≥ 10	7	70.0
Mean ± SD	19.20 ± 10.18	
Qualification		
Bachelors of agricultures	7	70.0
Bachelors of sciences	1	10.0
Bachelors of specific education	2	20.0

This table shows that half of the sample (50%) was aged 40 to<50 years old and about three quarter of them (70%) with more than 10 years experiences and their qualifications were Bachelors of agricultures.

Table (2) Distribution of the Studied Patients According to Their Medical history (n= 60)

Medical history	n= 60	
	No	%
Diagnosis		
Brain edema	7	11.7
Cerebral vascular stoke & infraction	16	26.7
Respiratory failure	10	16.7
Hepatic encephalopathy	8	13.3
Poly trauma	7	11.7
hemorrhagic infraction	3	5.0
Pneumonia & COPD	5	8.3
Pre eclampsia	4	6.7

This table shows that the most common diagnosis was cerebro vascular stroke and infarction (26.7%) and the least common diagnosis was hemorrhagic infraction (5.0%).

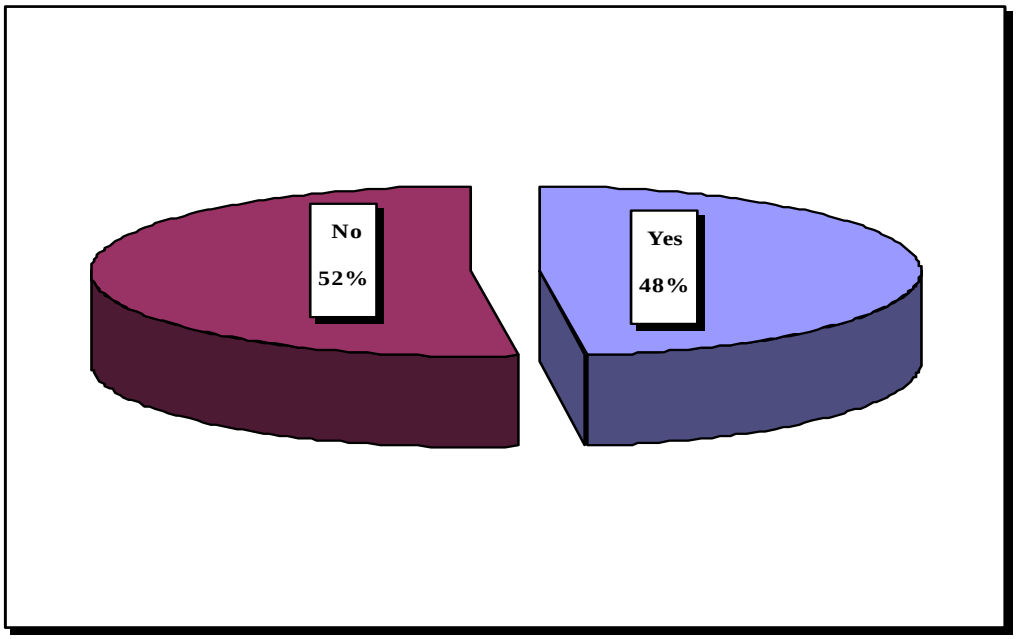

Figure (1) Distribution of the studied patients according to their smoking (n= 60)

This figure illustrates that more than half of sample were no smoker.

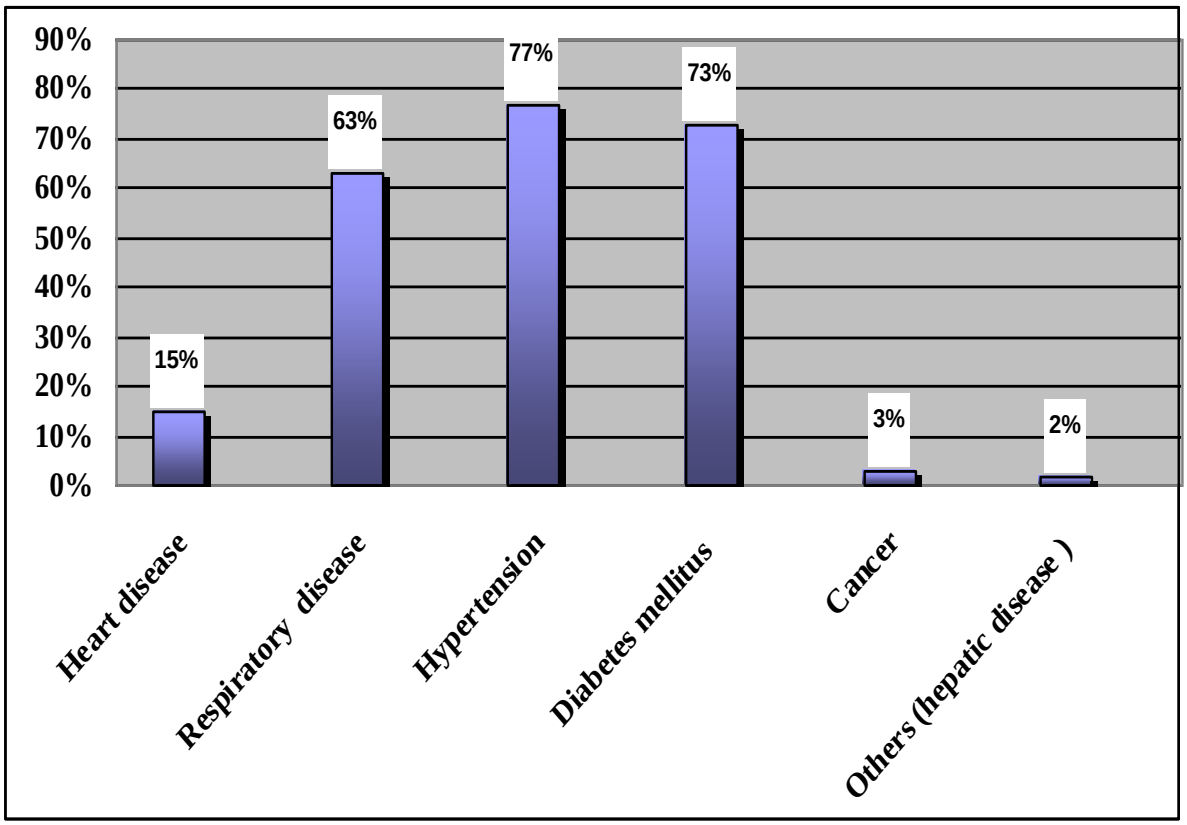

Figure (2) Distribution of the studied patients according to their co morbidity diseases (n= 60)

This figure demonstrates that the most common co morbid diseases were hypertension and diabetes mellitus and the least one was hepatic disease.

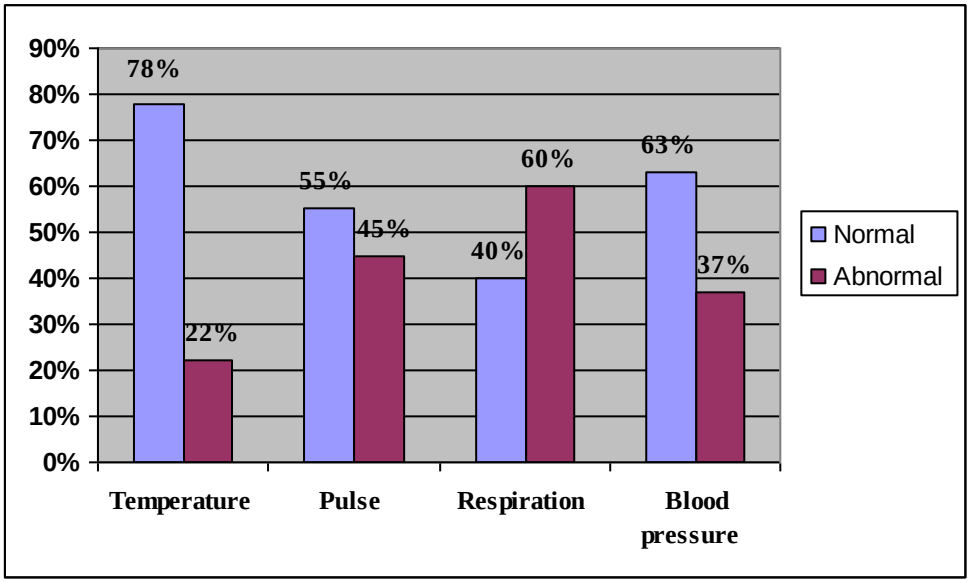

Figure (3) Distribution of the studied patients according to their vital signs (n= 60)

Table (3) Distribution of the studied patients according to their duration of mechanical ventilation (n= 60)

Item	n= 60	
	No	%
Duration of mechanical ventilation (days)		
7-10	42	70.0
11-14	8	13.3
≥ 15	10	16.7
Mean ± SD	10.80 ± 4.76	

This table shows that more than two thirds of subjects (70.0%) under mechanical ventilation for 7-10 days with mean duration of ventilator was (10.80± 4.76).

Section (II): - Nutritional status of mechanically ventilated patients in intensive care unit at Benha university hospital

Table (4) Actual nutritional support schedule of mechanically ventilated patients in intensive care unit at Benha university hospital (n= 60)

Items	n= 60		X^2	P value
	No	%		
Route of feeding			35.267	<0.001**
Enteral feeding(through nasogastric tube)and parenteral nutrition	53	88.3		
Total parenteral nutrition	7	11.7		
Components of food			12.900	<0.001**
Fluids(Juice+ yoghurt)	28	46.6		
Formula(fluids+ cooked food)	25	41.7		
Intravenous fluids	7	11.7		
Types of food			45.200	<0.001**
High protein diet	37	61.6		
Free fat & free salt diet	12	20		
Low protein diet	4	6.7		
Intravenous fluid	7	11.7		
Amount intake / 24 hours				
Mean ± SD	2092.45 ± 611.07			
Actual calories intake / 24 hours				
Mean ± SD	1604.33±621.85			

A statistical significant difference (P ≤ 0.05)
A highly statistical significant difference (P ≤ 0.001)

This table shows that the majority of subjects (88.3%) were feeding by enteral route through nasogastric tube combined with parenteral nutrition with highly statistical significant diffrences and only (11.7%) was feeding by total parenteral nutrition also shows that almost half of the subjects

(46.6%) was fed by fluids (juice and yogurt) and (41.7%) was fed by formula (fluids &cooked food).and shows that the mean of actual calories intake through 24 hours was (1604.33±621.85).Also this table illustrate that two thirds of the subjects (61.7%) had high protein diet and only (6.7%) had low protein diet with highly statistically significant differences.

Table (5) Distribution of laboratory investigations of mechanically ventilated patients in intensive care unit at Benha university hospital (n= 60)

Item	n= 60							
	High		Normal		Low		X^2	P value
	No	%	No	%	No	%		
Albumin	1	1.7	15	25.0	44	73.3	48.100	<0.001**
Blood urea nitrogen	50	83.3	10	16.7	0	0.0	26.667	<0.001**
Hemoglobin	0	0.0	9	15.0	51	85.0	29.400	<0.001**
Sodium	19	31.7	38	63.3	3	5.0	30.700	<0.001**
Calcium	39	65.0	5	8.3	16	26.7	30.100	<0.001**
Potassium	15	25.0	25	41.7	20	33.3	2.500	> 0.05
Pao2	23	38.3	21	35.0	16	26.7	1.300	> 0.05
Paco2	20	33.3	21	35.0	19	31.7	0.100	> 0.05

A statistical significant difference (P ≤ 0.05)
A highly statistical significant difference (P ≤ 0.001)

This table shows that less than three quarter of sample (73.7%) had low albumin level; with highly statistical significant differences, while majority of them (83.3%) had high blood urea nitrogen with highly statistical significant differences, and also majority (85.0%) of sample had low hemoglobin level with highly statistical significant differences, and about two thirds of them (65.0%) had high calcium with highly statistical significant differences.

Table (6) Mean Scores of fluid Balance of Mechanically Ventilated Patients in Intensive care unit at Benha University Hospital (n= 60)

Items	Mean ± SD
Intake (cc)	4845.33 ± 1698.28
Output (cc)	4516.00 ± 2081.23
Balance (cc)	1205.50 ± 1368.65

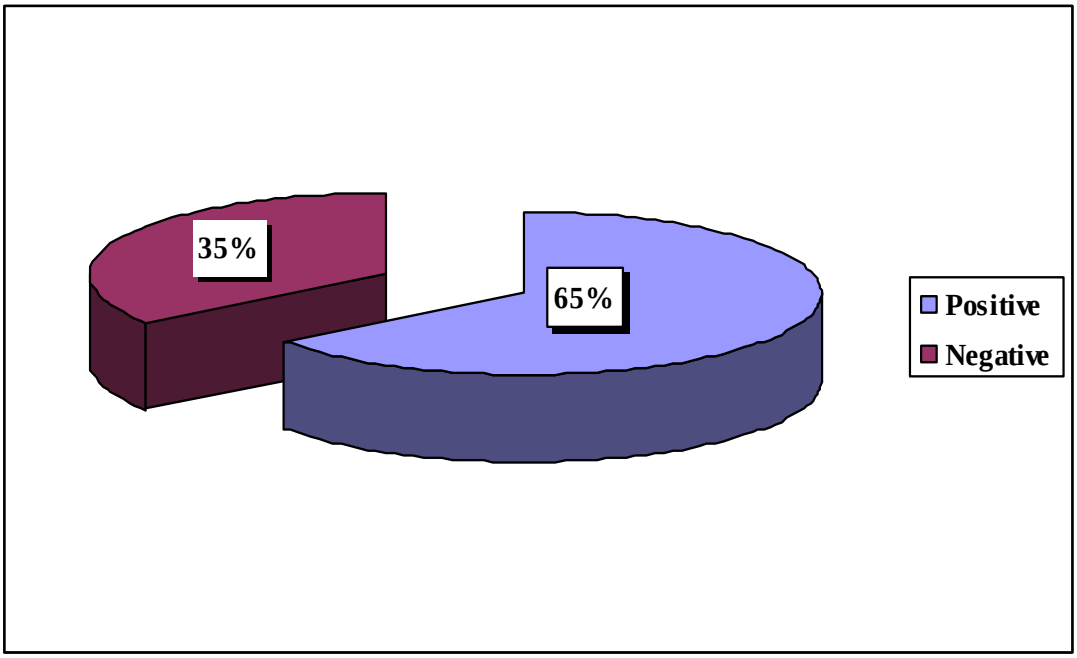

Figure (4) Distribution of the studied patients according to their fluid balance (n= 60)

This figure illustrates that two thirds of the studied patients had positive fluid balance.

Table (7) Health Problems Associated with Nutritional Support of the Studied Patients (n= 60)

Health problems	n= 60			
	Yes		No	
	No	%	No	%
-Vomiting	44	73.3	16	26.7
Frequency / day				
Mean ± SD	4.61 ± 2.115			
-Diarrhea	15	25.0	45	75.0
Frequency / day				
Mean ± SD	3.60 ± 0.74			
- Bleeding (hematemesis)	20	33.3	40	66.7
Amount (cc)				
Mean ± SD	305.00 ± 238.91			

This table shows that the problem of frequent occurrence was vomiting about three quarter of subjects suffer from vomiting (73.3%) with mean of frequency per day(4.61 ± 2.115).

Section (III):Anthropometric Measurements of Mechanically Ventilated Patients in Intensive care unit at Benha University Hospital

Table (8) Anthropometric measurements of mechanically ventilated patients (n= 60)

Anthropometric measurements	Male (n= 34)						Female (n= 26)						X^2	P value
	High		Normal		Low		High		Normal		Low			
	No	%	No	%	No	%	No	%	No	%	No	%		
Midarm circumference	5	14.7	13	38.2	16	47.1	19	73.1	6	23.1	1	3.8	23.329	<0.001**
Triceps skin folds	9	26.5	13	38.2	12	35.3	2	7.7	1	3.8	23	88.5	17.441	<0.001**
Midarm muscle circumference	7	20.6	16	47.1	11	32.3	20	77.0	5	19.2	1	3.8	19.637	<0.001**

A statistical significant difference (P ≤ 0.05)
A highly statistical significant difference (P ≤ 0.001)

This table shows that more than one third of males (38.2%) had normal rang of mid arm circumferences and triceps skin foldness while about three quarter of females (73.1%) had high range of mid arm circumferences, but majority of them (88.5%) had low range of triceps skin foldness, and more than three quarter of female (77.0%) had high mid arm muscle circumference, There's highly statistical significant differences between male and female in all anthropometric measurements.

Section (IV): Relations and Correlation Coefficient

Table (9): Relation between nutritional support and related health problems of mechanically ventilated patients in intensive care unit at Benha university hospital (n=60)

Related health problems / Items	Vomiting n= 44		Diarrhea n= 15		bleeding (hematemesis) n= 20	
	No	%	No	%	No	%
Components of food						
Fluids(Juice+yoghurt)	17	38.6	5	33.3	8	40.0
Formula(fluids+ cooked food	20	45.5	10	66.7	11	55.0
Intravenous fluids	7	15.9	0	0.0	1	5.0
X^2	5.394		6.095		2.709	
P value	>0.05		<0.05*		>0.05	
Route of feeding						
Enteral feeding+parenteral nutrition	37	84.1	15	100.0	19	95.0
parenteral nutrition only	7	15.9	0	0.0	1	5.0
X^2	2.882		2.642		1.294	
P value	>0.05		>0.05		>0.05	

A statistical significant difference (P ≤ 0.05)
A highly statistical significant difference (P ≤ 0.001)

This table shows that the subjects who fed by formula suffered from vomiting, diarrhea and bleeding more than the subjects who fed by fluids only.

Table (10) Relation between food components and vital signs for mechanically ventilated patients in intensive care unit at Benha university hospital (n=60)

Components of food / Items	n= 60									
	Fluids(Juice + yoghurt)		Formula(fluids + cooked food		Intravenous fluids		Total		X^2	P value
	No	%	No	%	No	%	No	%		
Temperature (°C)										
Normal	22	36.7	20	33.3	5	8.3	47	78.3	0.238	>0.05
Abnormal	6	10.0	5	8.3	2	3.3	13	21.7		
Pulse (b/m)										
Normal	15	25.0	15	25.0	3	5.0	33	55.0	0.693	>0.05
Abnormal	13	21.7	10	16.7	4	6.7	27	45.0		
Respiration (c/m)										
Normal	12	20.0	10	16.7	2	3.3	24	40.0	0.476	>0.05
Abnormal	16	26.7	15	25.0	5	8.3	36	60.0		
Blood pressure (mm Hg)										
Normal	20	33.3	15	25.0	3	5.0	38	63.3	2.174	>0.05
Abnormal	8	13.3	10	16.7	4	6.7	22	36.7		

This table shows that there are no statistical significant differences between food components and vital signs.

Table (11) Relation Between Anthropometric Measurements and Components of diet for Mechanically Ventilated Patients in Intensive care unit at Benha University Hospital (n=60)

Items	Fluids(Juice + yoghurt)	Formula(fluids + cooked food	Intravenous fluids	F	P value
	Mean ± SD	Mean ± SD	Mean ± SD		
Mid arm circumference (MAC)(cm)					
Male	27.19±2.42	27.07±3.54	25.75±1.70	0.408	>0.05
Female	31.25±4.03	31.00±4.34	32.67±3.22	0.197	>0.05
Triceps skin folds (TSF) (mm)					
Male	12.09±1.21	11.99±1.79	9.98±1.32	3.422	<0.05
Female	12.68±1.08	14.08±2.86	13.60±1.02	1.354	>0.05
Midarm muscle circumference(MAMC) (cm)					
Male	23.33±2.34	24.51±3.27	22.57±1.40	1.118	>0.05
Female	27.40±3.79	26.50±4.15	28.33±2.91	0.316	>0.05

This table shows that there is no statistical significant difference between anthropometric measurements for both male and female and components of diet except in TSF for male there is statistical significant differences.

Table (12) Relation Between food Components regarding Intake, Output and balance for Mechanically Ventilated Patients in Intensive care Unit at Benha University Hospital (n=60)

Items	n= 60				
	Fluids(Juice+ yoghurt)	Formula(fluids + cooked food	Intravenous fluids	F	P value
	Mean ± SD	Mean ± SD	Mean ± SD		
Intake (cc)	5019.64±1889.22	4690.80±1600.02	4700.00±1339.15	0.270	>0.05
Output (cc)	4280.71±2107.47	4858.00±2200.60	4235.71±1548.85	0.572	>0.05
Balance (cc)	1307.50±1581.92	1158.80±1279.58	964.29±695.65	0.196	>0.05

This table shows that there are no statistical significant difference between food components(fluids ,formula ,IV fluids)regarding intake , output and balance.

Table (13) Correlation Coefficient Between Laboratory Investigations of Patients, actual calories Intake and Duration of Mechanical Ventilation in Intensive care unit at Benha University Hospital (n=60)

Items	Duration of mechanical ventilation		Actual calories intake	
	r	p	r	p
Albumin (g/dl)	-0.082	>0.05	0.130	>0.05
Blood urea nitrogen (Mg/dl)	0.002	>0.05	-0.099	>0.05
Hemoglobin(Hgb) (g/dl)	-0.188	>0.05	0.056	>0.05
Sodium (MEq/L)	-0.088	>0.05	-0.018	>0.05
Calcium (ca) (MEq/L)	-0.067	>0.05	-0.012	>0.05
Potassium (MEq/L)	-0.066	>0.05	-0.147	>0.05
Pao2 (mmhg)	0.004	>0.05	-0.133	>0.05
Paco2(mmhg)	0.029	>0.05	-0.211	>0.05

Correlation is significant at (P ≤ 0.05)
Correlation is A highly statistical significant at (P ≤ 0.001)

This table shows that there is no statistical significant difference between laboratory values, duration of mechanical ventilation and actual calories intake .

Table (14) Correlation Coefficient Between fluid Balance of Patients and Duration of Mechanical Ventilation in Intensive care unit at Benha University Hospital (n=60)

Items	Duration of mechanical ventilation	
	r	p
Intake	0.098	>0.05
Output	0.055	>0.05
Balance	-0.064	>0.05

Correlation is significant at (P ≤ 0.05)
Correlation is A highly statistical significant at (P ≤ 0.001)

This table shows that there is no statistical significant difference between fluid balance of patients and duration of mechanical ventilation and there is a negative correlation between fluid balance and duration of mechanical ventilation.

Table (15) Correlation coefficient between Anthropometric Measurements of Patients actual Calories Intake and Duration of Mechanical ventilation in Intensive care unit at Benha University Hospital (n=60)

Anthropometric measurements	Duration of mechanical ventilation		Actual calories intake	
	r	p	r	p
Mid arm circumference	0.006	>0.05	0.064	>0.05
Triceps skin folds	0.086	>0.05	0.024	>0.05
Midarm muscle circumference	-0.074	>0.05	0.131	>0.05

Correlation is significant at (P ≤ 0.05)
Correlation is A highly statistical significant at (P ≤ 0.001)

This table shows that there is no statistical significant difference between Anthropometric measurements of patients, actual calories intake and duration of mechanical ventilation, also there is a negative correlation between midarm muscle circumference and duration of mechanical ventilation.

Section (V):

Table (16)Distribution of Dietitians According to Their Opinions Regarding Their Role in Determining Suitable Nutritional plan for Mechanically Ventilated Patients (n= 10)

Items	n= 10							
	Yes		Sometimes		No		X^2	P value
	No	%	No	%	No	%		
A dietitian practice an active role in determining the proper diet for each patient	0	0.0	4	40.0	6	60.0	0.400	> 0.05
The dietitian assesses each pati ent's nutritional needs before he put diet plan	1	10.0	2	20.0	7	70.0	6.200	< 0.05*
Nutritional needs for each patient is calculated by age, weight, height and type of disease.	1	10.0	4	40.0	5	50.0	2.600	> 0.05
For each patient nutritional need are different from the other patient, although involved in the same disease.	8	80.0	1	10.0	1	10.0	9.800	< 0.001**
Meals are consolidated for all patients	8	80.0	1	10.0	1	10.0	9.800	< 0.001**
Dietitian specialist follow-up nutrition plan and its effectiveness.	1	10.0	2	20.0	7	70.0	6.200	< 0.05*
Dietitian specialist care about the patient's laboratory values to determine the effectiveness of the diet plan for the patient.	0	0.0	2	20.0	8	80.0	3.600	> 0.05
Possible for the dietitian specialist to request some special tests to assess the nutritional status of the patient.	5	50.0	1	10.0	4	40.0	2.600	> 0.05
Dietitian takes into account the ventilated patient to develop a plan especially for him.	5	50.0	3	30.0	2	20.0	1.400	> 0.05
The majority of patients have malnutrition while their hospitals stay.	5	50.0	2	20.0	3	30.0	1.400	> 0.05

A statistical significant difference (P ≤ 0.05)
A highly statistical significant difference (P ≤ 0.001)

This table shows that more than half of the subjects(60%) don't practice an active role in determining the proper diet for each patient, and more than two thirds of them(70%) don't assesses each patient's nutritional needs before he put diet plan with statistical significant diffrences,and most of them(80%) agree that the meals are consolidated for all patients with highly statistical significant differences .Also(80%) don't care about the patient's laboratory values to determine the effectiveness of the diet plan for the patient and (70%) don't follow-up nutrition plan and its effectiveness with statistical significant differences.