

Evaluation the Role of Nutrition Support Team for Monitoring the Types, Complication, Nutrients and Drugs Provision in the Parenteral Nutrition

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ABSTRACT

Parenteral nutrition (PN) is a form of administering nutrients, include water, macro and micronutrients and is one of widely used mode of therapy used in patients who are unable to tolerate oral or enteral feeding. Therefore, the success of nutritional therapy depends chiefly on nutrition support teams. The aim of the present work to evaluation the provision of parenteral nutrition in the Benghazi medical center.

A total of 86 patients were involved in the study and numbers of questions were answered from nutrition support team at the hospital. The result revealed that PPN (IV drip) most common used and mixture of dextrose and sodium chloride were highly provision in the hospital. Furthermore, the Doctors at the ward were shown have fully responsibility for provided PN but there were neglected role of dietitian and pharmacist. Patients' monitoring were not carried out routinely. Most drug delivered by PN found NSAIDs and insulin. Dextrose and sodium chlorides commonly used in the hospital for delivery medication. The present study also demonstrated that, PN did not fulfill the patients requirement and there were no patients monitoring. PN found to be used most frequently in some condition were where in real need such as pulmonary disease, GIT disorder and renal disease. Furthermore, TPN provided for the admitted patients include in emergencies, therapeutic and for unconscious patients. There

were reported a number of complications in patient received PN due to lack of monitoring and prolong replacements of PN drainage. PPN (Iv drips) were the most common uses at the hospital and longer duration was proved which might led to patients burden in the hospital. Furthermore, due to the uses of PPN for longer times this could contribute for patients malnutrition. Our data suggested that, comprehensive nutrition support team and provision of intervention programs in order to increased quality and reduced patients burden and also the result of our study needed to be validated in large sample to know the real role of dietitian and pharmacist for ordered of drugs and nutrients and nutrients drug interactions.

Key Words: Nutrients, Provision, TPN, PN, complication, medications.

INTRODUCTION

Parenteral nutrition (PN) therapy is an intravenous administration of nutrients in adequate admixtures consisting of water, dextrose, amino acids, lipid, electrolytes, vitamins and trace elements to patients who are critically ill or unable to feed orally [1]. If the daily nutritional requirements are provided to the patient by PN formulations, the therapy is called Total parenteral nutrition (TPN) [2]. Furthermore, such type of therapy became a lifeline for patients with various clinical conditions such as

premature neonates, critically ill patients and patients with gastrointestinal dysfunction [3]. Parenteral nutrition therapy assumed to be provided by a multidisciplinary team so called the Nutrition Support Team (NST) and this team consists of different specialists include physician, pharmacist, dietician and nurse who coordinate their efforts to optimize patient care [4]. Moreover, the NST team participate in the administrative management of nutrition support services in the hospital including the development documentation, implementation, and periodic review of hospital policies/protocols related to nutrition support therapy and further develop and the maintenance of an appropriate and cost-effective nutrition support formulary [5, 6]. Several studies have demonstrated that the importance of dietician on NSTs and their positive impact on the efficacy and safety of PN therapy [7, 8]. The contribution of the dietician in providing direct patient care has been linked to improve patients' nutritional status and clinical outcomes, to prevent and resolve PN-related complications, and to achieve significant cost savings [9]. In addition, there is primary mission of the pharmacist is to provide pharmaceutical care to the patients which involves the direct responsible provision of medication-related care for achievement definite outcomes that led to improving a patient's quality of life [10]. However, there are several barriers implemented suboptimal care practice for NST which include time constraints, insufficient staff and deficient clinical knowledge and communication skills of personnel [11].

Due to misuse and less monitoring of patients during TP provision may arise numbers of health hazards and complication to the patients, therefore adequate supply and follow up administration of PN needed to be in high priorities in order to reduced patients burden, malnutrition and cost of hospitalized [12]. The role of nutrition support team (NST) are more like limited in

Libya and lack of well cooperation also reported. Patients' nutrient administration by PN were also found poor. Furthermore, patients monitoring need to be further advocated. Therefore, the present work will evaluate the responsibility of nutrition support team and also the purpose for provision of PN and pattern of patients monitoring and most common complication of PN.

METHODOLOGY

Study population

A cross series study carried out from end of May 2019 to end of October 2019 at Benghazi medical center in Benghazi the second largest city in Libya.

Approached of our study are patients attending the Benghazi medical center for different reason and receiving parenteral nutrition. The samples 86 subjects (51 male and 35 female) and the age of patients ranging between 9-80 years were involved in the study were hospitalized. After obtaining written consent, the patients were requested to fill out a questionnaire and also health provider. Although we approached different number of subjects and the final completed questionnaires in hand were 84.

3.2 Questionnaire.

The questionnaire for this study based on 36 items divided into four sections. It contained questions about personal information, patients information, Parenteral nutrition, monitoring of patients, complication and indications of PN, and biochemical investigations. Questions also related to the nurse, dietician, pharmacist, and doctors.

3.3 Biochemical tests.

The laboratory tests were obtained from patients or patient files include patients monitoring for recommended and routinely biochemical tests.

3.4 Ethical statement

This study was approval by the local Ethics Committee of the Benghazi province.

Informed written consent was obtained through a consent form that was given to the participants along with the questionnaire.

3.5 Statistical analysis

The data from the questionnaires was entered using Excel. Data set was exported to SPSS v.22 and Epi-info for complete analysis. Statistical analysis was carried out for the complete sample which were created according to PN: Frequencies for each categorical variable were calculated for each group as well. To determine the differences regarding each categorical variable in the groups, Chi-square test was performed. $p \leq 0.05$ was considered to be statistically significant.

RESULT

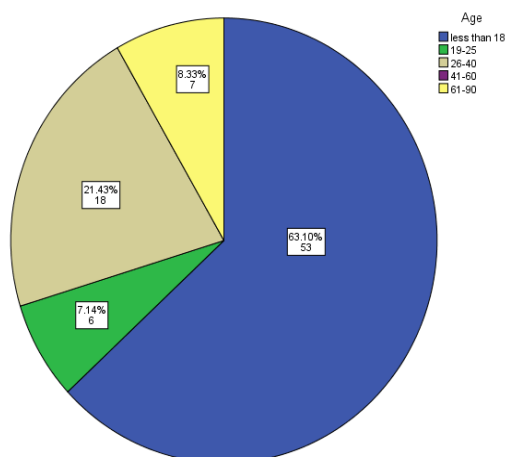


Figure 1: Age distribution:

The data collected on 84 patients received parenteral nutrition shown that, 63.1% of patients admitted were aged less than 18 years old followed by age groups between 26-40 years old 21.43% (Figure 1).

The gender distribution of the samples shown that male more predominant than female 58.33% vs 41.67% (Figure 2).

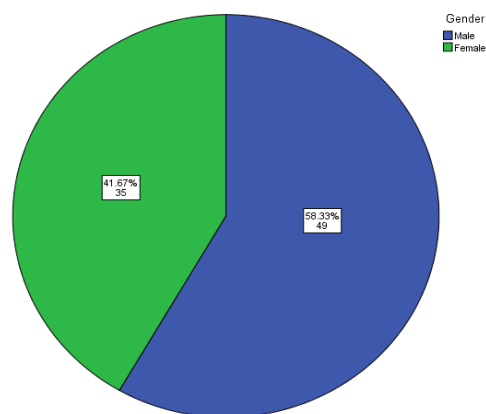


Figure 2: Gender distributions

IV drips (PPN) were most commonly used in Benghazi medical center (70.9%) ($P=0.000$) while TPN alone being less (19.8%). Furthermore, the route of TPN feeding were found centrally used than peripheral 22.1% and 7% respectively ($P=0.02$) (Table 3). Further investigation of TPN nutrition revealed that TPN was administrated with mix of CHO, protein and fat (17.4%) (Table 1).

Table 1: Characteristics of Parenteral feeding:

	N	N %	P values*
Type of parenteral nutrition	IV + TPN	8	9.3%
	IV drip	61	70.9%
	TPN	17	19.8%
	Total	86	100.0%
If TPN What Route of access	No	2	2.3%
	Central	61	90.7%
	Peripheral	19	22.1%
	Total	86	100.0%
Content of TPN:	No	2	2.3%
	(CHO + fat+ Protein)	61	70.9%
	CHO + fat+ Protein+ vitamin +Minerals	15	17.4%
	CHO + fat+ Protein+ vitamin +Minerals	10	11.7%
	Total	86	100.0%

*Chi-square test was performed and considered significant at $\alpha < 0.05$.

No differences have been found whether TPN used based on patients' energy and nutrients requirement or not ($P=0.9$).

Further investigated how the patients got order of TPN nutrition, the result shown Doctors were most participate in ordered

and recommended use TPN for the patients (P=0.01). The IV drips contents shown that the majorities of patients used premix

dextrose and Sodium chloride as feed process (P=0.01) (Table 2).

Table 2: Recommended and contents of parenteral feeding:

	N	N %	P values*
Using TPN based on	No	59	70.9%
	Energy and nutrient required	14	16.3%
	Not dependent on requirements	11	12.8%
	Total	86	100.0%
Recommended of TPN or IV drips by	Pharmacist	6	7%
	Doctor and nurse	20	23.3%
	Doctors	40	46.5%
	Dietitian	10	11.6%
	Nurse	10	11.6%
	Total	86	100.0%
Content of IV drips	Dextrose	20	26.3%
	Dextrose and NaCl	37	43.0%
	Sodium chlorides	9	10.5%
	Ringer's solution	19	22.1%
	Total	86	100.0%

*Chi-square test was performed and considered significant at $\alpha < 0.05$.

Duration of both IV drip and TPN uses by patients shown that, IV drips continue to use for feeding 1-3 days (58.1%) (P=0.001), while TPN feeding supplemented to the patients for period longer than one weeks (16.3) (P=0.04). The

patients received either IV drips or TPN feeding were found related to admission for surgical procedures 31.4% (P=0.01) subsequently by malnutrition (17.5%) (Table 3).

Table 3: Duration of using of parenteral nutrition:

	N	N %	P values*
Duration of feeding by IV drip	One day	26	30.3%
	1-3 days	50	58.1%
	4-7 days	5	5.8%
	More than one week	5	5.8%
	Total	86	100.0%
Duration of TPN feeding	No	61	70.9%
	One day	2	2.3%
	1-3 days	4	4.7%
	4-7 days	4	4.7%
	More than one week	14	16.3%
	Total	86	100.0%
Condition of admission and receiving parenteral feeding	Diabetic	8	9.3%
	HTN	7	8.1%
	Car accidents	9	10.5%
	CVD	3	3.5%
	malnutrition	15	17.5%
	coma	6	7.0%
	Unknown reason	6	7.0%
	surgical	27	31.4%
	others	4	4.7%
	Total	86	100.0%

*Chi-square test was performed and considered significant at $\alpha < 0.05$.

The parenteral nutrition beside its functions it was shown to be used with other purpose in which 82.5% for receiving medication (P=0.000). The most common

types of medication used in parenteral feeding were NSAID and antibiotics 38.4% (P=0.03). For the replacement of parenteral nutrition in order to reduce risk of ill-health,

the result shown that an average 3-5 days accessories replaced 38.4% (P=0.04) (Table 4).
 were the most periods of parenteral 4).

Table 4: Purpose and uses of parenteral feeding:

		N	N %	P values*
Receiving medication in parenteral feeding	Yes	71	82.5%	0.000
	No	15	17.5%	
	Total	86	100.0%	
what types of medication received	No	13	15.5%	0.03
	NSAID and antibiotics	33	38.4%	
	NSAID	9	10.5%	
	Medication for GIT	4	7.7%	
	Antiplatelet	1	1.2%	
	Anticoagulant	2	2.3%	
	Insulin	11	12.8%	
	Antihypertensive	7	8.2%	
	Antibiotics	6	7.0%	
	Total	86	100.0%	
In case using parenteral nutrition longer than 1 day How often replaced:	No information	17	19.7%	0.04
	daily	18	20.9%	
	Every 2 days	17	19.8%	
	3-5 days	33	38.4%	
	Total	86	100.0%	

*Chi-square test was performed and considered significant at $\alpha < 0.05$.

Infections and Hypernatremia were most common complication of parenteral feeding 14% and 15.2% respectively, while similarities found with other complications include painful, hypoglycemia 9.3% and

8.2% respectively. No monitoring of parenteral feeding have been reported 72% (P=0.000). But the monitoring presented least for CBCs LFT and serum electrolytes (8.2% Vs 7%) (Table 5).

Table 5: Complication and monitoring parenteral nutrition:

		N	N %	P values*
Complication of parenteral feeding	None	25	29%	
	infection	12	14%	
	Refeeding syndrome	5	5.8%	
	painful	8	9.3%	
	hyperglycemia	4	4.7%	
	Hypoglycemia	7	8.2%	
	Azotemia	5	5.8%	
	hypophosphatemia	4	4.7%	
	cholestasis	3	3.5%	
	Hypernatremia	13	15.2%	
	Total	86	100.0%	
Monitoring Hospitalized Patients on parenteral feeding	Yes	24	28%	0.000
	No	62	72%	
	Total	86	100.0%	
If Yes: What type of test be done	No	62	72%	
	LFT	6	7%	
	Blood sugar	2	2.3%	
	Serum electrolytes	6	7%	
	CBC	7	8.2%	
	CRP	3	3.5%	
	Total	86	100.0%	

*Chi-square test was performed and considered significant at $\alpha < 0.05$.

Most patients admitted to the hospital for receiving parenteral feeding were those complain of pulmonary disease (23.3%), GIT disorder (20.9%) and renal disease (15.15%). The indication of TPN for

the admitted patients shown Emergencies, therapeutic and Patients unconscious uses were the main goal for use TPN 32.6%, 27.9% and 23.3% respectively (Table 6).

Table 6: Indication and complications of parenteral nutrition:

		N	N %
Patient s Complain Of	No	19	22.1%
	CVD	2	2.3%
	DM	7	8.1%
	HTN	5	5.8%
	Renal disease	13	15.1%
	GIT disorders	18	20.9%
	CNS disease	2	2.4%
	Pulmonary disease	20	23.3%
	Total	86	100.0%
Indication of TPN or drips for	Receiving medications	4	4.7%
	Therapeutic uses	24	27.9%
	Receiving medications	6	7.0%
	GIT not functioning .	4	4.7%
	Patients unconscious	20	23.3%
	Emergencies	28	32.6%
	Total	86	100.0%

DISCUSSION

In the present work, parenteral nutrition administration shown that IV drips were most commonly used in Benghazi medical center (70.9%) (P=0.000) while TPN alone being less (19.8) %. Furthermore, the route of TPN feeding were found centrally used than peripheral 22.1% and 7% respectively (P=0.02). Further investigation of TPN nutrition revealed that TPN was administrated with mix of CHO, protein and fat (17.4%). The parenteral nutrition should be met the patients requirement with energy and macronutrients. The finding of this study disagrees with the fact that parenteral nutrition should fulfill all criteria for patients [13, 14] because only few patients receiving energy and macronutrients as a source of nourishments. However, no differences have been found whether TPN used based on patients energy and nutrients requirement or not (P=0.9). And this could explain why the patients not get fully daily requirements.

Parenteral nutrition administration shown that the doctors were most participate in ordered and recommended use PN for the patients (P=0.01). This result was also inconsistent with numbers of studies [15, 16] by which limited roles of dietitian and pharmacist in ordered and monitoring the patients.

For Peripheral parenteral nutrition, the IV drips contents shown that the

majorities of patients used premix dextrose and Sodium chloride as feed process (P=0.01) this result were considered unpredicted in case uses the IV drips more than one day [17] because if continuation uses of PPN which will result in malnutrition [18].

Duration of both (PPN) IV drip and PPN for the patients, IV drips continue to use for feeding 1-3 days (58.1%) (P=0.001). As mentioned earlier uses of IV drips longer than 24 hours will not recommended due to resultant of longer hospitalization cost and malnutrition [19].

TPN feeding supplemented to the patients for period longer than one weeks (P=0.04). Continuation of uses of TPN longer than one weeks were found reported from health team staff at BMC related to patients condition (surgical and malnutrition).

The purpose of uses parenteral nutrition at the hospital were the majorities related to receiving medication (P=0.000). This one of the most common purposes of uses parenteral nutrition were also found by numbers of researchers [20]. Furthermore, the current study revealed that most common types of medication used in parenteral feeding were NSAID and antibiotics 38.4% (P=0.03).

For the replacement of parenteral nutrition sites in order to reduce risk of ill-health, the result of present study shown that an average 3-5 days were the most periods of parenteral accessories replaced 38.4%(P=0.04). This period for replaced the drainage of parenteral feeding proved in this study lead to more patients get complications. Because the replacement of drainage should be after monitoring the patients which will not be more than 24 hours for PPN and with an averages 3 days for TPN [21, 22].

Infections and Hypernatremia were most common complication of parenteral feeding and these were the most common complication of parenteral nutrition and also due to the finding previously discussed in this study in which uses of TPN longer than

3 days. The questions related to the complication of uses TPN demonstrated that painful ad hypoglycemia resented the common complication and this also found somewhere else [23, 24]. No monitoring of parenteral feeding has been reported by 72% (P=0.000) of the patients and this due to neglected the roles of other health team such as pharmacist and dietitians. As mentioned earlier the one reported in this study and responsible for patients monitoring was a doctor. But this finding was disagreed with national and international guide line for responsibilities of TPN administration and monitoring [25]. Least mentoring being have been found in patients uses TPN which presented for CBCs, LFT and serum electrolytes. According to PN guideline the monitoring strongly advocated dependently and routinely for all vital signs and blood parameters [26]. Least monitoring of patients this is in part due to lack of other health team roles such as pharmacist and dietitian as well as nurse.

In the present work, most patients admitted to the hospital for receiving parenteral feeding where they complain of pulmonary disease (23.3%), GIT disorder (20.9%) and renal disease (15.15%). Furthermore, the indication of TPN for the admitted patients shown for emergencies, therapeutic and Patient's unconscious. The finding of this work to some extents right way for the aforementioned conditions and this also the condition were PN recommended (27, 28).

In sum, many negative sides point of view were found in this study include longer uses of PPN, least met the PN patients requirement, more complication related less monitoring and replaced of PN drainage. These results were need further validated and involved more health teams in studies and our data need to know the real role of dietitian and pharmacist for ordered of drugs and nutrients and nutrients drug interactions.

CONCLUSION

The present study demonstrated that, PN did not fulfill the patients' requirement

and there were no patients monitoring performing and the role of both dietitian and pharmacist were neglected for ordered and patients monitoring. PN found to be used most frequently in some conditions were in real need such as pulmonary disease, GIT disorder and renal disease. Furthermore, the indication of TPN for the admitted patients shown for emergencies, therapeutic and patients unconscious. Complications were found highly in patient received PN due to lack of monitoring and prolong replacements of PN drainage. PPN (IV drips) were the most common uses at the hospital and longer duration was proved which might led to patients burden in the hospital. Furthermore, due to the uses of PPN for longer times this could contribute for patients' malnutrition. Our data suggested that, investigate the real role of dietitian and pharmacist for provision of drugs and nutrients and nutrients drug interactions. Its highly recommended that all patients admitted to the hospital should be monitoring for all needs and the roles of pharmacist and dietitian should be advocated as nutrition support team rather than neglected.

Acknowledgement

We are grateful to all subjects involved in the study.

Conflict of Interest

No conflict of interest.

Ethical Approval

This study involved human being and was approval by the local Ethics Committee of the Benghazi province. Informed written consent was obtained through a consent form that was given to the participants along with the questionnaire.

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