

Awareness of Healthcare Workers to Total Parenteral Feeding in Neonatal Units

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Background: The partnership between hospital policy and staff procedures needs to be coordinated. In the case of neonatal care, failures of this partnership can result into complications.

Objective: To evaluate staff awareness, hospital policy and current procedures relating to total parenteral nutrition (TPN) in Neonatal Intensive Care Units in Bahrain.

Design: A Self-Administered Questionnaire.

Setting: NICU, King Hamad University Hospital (KHUH) and Salmaniya Medical Center (SMC), Bahrain.

Method: The study population consisted of nurses and neonatal doctors in NICUs in King Hamad University Hospital and Salmaniya Medical Center. Participation in the study implied consent; the survey was anonymous. The self-administered questionnaire was distributed in August 2013 and consisted of 10 multiple-choice and open-ended questions.

Result: Sixty-two (80%) were aware of the risks of administering TPN. Different policies and guidelines were followed depending on the institution. Fifty-four (69%) respondents thought that TPN preparation should be carried out under sterile conditions; 63 (80%) preferably by a pharmacist rather than in the ward by doctors or nurses. Low staff satisfaction was found in 19 (67%) because the pharmacy did not prepare the TPN.

Conclusion: Although staff may have high knowledge and awareness to reduce TPN risks, there is a clear need for hospital policy to consider the needs of the end user to reduce the neonatal infections.

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Total Parenteral Nutrition (TPN) is a technique used to administer essential nutrients to the body intravenously when oral or enteral feeding is not possible, typically because of gastrointestinal failure¹. Therefore, it is useful in patients with severe malnutrition, severe burns, bowel diseases disorders and acute renal failure. Sick or premature neonates may have TPN administered when they are not able to absorb nutrients through the gastrointestinal tract for a long time. TPN has been shown to promote postnatal growth and improve neuro-developmental outcomes².

Although TPN nutrition may be lifesaving, it also carries serious risks within neonatal units. Neonates are particularly susceptible to infection because their immune system is not fully developed or due to invasive diagnostic and therapeutic procedures. An important source of infection occurs during TPN preparation, including the addition of any admixtures such as the trace elements (Zinc, Copper, Manganese, Chromium, Selenium, and Molybdenum). Tresoldi et al described key stages where TPN-related contamination may result: failures in sterilization, storage and aseptic technique³. These failures are typically controlled by good hospital management, good nursing practices and good healthcare policies.

Hospitals should follow TPN preparation guidelines, such as the Society of Parenteral and Enteral Nutrition and incorporate them into their own local hospital policy. Interpretations may occur to suit the local environment while aspiring towards best practice. Variation between hospital policies does not always match the staff procedure at a ward level and may directly increase TPN related risks⁴.

The aim of this study is to examine staff awareness, hospital policy and current procedures related to Total Parenteral Nutrition (TPN) in Neonatal Intensive Care Units in Bahrain.

METHOD

The study population consisted of nurses and neonatal doctors practicing in NICUs of King Hamad University Hospital and Salmaniya Medical Center in Bahrain. Participation in the study implied consent and the survey were anonymous. The self-administered questionnaire was distributed in August 2013 and consisted of 10 multiple-choice and open-ended questions. It included data on personal characteristics, current hospital TPN policies and procedures, and HCWs perceived knowledge towards TPN associated risks. Both open-ended questions intended to gather qualitative data and 4-point Likert scale (strongly agree, agree, disagree, or not sure) was used to answer these questions. Data were analyzed using Microsoft Excel.

RESULT

A total of 78 questionnaires were completed between two neonatal units. Participants were predominantly young females, 75 (95%); 55 (70%) were nurses dealing with TPN for less than or equal to 5 years, see table 1.

Table 1: Personal Characteristics

Participants	Hospital A	30 (38%)
	Hospital B	48 (62%)

	Total	78 (100%)
Type Of Healthcare Worker	Nurse NICU	55 (70%)
	Doctor NICU	21 (27%)
	Other	2 (3%)
	Total	78 (100%)
Gender	Female	75 (96%)
	Male	3 (4%)
	Total	78 (100%)
Age	≤25	8 (10%)
	26-40	63 (81%)
	41-55	7 (9%)
	≥56	0 (0%)
	Total	78 (100%)
Work with TPN	≤5 years	51 (65%)
	≥5 years	27 (35%)
	Total	78 (100%)

In each of the two institutions surveyed, there was a difference in both policy and procedure regarding TPN handling and preparation, see table 2.

Table 2: Current Hospital TPN Policy and Hospital TPN Practices

Hospital	Adopted regulation	Practice reported
KHUH	ASPEN Guidelines	Ward: TPN preparation on the ward-TPN and admixtures prepared in the ward by nursing staff
SMC	ESPEN NHS Guidelines	Pharmacy: TPN and admixtures prepared by a pharmacist under sterile conditions

Each hospital has in-house policies using healthcare advice from the Society of Parenteral and Enteral Nutrition in either America (ASPEN) or Europe (ESPEN). Both guidelines list aseptic sterility as a fundamental for TPN preparation and administration.

KHUH, NICU followed the American ASPEN guidelines. Healthcare workers reported that TPN prepared in the ward by nursing staff. SMC, NICU adopted the UK-The Royal Cornwall Hospital National Health Service European ESPEN based regulations. TPN is prepared under sterile conditions by a qualified pharmacist, then transferred to the ward to be administered by a nurse.

Table 3 reveals the opinion of staff regarding TPN preparation. Over two-thirds of those surveyed prepare and administer TPN in the hospital. Almost all believed that TPN should not be prepared by a nurse or doctor in the ward but by a qualified pharmacist under sterile laboratory conditions.

Table 3: Staff Opinions and Attitudes towards TPN

Aware of all guidelines and TPN hospital policy	KHUH	30 (100%)	
	SMC	40 (83%)	
Believe wards are not suitable for TPN preparation	KHUH	19 (63%)	
	SMC	35 (73%)	
Who should prepare TPN?	KHUH	Nurse	4 (13%)
		Pharmacist	21 (70%)
		Others	3 (10%)
		Missing data	2 (7%)
	SMC	Pharmacist	42 (87.5%)
		Dietitian	2 (4%)
		Nurse	1 (2%)
		Doctor	1 (2%)
		Missing data	2 (4.5%)

Table 4 reveals staff attitudes to TPN-related hazards and precautions. Fifty-eight (75%) participants agreed that hand washing, aseptic technique, gowns, gloves, mask, short fingernails, hair cap, goggles and mask with eye shields are important while dealing with TPN. To reduce TPN-related infections, NICU participants suggested improving the sterile conditions and staff to patient ratios in the wards. Staff also identified the necessity for continual training and highlighted that most staff were only recently involved with TPN preparation or administration.

Table 4: Staff Knowledge on Preventing TPN Infections

Causes of Infection	Agreed Respondents	Importance for Preventing Infection	Agreed Respondents
Length of stay	70 (89.8%)	Mask with eye shields	48 (61.5%)
Lines/catheters	75 (96.1%)	Goggles	51 (65.4%)
Severity of illness	75 (96.1%)	Hair cap	66 (84.6%)
Patients age	61 (78.2%)	Mask	71 (91%)
Number of patients in a room	59 (75.6%)	Short fingernails	74 (94.9%)
Lack of staff knowledge	60 (76.9%)	Gowns	74 (94.9%)
Patients age	61 (78.2%)	Gloves	74 (94.9%)
Visitors adherence to hand washing	61 (78.2%)	Hand washing	75 (96.1%)
Lack of infection control policies	68 (87.1%)	Aseptic technique	75 (96.1%)
Length of stay	70 (89.8%)	How to Prevent TPN Infections	Agreed Respondents
Lack of Personal protective equipment	70 (89.8%)	Reduce staff to patient ratio	68 (87.1%)
Staff adherence to handwashing	73 (93.6%)	Regular training courses	69 (88.5%)
Lines/catheters	75 (96.1%)	Improve the sterile conditions	69 (88.5%)
Severity of illness	75 (96.1%)		

DISCUSSION

It is vital that hospital policies and procedures reflect each other particularly in the case of neonatal care. This study found that within a predominately young female neonatal staff, there was a high level of awareness towards TPN preparation, administration and infection control. Satisfaction rates of staff towards hospital policy varied between institutions. It was found that although two different procedural regulations were followed, staff opinion of TPN risks and

precautions remained almost the same. Respondents identified similar attitudes and opinions from previous findings in a similar US-based study⁴.

This study revealed that each hospital follows different regulatory guidelines; hence location for TPN preparation within the hospitals varies. In KHUH, TPN was prepared by nursing staff in the ward, under aseptic technique during compounding and transferring as stated in the ASPEN guidelines⁵. SMC, however, prepared TPN by a registered pharmacist under sterile conditions following ESPEN guidelines. Although, regardless of the policies and procedures adopted, most of the staff in both hospitals agree that wards are not suitable for TPN preparation and should be done under sterile conditions by a pharmacist. Staff attitudes appeared to be driven by the need for optimal safety procedures. It has been reported that TPN mixtures made by nurses were more likely to be contaminated than commercial preparations⁶.

CONCLUSION

Variations in the policies and procedures existed; however, staff opinions remained united. Staff believed in the importance of using protective measures, and sterile technique. The majority of nurses believed that TPN should be prepared by a qualified pharmacist and not by a registered nurse. If hospital policy and staff opinion are similar, high satisfaction levels will be recorded.

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