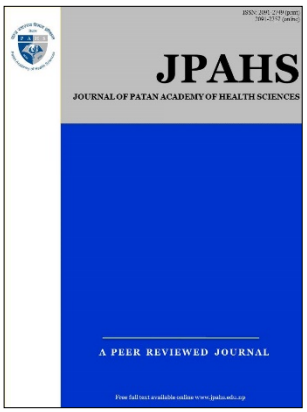

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Hospital supply of a polymeric enteral nutrition formula amongst inpatients at Patan Hospital, Nepal

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Abstract

Introduction: A retrospective quantitative descriptive study was undertaken to describe the provision of a standard polymeric nutritional supplement produced at Patan Hospital, Nepal, with the aim of assisting efforts to improve the nutritional care of malnourished patients.

Method: All adult inpatients (18 years and above) who commenced this nutritional supplement between December 2017 and August 2019 were included. Data was collected from a register and descriptive analysis done. The use across specialty areas, patient weights, duration of use, main feeding route, main volume recommended and main reasons for cessation were among the characteristics described.

Result: Total 894 records of the patients were analysed. Awareness-raising activities and launch of a modified supplement recipe, saw prescriptions increase from 13.3 to 47.4 patients per month. The general medical ward and medical intensive care unit initiated the greatest numbers of prescriptions (312 and 251 respectively). The nutritional supplement was most commonly prescribed as a 500 ml oral supplement. The average length of prescription was 9.8 d and the main reasons for ceasing were discharge (479) and patient expiry (158). Weight was recorded in 38% (340) and mean weight was 50.5 kg. The average age of the study population was 57.8 y.

Conclusion: For improving the nutritional care of malnourished patients, awareness raising activities appeared helpful in increasing prescriptions for the nutritional supplement. However, the use of the nutritional supplement remained low and practices varied significantly between wards.

Keywords: Enteral nutrition, malnutrition, Nepal, nutritional supplement

Introduction

Describing the provision of nutritional supplements is valuable for facilitating continuous improvements in managing inpatient malnutrition. Malnutrition is a widespread public health issue with associated clinical and economic ramifications.[1-6] Hospital inpatients are at significant risk; however, malnutrition is largely unrecognized and undertreated.[1]

The prevalence of malnutrition risk among inpatients ranges from 13-78%.[1] A study in Asia revealed a rate of malnutrition of 33.3% in a major tertiary care hospital.[7] A study at Patan Hospital study in 2001 showed that 53% of adult patients admitted to the hospital during the study period were malnourished.[8] Optimal delivery of nutrition support reduces mortality, while the length of stay increases significantly with the severity of malnutrition and malnourished patients experience more infections and need more prescriptions.[1,4,5]

Since 2001 a polymeric enteral formula, "Paustik Sanjiwani" has been produced and used at Patan Hospital for the treatment and prevention of malnutrition. The objective of this study is to describe the provision of Paustik Sanjiwani to adult inpatients over 21 months to review current practices and inform change. The study describes demographic features of patients, mean body weight, duration of use, main feeding route, volume recommended, the reason for cessation, and the distribution of use across specialty areas.

Method

Data were collected on adult inpatients (≥18 y) who were prescribed Paustik Sanjiwani orally or via enteral tube feeding for any period of their admission during the study period at Patan Hospital. Patients below 18 years of age were excluded as this nutrition supplement is generally not prescribed for these patients due to its high protein content.

Data were collected retrospectively for the 21 months from December 2017 to August 2019. This is a records-based study where data was taken from a register maintained by the Nutrition and Health Education Section (under the Administration Department). For patients who received Paustik Sanjiwani, the register provides information regarding patient age, ward, weight, start date, feeding route, prescribed volume, comments (including the reason for cessation), and end date.

Ethical approval was obtained through PAHS Institutional Review Committee (IRC). No direct contact with patients was required for the study and all patient identifiers were removed from the raw data.

Research data was gathered manually from the register and entered into Microsoft Excel worksheets. Data were descriptively analyzed using Microsoft Excel to determine frequencies, mean, median, mode, and range of the parameter categories. The number of prescriptions was divided by the number of beds available for a ratio of prescriptions per bed for each ward.

Result

In the 21 months, December 2017 to August 2019, a total of 894 patients, aged 18 and above received Paustik Sanjiwani during their admission at Patan Hospital.

A marked increase in the number of patients commencing Paustik Sanjiwani can be seen from March 2018 onwards, Figure 1. This coincides with the launch of a modified recipe and awareness-raising activities. In the three months before March 2018, the average number of patients commencing Paustik Sanjiwani was 13.3 per month, compared to 47.4 per month after March 2018.

The majority of prescriptions were initiated in the General Medical ward and Medical ICU, Figure 2. Combined, these two wards generated 563(63%) prescriptions. Some wards in the hospital are not inpatient wards

(such as emergency, admission, and renal wards) and therefore do not prescribe Paustik Sanjiwani.

There was a total of 332 beds in the wards that prescribed Paustik Sanjiwani. MICU initiated the largest number of prescriptions per bed by far, Figure 3. It shows that different wards and specialties prescribe Paustik Sanjiwani at different rates. Paustik Sanjiwani was given as an oral supplement to 601(67%) of the study population. A total of 185(21%) patients had Paustik Sanjiwani via enteral tube feeding and 108(12%) were prescribed Paustik Sanjiwani both orally and via enteral tube feeding during their admission (though not at the same time).

Of the 894 patients, 637(71.3%) were prescribed a maximum of 500ml. Most of these 500ml prescriptions were taken orally. Prescriptions reaching 1000ml (n=230) and 1500ml (n=27) were more common among patients fed via enteral tube feeding, Figure 4.

There were 185(21%) who received enteral tube feeding which was their only means of nutrition. Among these patients, 43(23%) were prescribed a maximum daily volume of 500ml.

Even though the majority of prescriptions appear to be mostly nine days or below, a few prescriptions longer in duration skew the average to 9.8 days, Figure 5. This average excludes 21 patients for whom the duration of the prescription could not be determined. The median duration of prescription was six days and the mode was four. The duration of prescriptions ranged from 1 to 149 days.

There were 479(53.6%) patients who ceased Paustik Sanjiwani on discharge from the hospital. Discharged patients included those who were transferred to another facility 22(4.6%) and those who left against medical advice 32(6.7%). There were 128(14.3%) patients who ceased Paustik Sanjiwani for 'other' reasons that were recorded in the register. The other reasons included: Refusal 73(57.0%), gastrointestinal symptoms such as diarrhea, nausea, vomiting 42(32.8%), and disliked 5(3.9%). Diarrhea was noted in the register for 30(3.4%) patients. The number of patients ceasing Paustik Sanjiwani due to expiration was 158(18%), and the number of patients without a recorded reason for ceasing was 129(14.4%).

Weight at the commencement of Paustik Sanjiwani was recorded in 340(38%) patients. The mean weight was 50.5Kg. Follow-up weights were recorded in 38 of these patients. Therefore, weight comparisons could be done in 4.2% of cases. Mid Upper Arm Circumference (MUAC) was measured for 56(6.3%) patients. For 25 of these patients, MUAC was recorded in addition to weight. Follow-up MUAC was not done on any patient.

Age began to be routinely recorded in the register from the end of August 2018. The number of patients for whom age was recorded was 533. The age group with the largest number of patients was 56-65 y. The average age of patients receiving Paustik Sanjiwani was 57.8 y. The age range of the study population was 18-99 y.

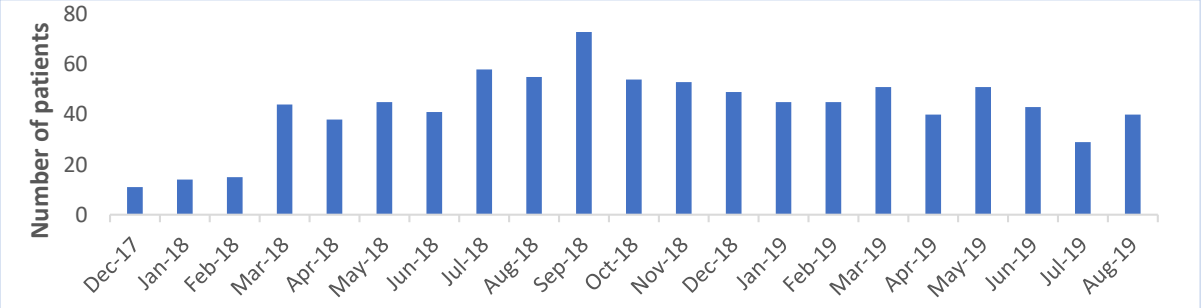

Figure 1. Number of admitted patients commencing Paustik Sanjiwani (enteral supplement produced by the dietary department of the hospital) by month, N=894

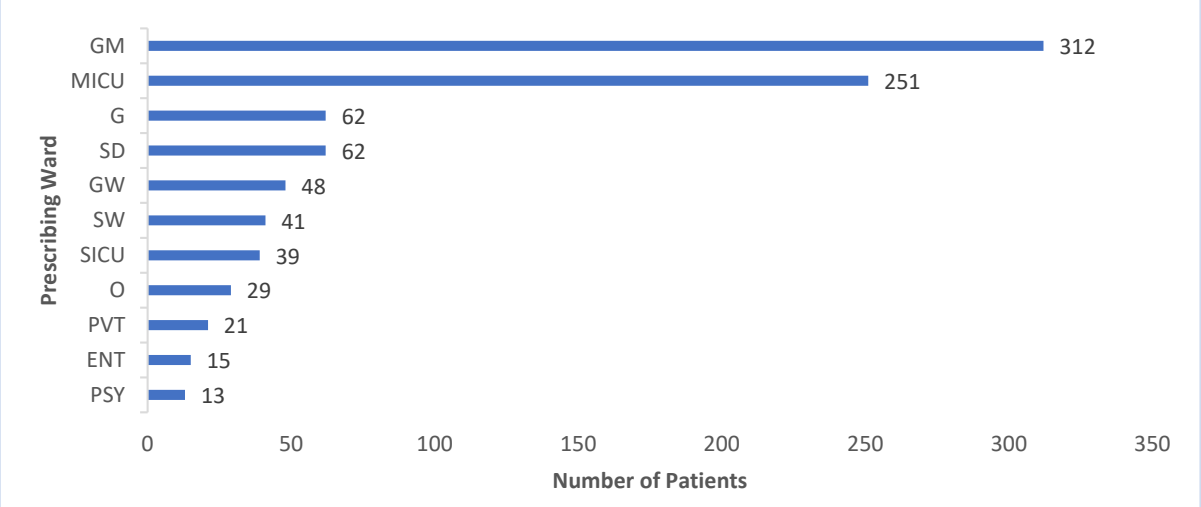

Figure 2. Paustik Sanjiwani prescribed for admitted patients in different wards during 21 months period, N=894

GM = General Medical, MICU = Medical Intensive Care Unit, G = Geriatric, SD = Step Down, GW = Gynecology Ward, SW = Surgical Ward, SICU = Surgical Intensive Care Unit, O = Orthopedics, PVT = Private Ward, ENT = Ear Nose Throat Ward, PSY = Psychiatric

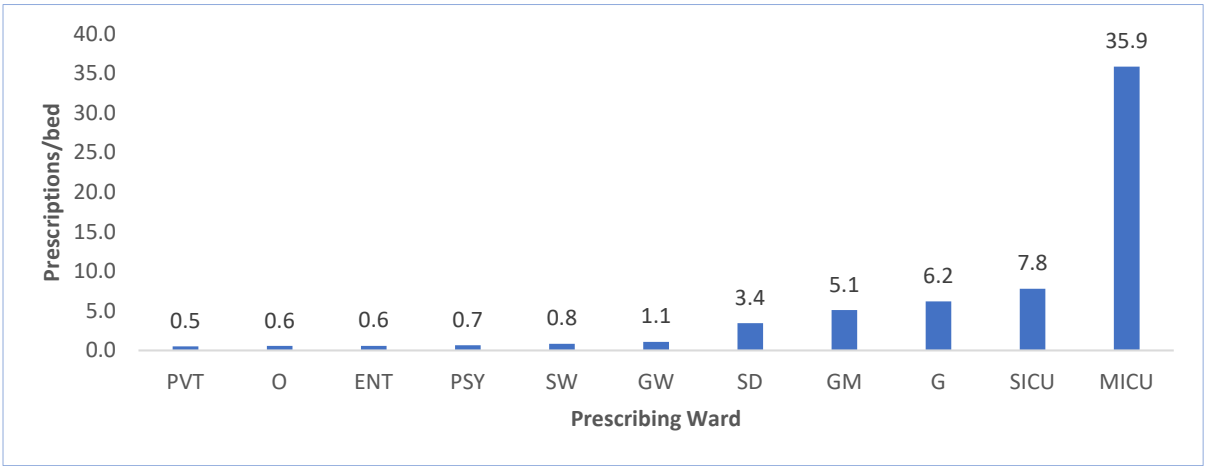

Figure 3. Prescriptions for Paustik Sanjiwani per bed for each ward

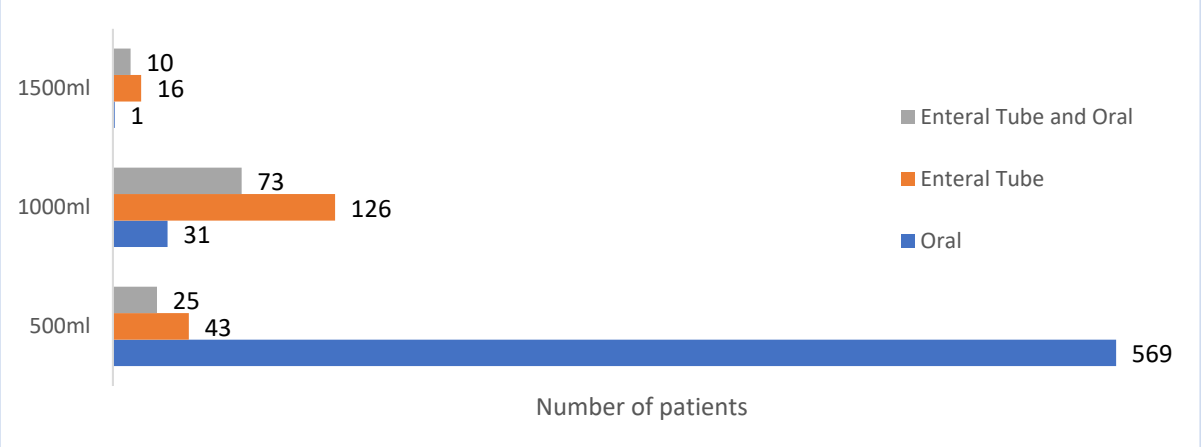

Figure 4. Maximum feeding volumes and routes of Paustik Sanjiwani for individual patients

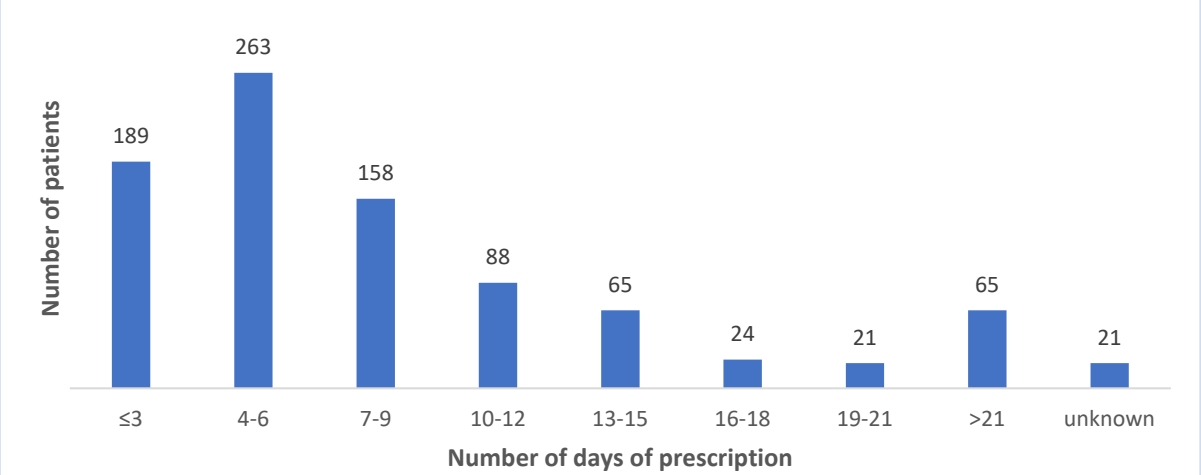

Figure 5. Duration of Paustik Sanjiwani prescription for admitted patients

Discussion

Improvement in the nutritional care of malnourished patients was achieved when clinical staff was supported through education sessions and protocols, facilitating more patients to receive the supplement Paustik Sanjiwani. However, the frequency and volume of Paustik Sanjiwani prescriptions appeared to remain lower than ideal and inconsistent prescribing rates occurred across wards. Monitoring of nutritional status and Sanjiwani tolerance was also inconsistent. A high proportion of patients ceased Paustik Sanjiwani on discharge, highlighting the importance of education for patients and their carers. An increase in Paustik Sanjiwani prescriptions followed the introduction of a modified recipe and coincided with clinical staff education and the launch of a malnutrition protocol in all adult wards in the study (except intensive care units). Education sessions were separate for doctors and nurses and some sessions were conducted for individual specialties also. Numerous studies highlight the value of ensuring nursing staff receive ongoing education and support regarding the importance of nutrition screening and providing adequate nutrition.[6,9] Use of a malnutrition screening tool increases the likelihood of nutritional interventions.[9] A recent systematic review found that nutrition education is insufficient in medical training, regardless of country, setting, or year of training. Since this impacts doctors' nutritional care of patients and ultimately patient outcomes, there is a need to increase knowledge, skills, and confidence in nutrition care.[10] Changing nutrition care practices in hospitals require raising awareness and providing education, but in addition to this an interdisciplinary team approach motivated by patient benefit is required to embed changes in the system.[11]

The medical wards (general medical and medical ICU) generated the highest number of prescriptions. Some prescriptions initiated in GM and MICU continued when patients were transferred to the Geriatric and Step-Down wards. Relative to bed capacity the hospital wards in the study had a great deal of variation in the proportion of patients who were prescribed Paustik Sanjiwani. A study on nutritional care practices in acute care hospital wards across Australia and New Zealand confirmed that hospital wards are either largely non-compliant with or vary greatly with evidence-based recommendations related to nutrition screening and intervention.[9]In this study at Patan Hospital, the variation in the use of Paustik Sanjiwani as a nutrition intervention, perhaps suggests the need for collaboration in efforts to resolve barriers to optimal nutritional care and the development of a consistent approach across hospital wards. Each ward has a responsibility to address the poor level of nutrition among patients using

the resources they have available. Clinical staff needs to be equipped and encouraged to evaluate the risk or presence of malnutrition, and treat and monitor their nutritional status. Part of this is also an increased awareness of the clinical and economic consequences of malnutrition.

Paustik Sanjiwani was most commonly prescribed as a 500ml oral supplement. Wherever possible oral intake is preferred as a means of nutrition intervention; enteral tube feeding is only indicated when a patient's nutritional needs cannot be met by oral intake alone, they are malnourished or at risk of malnutrition and have an accessible and functioning gut.[6]

Paustik Sanjiwani is a calorie-dense polymeric formula produced on-site at Patan Hospital. In low socioeconomic populations commercially prepared nutritional products are cost-prohibitive and other enteral feeding options are limited and often nutritionally inadequate. Blenderized feeds using a milk powder base and/or regular foods have been reported to be used for home and hospital enteral nutrition in India, Nepal, Pakistan, and Brazil.[12-15] These feeds vary greatly in production method, ingredients, and nutritional quality. As a standard polymeric formula, Paustik Sanjiwani has intact protein, carbohydrate, and fat molecules and a balance of macronutrients.[16] It provides 150Kcal and 6g protein per 100ml and is nutritionally complete in 1000ml (except for iron).

Of those who were weighed in the study, the average weight was 50.5kg. Based on this average it can be estimated that the 500ml oral supplement would provide 42-49% estimated energy requirements (30-35kcal/kg) and 59% estimated protein requirements (1g/kg). This is a significant contribution to nutritional needs as an oral supplement. However, 23% of enterally fed patients received a maximum of only 500ml, which is inadequate as a sole source of nutrition. Where possible, enterally fed patients need greater amounts than 500ml of Paustik Sanjiwani or to have oral food and supplementation in combination with enteral feeding to achieve nutritional requirements.[6]

On a randomly selected day during the study period, a census report of Patan Hospital's occupancy on the wards prescribing Paustik Sanjiwani (PS), showed that 244 of the beds were occupied. In the 637 days of the study period, 894 patients commenced PS, an average of 1.4 patients per day. With an average length of prescription being 9.8 d, the average number of patients receiving PS each day was 13.72. Out of 244 beds, we can estimate that 5.6% of patients received PS.

Considering that Paustik Sanjiwani is the main nutrition therapy for malnourished adult patients at Patan Hospital, rates of prescription appear to be lower than expected. A study at Patan Hospital in 2001 showed that 53% of adult patients admitted to the hospital during the study period were malnourished.[8] Standing among the world's poorest countries, acute food shortages and high rates of undernutrition have been long-standing public health issues in Nepal.[17-19] Surveys have found that 17% of Nepali men and women aged 15-49 are underweight (BMI<18.5kg/m^2).[19,20] If the rate of underweight residents is 17% in the community, it is reasonable to expect a hospital population to have a much higher proportion of malnutrition. Additionally, numerous studies in Asia and globally, demonstrate that malnutrition typically affects 20-50% of hospital patients.[2,4-7] Optimal delivery of nutrition support reduces mortality and morbidity, but an international study observed a gap between recommendations and actual practice.[1,21,22]

The average length of prescription for Paustik Sanjiwani was 9.8 d. Together with the median number of days being six, this reflects guidelines recommending nutrition support for patients at risk of malnutrition who have eaten little or nothing for more than five days and/or are likely to eat little or nothing for the next five days or longer.[6] The mode of four days of prescription is less than the guidelines recommend, however, there are many unforeseeable circumstances where the

duration of prescriptions can be less than expected (expiry or self-discharge, for example).

More than half of the patients ceased taking Paustik Sanjiwani at the time of discharge. This highlights the need to educate patients and their caregivers before discharge regarding a high-energy, high-protein diet during recovery. Given the substantial evidence demonstrating positive effects of nutrition interventions on patient outcomes, interventions must continue post discharge.[2]For those who ceased Paustik Sanjiwani due to refusal or gastrointestinal disturbances, modified nutrition support regimes need to be encouraged for patients.

Based on what is recorded in the Paustik Sanjiwani register, monitoring of the patient's nutritional status and feed tolerance is limited. Challenges for nursing staff may include unsuitable or unavailable weighing scales. Patients receiving nutrition support in the hospital should be monitored by clinical staff, referring to protocols for nutrition, anthropometric, clinical, and laboratory monitoring. This ensures the patient is tolerating the feed and that the aspects of the regime continue to be appropriate.[9]

Possible limitations and significance of the study include, being a retrospective study, the information in the register was not collected specifically for research needs, which led to some gaps in information. For example, the register does not specify the information on patient tolerance. However, the register did provide a concise record of many relevant aspects of patients' nutrition support with Paustik Sanjiwani.

Accuracy of delivery and consumption concerning the Paustik Sanjiwani prescription was not part of this study and would be useful aspects of provision to audit. The prescription of Paustik Sanjiwani is one of the main nutrition interventions in the prevention and treatment of malnutrition at Patan Hospital. The study did not investigate malnutrition screening practices or other nutrition care strategies. While beyond the scope of this study they are worthy of exploration. Also, a qualitative element in the study may have further helped identify barriers and enablers to optimal nutrition care practices from clinical staff perspectives. However, the present study can serve as a starting point for evaluating current practices to inform future practices.

This study highlights the value of raising awareness among clinical staff of the prevalence, consequences, prevention, and treatment of malnutrition. Increased awareness and use of a malnutrition protocol by clinical staff, including staff from the wards not currently using Paustik Sanjiwani, supports efforts for improved care of malnourished patients. A more collaborative approach to identification and treatment, along with appropriate monitoring of malnourished patients can contribute to improved patient outcomes and economic benefits. In addition, routine nutrition education for patients and carers before discharge could further assist efforts to improve the nutritional status of patients. Monitoring or auditing kitchen supply and patient consumption of Paustik Sanjiwani would be valuable for evaluating supply and consumption.

Conclusion

Awareness-raising activities at the time of launching the modified Paustik Sanjiwani formula appear helpful in creating a sustained increase in the prescriptions for patients at risk of malnutrition. Following the launch of the modified formula rates of prescription increased to 47.4 patients per month. However, relative to the patient population, the use of this key nutrition therapy seems low, considering the typical rates of malnutrition in acute care hospitals. There were variations in the prescription of Paustik Sanjiwani between the wards, even considering the relative number of beds each ward has.

The length of prescriptions was in accordance with guidelines, but 23% of enterally-fed patients received insufficient volumes. It was found that more than half of the study population ceased Paustik Sanjiwani on discharge. Describing specific aspects of Paustik Sanjiwani's provision has given useful guidance on practices to improve the nutritional care of malnourished patients.

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Conflict of Interest

None

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Author Contribution

Concept, design, planning: BPS, VK; Literature review: BPS, VK; Data collection: VK; Data analysis: BPS, VK; Draft manuscript: BPS, VK; Revision of draft: BPS, VK; Final manuscript: BPS, VK; Accountability of the work: BPS, VK.

Reference

1. Tignanelli CJ, Bukowiec JC. Hospital based nutrition support: a review of the latest evidence. J Clin Nutr Diet. 2017;3(3):22. | DOI | Google Scholar | Full Text | Weblink |
2. Tapsell L, Hickman I. Evidence based practice guidelines for the nutritional management of malnutrition in adult patients across the continuum of care. J Dieti Aus. 2009;66(s3):S1-S34. | DOI | Google Scholar | Full Text |
3. Keys A, James AT. The Biology of Human Starvation. Am J Public Health.1951 Feb;41(2):236-7. | PubMed | Google Scholar | Full Text |
4. Barker LA, Gout BS, Crowe TC. Hospital Malnutrition: Prevalence, Identification and impact on patients and the healthcare system. Int J Environ Res Public Health. 2011 Feb;8(2):514-27. | DOI | PubMed | Google Scholar | Full Text |
5. Edington J, Boorman J, Durrant ER, Perkins A, Giffin CV, James R, et al. Prevalence of malnutrition on admission to four hospitals in England. J Clin Nutr. 2000 Jun;19(3):191-5. | DOI | PubMed | Google Scholar | Full Text |
6. National Collaborating Centre for Acute Care. Nutrition support for adults: Oral nutrition support, enteral tube feeding and parenteral nutrition. | PubMed | Google Scholar | Full Text |
7. Huong PT, Lam NT, Thu NN, Quyen TC, Lien DT, Ahn NQ, et al. Prevalence of malnutrition in patients admitted to major urban tertiary care hospital in Hanoi, Vietnam. Asia Pac J Clin Nutr. 2014;23(3):437-44.| DOI | PubMed | Google Scholar | Full Text | Weblink |
8. Keylock J. The nutritional status of adult patients in Patan Hospital, Nepal. Glasgow Caledonian University. 2001. Unpublished. | Full Text |
9. Agarwal E, Ferguson M, Banks M, Batterham M, Bauer J, Capra S, Isenring E. Nutrition care practices in hospital wards: Results from the Nutrition Care Day Survey 2010. Clin Nutr. 2012 Dec;31(6):995-1001. | DOI | PubMed | Google Scholar| Full Text |
10. Crowley J, Ball L, Jan Hiddink G. Nutrition in medical education: a systematic review. The Lancet Planetary Health. 2019;3(9):e379-89. | DOI | PubMed | Google Scholar | Full Text |
11. Laur C, Vilaitis R, Bell J, Keller H. Changing Nutrition Care Practices in Hospital: a thematic analysis of hospital staff perspectives. BMC Health Serv Res. 2017 Jul 19;17(1):498. | DOI | PubMed | Google Scholar| Full Text | Weblink |
12. Dahal S. Formulation of Standard and High Protein Ready to Reconstitute Enteral Formula Feeds. Department of Nutrition and Dietetics. Institute of science and technology, Tribhuvan University, Nepal 2018. Dissertation unpublished. | Google Scholar | Full Text |
13. Gopalan S. Enteral and parenteral nutrition in developing countries: challenges. Indian J Paediatr. 2008;75:S152-S54. | Google Scholar|
14. Khan MN, Farooq S, Khalid S, Kausar N, Khalid M. Development of energy dense, cost effective home-made enteral feed for nasogastric feeding. IOSR Journal of Nursing and Health Science.2015 May- June;4(3):34-41. | Google Scholar| Full Text |
15. Jansen AK, Generoso SDV, Guedes EG, Rodrigues AM, LAVDO Miranda, Henriques GS.

Development of enteral home made diets for elderly persons receiving home care and analysis of macro and micronutrient composition. Rev Bras Geriatr Gerontol, Rio de Janeiro. 2017;20(3):387-97. | DOI | Google Scholar| Full Text | Weblink |
16. Malone A. Enteral formula selection: A review of selected product categories. Practical Gastroenterology. 2005 Jun;29(6):44-74. | Google Scholar | Full Text |
17. Human Development Indices and Indicators. 2018 Statistical Update. UNDP. | Full Text |
18. USAID. Nepal: Nutrition Profile. 2014 July. | Full Text |
19. Acharya AK, Paudel MP, Wasti PC, Sharma RD, Dhital S. Status Report on Food and Nutrition Security in Nepal. Ministry of Agriculture, Land Management and Cooperatives, Kathmandu, Nepal. 2018. | Google Scholar | Full Text |
20. Ministry of Health, Nepal; New ERA; and ICF. Nepal demographic and health survey 2016. Published 2017. | Full Text |
21. Thapa PB, Nargakoti K, Lama T, Marharajan DK, Tuladhar M. Early Enteral Feeding in Intestinal Anastomosis. J Nepal Health Res Counc 2011 April;9(18):1-5 | PubMed | Google Scholar | Full Text |
22. Cahil NE, Dhaliwal R, Day AG, Jiang X, Heyland DK. Nutrition therapy in the critical care setting. What is “best achievable” practice? An international multicentre observational study. Critical Care Medicine 2010 Feb;38(2):395-401.| PubMed | Google Scholar | Full Text |