

# Training in Paediatric Clinical Nutrition Across Europe: A Survey of the National Societies Network (2016–2019) of the European Society for Paediatric Gastroenterology, Hepatology and Nutrition

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## ABSTRACT

**Objectives/Background:** Disease-related malnutrition is common in patients with chronic diseases and has detrimental effects, therefore, skills in nutrition care are essential core competencies for paediatric digestive medicine. The aim of this survey, conducted as part of a global survey of paediatric gastroenterology, hepatology and nutrition (PGHN) training in Europe, was to assess nutrition care-related infrastructure, staff, and patient volumes in European PGHN training centres.

**Methods:** Standardized questionnaires related to clinical nutrition (CN) care were completed by representatives of European PGHN training centres between June 2016 and December 2019.

**Results:** One hundred training centres from 17 European countries, Turkey, and Israel participated in the survey. Dedicated CN clinics exist in 66% of the centres, with fulltime and part-time CN specialists in 66% and 42%, respectively. Home tube feeding (HTF) and home parenteral nutrition (HPN) programmes are in place in 95% and 77% of centres, respectively. Twenty-four percent of centres do not have a dedicated dietitian and 55% do not have a dedicated pharmacist attached to the training centre. Even the largest centres with >5000 outpatients reported that 25% and 50%, respectively do not have a dedicated dietitian or pharmacist. Low patient numbers on HTF and HPN of <5 annually are reported by 13% and 43% of centres, respectively.

**Conclusions:** The survey shows clear differences and deficits in Clinical Nutrition training infrastructure, including staff and patient volumes, in European PGHN training centres, leading to large differences and limitations in training opportunities in Clinical Nutrition.

**Key Words:** children, clinical nutrition training, training in paediatric gastroenterology, hepatology and nutrition

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## What Is Known

- Paediatric gastroenterologists should know how to assess the growth and nutritional status of their patients, and they should know how gastrointestinal diseases affect nutritional status and, conversely, how nutritional status can affect the outcomes of gastrointestinal diseases, and they should be able to apply evidence-based nutritional care.
- Training in Clinical Nutrition is an important part of the curriculum for Paediatric Gastroenterology, Hepatology, and Nutrition.

## What Is New

- The survey shows clear differences and deficiencies in Clinical Nutrition training infrastructure, including staff and patient volumes, across European Paediatric Gastroenterology, Hepatology, and Nutrition training centres, leading to wide disparities and limitations in training opportunities in Clinical Nutrition.

The ability to assess a patient's growth and nutritional status and to understand the interaction between the effects of gastrointestinal (GI) disease on nutrition and of nutritional status on various disease states is an essential component of training in paediatric gastroenterology, hepatology and nutrition (PGHN) (1).

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Paediatric gastroenterologists should be able to assess the growth and nutritional status of their patients, and they should know how diseases of the digestive system affect nutrition and, conversely, how nutritional status can influence disease states (1). Trained and qualified PGHN specialists should understand the mechanisms of malnutrition and be able to diagnose and treat it effectively through multidisciplinary nutrition care teams (NCT). Therefore, training in Clinical Nutrition (CN) is an essential part of the PGHN training curriculum. A recent study, however, found wide variability in the nutrition component of PGHN training, indicating existing gaps in nutrition knowledge among trainees (2). The lack of a well-structured curriculum setting out the learning objectives and clinical framework was a barrier to nutrition training.

Both the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) (3,4), and the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) (5,6) emphasized the importance of the training framework for CN in PGHN fellowships. NASP-GHAN guidelines recommend at least 1 year of advanced training at an academic centre under the supervision of fulltime nutrition faculty and participation in basic or clinical research in nutrition (6).

The framework of a PGHN training centre suggested by the Paediatric Guidance Checklist Gastroenterology and Hepatology (7) of the British PGHN College Specialty Advisory Committee (CSAC), should include a minimum of 1 whole time equivalent (wte) nurse specialist, 1 wte paediatric dietitian, and a minimum of 0.5 wte pharmacist with experience in prescribing parenteral nutrition. With regards to the patients volumes, each trainee should be exposed to at least 10 children with intestinal failure per year (of which 5 are new cases). In light of recent efforts to improve the structure of nutrition training for the trainees in PGHN (1,8–10), our survey aimed to examine the infrastructure, staff, and patient volume at PGHN training centres across Europe to determine whether they meet the above criteria.

## METHODS

Questions related to the availability of specialists with expertise in CN, of dedicated Clinic on Nutrition (Clin), the availability of dietitians or pharmacists were included in the standardised questionnaires (Appendix 1, Supplementary Digital Content, <http://links.lww.com/MPG/C651>) prepared by members (A.P., A.B., and C.R.C.) of the Executive Committee of the ESPGHAN National Societies Group 2015 to 2017. The questionnaire was assessed by the participants of the 2016 National Societies Group meeting for feasibility, readability, consistency of style and formatting, and clarity of language used, and

sent to the presidents/representatives of the ESPGHAN National Societies network who distributed it to the heads of PGHN training centres in their countries and collected the responses. In countries where National Society representatives did not participate in the distribution of the questionnaires (Italy, Portugal, and Switzerland), an ESPGHAN volunteer from that country (A.G. for Italy and R.F. for Switzerland) distributed and collected the questionnaires, or individual centres provided their data after direct communication with the study coordinators (Portugal). The project was approved by the ESPGHAN Council in 2016 and was partially financially supported by ESPGHAN. It was conducted from June 2016 to December 2019. The data and manuscript were subsequently submitted to an invited expert on CN (B.K.) for review and constructive comments.

## Statistical Analysis

Statistical analysis was performed with the use of IBM SPSS software. Descriptive statistics were performed to characterize the study groups. For categorical data, chi-square test was performed for comparisons. All statistical analyses were performed with the statistical package PSAW Statistics 21 (SPSS, Inc., Chicago, IL). Statistical significance at  $P < 0.05$  was assumed.

## RESULTS

A total of 100 training centres (all academic; Appendix 2, Supplementary Digital Content, <http://links.lww.com/MPG/C652>) from 17 European countries, Turkey, and Israel participated in the survey: 30 training centres were from the capitals of the 19 countries and 70 from other cities.

### Availability of Specialists Trained in Clinical Nutrition

Seventy-nine centres responded to the question on the availability of full-time/part-time CN-trained specialists: 27 of 41 (66%) reported the availability of full-time specialists, whereas 16 of 38 (42%) reported the availability of parttime specialists.

### Availability of Dedicated Clinic on Nutrition and Home Tube Feeding and Home Parenteral Nutrition Programmes

Thirty-two (34%) of the 94 training centres that responded to the relevant question indicated that they did not have a dedicated

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TABLE 1. Availability of separate clinics on nutrition, home tube feeding, and home parenteral nutrition programmes, dietitians and pharmacists attached to the training centres in paediatric gastroenterology, hepatology and nutrition across Europe

Number (%) of training centres	Availability of CliN	Availability of HTF programme	Availability of dietitian attached	Availability of HPN programme	Availability of pharmacists attached
Training centres of European capitals, n = 30	18/28 (64%)	27/29 (93%)	22/28 (79%)	23/29 (79%)	16/27 (59%)
Centres of other cities, n = 70	44/66 (67%)	63/66 (95%)	50/67 (75%)	52/68 (76%)	25/65 (38%)
P value	0.959	0.865	0.812	0.947	0.171

CliN = clinics on nutrition and metabolism; HPN = home parenteral nutrition programme; HTF = home tube feeding programme; PGHN = paediatric gastroenterology, hepatology and nutrition.

CliN (Table 1). CliN is more common in larger centres than in smaller ones (Table 2). It should be, however, noted that as many as 20% of centres with >5000 outpatients reported that they do not have a dedicated CliN. Home tube feeding (HTF) programmes were established in 95% and home parenteral nutrition (HPN) programmes in 77% of the training centres (Table 1).

### Availability of Dietitians Attached to the Training Centres

In a large number of centres, dietitians affiliated to the training centre were not available (Table 1). Although 95% of centres reported the availability of an HTF programme, 24% reported that there was no dietitian affiliated with the training centre (Table 1). The size of the training centre (based on outpatient volume) did not seem to play a decisive role (Table 2): 30% of centres with <1500 outpatients reported not having a dedicated dietitian, although 80% of them had established HTF programmes. A similar percentage of 25% of the largest centres with >5000 outpatients reported the absence of a dedicated dietitian, although almost all (95%) had established HTF programmes.

### Availability of Pharmacists Attached to the Training Centres

Although the role of the pharmacist as a member of the multidisciplinary nutrition care team is widely recognised (11), our survey showed that the availability of a pharmacist attached to the training centre was not universal. Fifty-one (55%) of 92 training centres responding to the relevant question indicated that there was no pharmacist attached to the centre, although 75 of 97 (77%) reported running a HPN programme (Table 1). Larger centres were more likely to have a dedicated pharmacist than smaller centres

(Table 2). Although 70% of centres with less than 1500 outpatients per year had HPN programmes, 75% reported that the training centre did not have a dedicated pharmacist. In the largest centres (> 5000 outpatients per year), the problem was slightly less severe: 50% of them reported that the training centre did not have a dedicated pharmacist, although 80% had HPN programmes.

### Annual Numbers of Patients on Home Tube Feeding and Home Parenteral Nutrition

The annual number of patients receiving HTF or HPN varied between European PGHN training centres. Sixty-three of 91 (69%) centres had > 10 patients on HTF per year and 33 of 95 (35%), > 10 patients on HPN per year (Table 3). Fewer than 5 patients on HTF were reported by 13% of training centres (Table 3). An even larger percentage (43%) of training centres had <5 patients on HPN per year (Table 3). We were interested in the annual numbers of HTF and HPN according to outpatient volume (Table 4). Less than 5 patients on HTF per year were not only reported by 67% of small centres (<500 outpatients per year) but also by 11% of large centres (>5000 outpatients per year). An even larger percentage of training centres reported very few (< 5) patients on HPN per year: not only 100% of small centres (<500 outpatients) but also 42% of the largest centres (>5000 outpatients).

## DISCUSSION

Our survey indicated marked differences and deficits in training resources in paediatric clinical nutrition including the availability of CliN and NCTs in PGHN training centres in Europe. More than a third of PGHN training centres did not have a dedicated CliN, about a fifth did not have dedicated dietitians attached to the training centre, whereas more than half of the training centres did not have a dedicated pharmacist available, although 95% had HTF

TABLE 2. Numbers (%) of training centres reporting availability of dedicated clinics on nutrition, home tube feeding, and home parenteral nutrition programmes, dietitians and pharmacists attached to the training centre, according to the annual numbers of outpatients

Annual number of outpatients	Number (%) of training centres with dedicated CliN	Number (%) of training centres with HTF programme	Number (%) of training centres with dietitian attached	Number (%) of training centres with HPN programme	Number (%) of training centres with pharmacists attached
<500 (N = 3)	0/3 (0%)	2/3 (67%)	1/2 (50%)	1/3 (33%)	0/2 (0%)
501–1500 (N = 18)	10/15 (67%)	14/17 (82%)	13/18 (72%)	13/17 (76%)	5/18 (28%)
1501–3000 (N = 33)	16/31 (52%)	30/33 (91%)	23/30 (77%)	25/31 (81%)	8/27 (30%)
3001–5000 (N = 25)	20/24 (83%)	24/25 (96%)	19/24 (79%)	19/24 (79%)	17/24 (71%)
>5000 (N = 20)	16/20 (80%)	19/20 (95%)	15/20 (75%)	16/20 (80%)	10/20 (50%)
P value	0.017	0.446	0.487	0.885	0.005

Ratios show the positive responses and denominators, the total responses. CliN = clinics on nutrition and metabolism; HPN = home parenteral nutrition programme; HTF = home tube feeding programme.

TABLE 3. Annual numbers (%) of patients on home tube feeding and home parenteral nutrition programmes in training centres of European capitals compared with other cities

Annual number of patients on	Number (%) of training centres of European capitals	Number (%) of training centres of other cities	P value
HTF			0.357
<5	6/29 (21%)	6/62 (10%)	
5–10	3/29 (10%)	12/62 (19%)	
>10	20/29 (69%)	43/62 (69%)	
HPN			0.297
<5	10/28 (36%)	31/67 (46%)	
5–10	5/28 (18%)	16/67 (24%)	
>10	13/28 (46%)	20/67 (30%)	

Ruminators show the positive responses and denominators, the total responses. HPN = home parenteral nutrition programme; HTF = home tube feeding programme.

and 77% had HPN programmes in place. About 13% of the training centres cared for a very small number of less than 5 HTF patients per year and 43% cared for less than 5 HPN patients per year, providing a limited opportunity for adequate training and experience in this important part of PGHN practice. It is noteworthy that this survey was conducted before the coronavirus disease (COVID-19) pandemic, which mobilized hospital resources to care for COVID-19 patients and may have actually worsened the delivery of nutrition care training (12).

Knowledge and skills in nutritional care are critical for paediatric gastroenterologists. Disease-related malnutrition is common in patients with chronic diseases and is associated with an increased risk of complications, poorer disease outcome, and higher costs (13). Early detection and appropriate treatment through multidisciplinary NCT is of paramount importance. The ESPGHAN Committee on Nutrition has highlighted the consequences of disease-related malnutrition and reviewed recommendations for nutrition support (11). Nutrition intervention includes nutrition counselling, use of oral nutritional supplements, enteral tube feeding, and parenteral nutrition (14–17). Paediatric patients receiving enteral tube feeding should be supported by an NCT in optimal communication and collaboration with parents or carers. Suggested standards of practice for HTF have been published by the British Association for Parenteral and Enteral Nutrition (18). Paediatricians with expertise in nutrition and specialist paediatric dietitians are part of the NCT and practise based on written protocols accepted by the specialist network (11,19).

Parenteral nutrition helps meet the nutritional needs of impaired or immature gastrointestinal function when adequate oral nutrition is not possible (20). The care of a patient with PN requires the development of a nutrition plan and a supportive multidisciplinary

NCT able to coordinate optimal nutritional care (20). The outcome for patients with intestinal failure who require PN is improved by their management by a multidisciplinary NCT (20–24), consisting of a specialist paediatrician, a paediatric dietitian, a pharmacist, and a clinical nurse, all with knowledge and experience in PN and nutrition support (11,18,20), especially when PN is administered long-term (21,25). Nutrition support algorithms and effective networking with local unit collaboration are essential for the management and monitoring of paediatric patients receiving PN (26). Our survey, however, showed wide variation and deficits in the availability of NCT in European PGHN training centres, with one-fifth having no dietitians attached to the training centre, whereas half had no pharmacist attached, highlighting gaps in the availability of multidisciplinary teams responsible for the management of such patients and in the ability to adequately train subspecialists.

Previous studies have reported inadequate knowledge and skills of physicians in nutrition. Coombs et al (27) showed a considerable gap between patients' desire for nutrition advice and actual physician practice, with only about one-third of physicians routinely discussing nutrition during clinical visits. Although physicians agree that nutrition assessment and counselling should be a clinical duty (28) that contributes to health (29), many do not feel adequately trained to provide nutrition counselling (28,29). Lack of time, inadequate knowledge, and inadequate counselling skills were the most commonly cited barriers to nutrition care (30). Historically, there has been a lack of emphasis on nutrition education during both medical school and residency, and the quality of nutrition education during medical school was perceived as inadequate by physicians overall (31).

PGHN is the one of the few medical subspecialties that has included nutrition in its formal curriculum but trainees in PGHN in

TABLE 4. Annual numbers (%) of patients on home tube feeding and home parenteral nutrition programmes according to the annual numbers of outpatients

Annual number of patients on	<500 (N = 3)	501–1500 (N = 18)	1501–3000 (N = 33)	3001–5000 (N = 25)	>5000 (N = 20)	P value
HTF						0.069
<5	2/3 (67%)	2/15 (13%)	7/31 (23%)	2/24 (8%)	2/19 (11%)	
5–10	0/3 (0%)	4/15 (27%)	6/31 (19%)	2/24 (8%)	4/19 (21%)	
>10	1/3 (33%)	9/15 (60%)	18/31 (58%)	21/24 (88%)	13/19 (68%)	
HPN						0.178
<5	3/3 (100%)	8/15 (53%)	14/31 (45%)	8/24 (33%)	8/19 (42%)	
5–10	0/3 (0%)	4/15 (27%)	9/31 (29%)	6/24 (25%)	2/19 (11%)	
>10	0/3 (0%)	3/15 (20%)	9/31 (29%)	11/24 (46%)	9/19 (47%)	

Ruminators show the positive responses and denominators, the total responses. HPN = home parenteral nutrition programme; HTF = home tube feeding programme.



US, feel that their basic knowledge and training in nutrition is suboptimal (7). According to Hu et al (32), there are also significant gaps in nutrition education in GI scholarship programmes in Canada. In Canada, the creation of nutrition education standards and a nutrition curriculum for GI fellowship training has been proposed. According to Paediatric Guidance Checklist Gastroenterology and Hepatology, reviewed by the PGHN College Specialty Advisory Committee (CSAC), PGHN trainees should be exposed to at least 10 children with intestinal failure per year, of which 5 should be new cases, while participation of fellows in ward rounds for management of children with intestinal failure, especially neonatal surgical cases, along with a pharmacist and a paediatric surgeon, either as part of ward rounds or separate meetings, is considered extremely important (7). In 2013, NASPGHAN Nutrition Committee developed strategies to enhance training in CN as an integral part of the training in PGHN, based on the NASPGHAN curriculum (5). The curriculum included basic nutrition training topics for all trainees and advanced training topics for those trainees specifically interested in CN (33). In 2019, ESPGHAN published an updated version of the European Training Requirements for PGHN, formally adopted by the European Academy of Paediatrics (EAP) and the European Union of Medical Specialists (UEMS), defining the knowledge and skills in CN to be acquired during PGHN training (4).

This study has a number of limitations, such as the cross-sectional design of the study, the reliance on volunteers who were willing to self-report the requested information, and the variability of the response rate. In some countries (Austria, Bulgaria, Croatia, Greece, Hungary, Israel, Slovenia), all PGHN training centres responded, whereas in others, such as Germany and Turkey, only some of the training centres participated in the survey. Therefore, the data presented here cannot necessarily be considered representative of all European training centres. Strengths include standardized data collection on CN-related training resources across Europe and the provision of the largest dataset to date on infrastructure, staff, and patient volumes in paediatric CN across Europe.

## CONCLUSIONS

In conclusion, our survey reveals clear differences and deficits in terms of CN infrastructure, number of staff and patients, and thus training conditions amongst European PGHN training centres. National PGHN Societies should raise awareness of the impact of malnutrition on disease outcome and the need for early recognition and initiation of nutrition support supervised by NCTs. Agreed minimum standards in clinical nutrition care for PGHN training centres need to be established, implemented, and monitored at European level, following the European Training Requirements in PGHN adopted by the EAP and UEMS. ESPGHAN could have the opportunity to promote and improve training standards by confirming the accreditation of training centres that meet the agreed criteria and by introducing a European board examination in PGHN.

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