

ORIGINAL ARTICLE

Survey on Endocrinology and Nutrition undergraduate teaching in Spain-2021



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KEYWORDS

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Abstract

Objectives: Advances in endocrinology and nutrition (E&N) and the importance of its associated disorders require that its teaching within the medical degree meets adequate standards of quality and homogeneity. Our objective was to expand the data on E&N undergraduate teaching in Spain.

Methods: We designed an observational, cross-sectional web-based study addressed to the coordinators of E&N teaching at the 42 faculties of medicine that had taught the subject during the 2020–2021 academic year.

Results: One in three faculties had a professor who was an E&N specialist, but less than half had a full professor of E&N. There is great variability in teaching programmes, although most of them dedicate 6 ECTS credits to the subject. Over two-thirds of the faculties maintain theoretical lessons with over 50 students per class. Most programmes dedicate between four and six hours to hypothalamic pituitary disorders, thyroid diseases and adrenal gland disorders. However, there is great variability in the time dedicated to diabetes and nutrition. In one-third of the faculties, students are not required to do a rotation in the E&N department. Teachers at the universities widely participate in undergraduate/master's students' final projects and master's degree studies.

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¹ The members of the boards of directors are presented in Annex 1.

Conclusions: The E&N specialty maintains a good position within universities, but there is still great heterogeneity in the teaching structure of the subject.

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PALABRAS CLAVE

Endocrinología;
Nutrición;
Formación;
Educación médica

Encuesta sobre la docencia pregrado de Endocrinología y Nutrición en España-2021

Resumen

Objetivos: Los avances en Endocrinología y Nutrición (EyN) y la importancia de las patologías de su competencia requieren que su enseñanza en el grado de Medicina siga unos adecuados estándares de calidad y homogeneidad. Nuestro objetivo fue ampliar la información sobre la docencia pregrado de la asignatura de EyN en España.

Métodos: Para ello, se diseñó un estudio observacional, transversal como encuesta vía web dirigida a los responsables de la asignatura en las 42 Facultades de Medicina que habían impartido la asignatura durante el curso 2020–2021.

Resultados: En 1 de cada 3 facultades hay un especialista de EyN como Catedrático de Universidad, pero en menos de la mitad hay un profesor titular. Existe gran variabilidad en los planes docentes, aunque la mayoría dedican 6 créditos ECTS a la asignatura. Más de dos tercios de las facultades mantienen grupos de enseñanza teórica con 50 o más alumnos por clase. La mayoría dedican entre 4 y 6 horas a la docencia de la patología hipotálamo-hipofisaria, la patología tiroidea y la patología suprarrenal, sin embargo, existe gran variabilidad en el tiempo dedicado a la diabetes y la nutrición. En 1 de cada 3 facultades, los alumnos no tienen obligación de rotar en sus prácticas por EyN. Existe una amplia participación de los docentes en los Trabajos de Fin de Grado/Máster y en los estudios de Máster de la Universidad.

Conclusiones: Así, los especialistas en EyN mantienen un buen posicionamiento dentro de la universidad, pero existe una gran heterogeneidad en la estructura docente de la asignatura.

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Introduction

Endocrinology and nutrition is a medical specialty which addresses the study and treatment of diseases of the endocrine system, metabolic diseases, and all diseases resulting from the nutritional process.¹ Thus, its remit includes both diseases of high prevalence and/or high impact on the morbidity and mortality of the population (diabetes mellitus, overweight-obesity, dyslipidaemia, thyroid disease, osteoporosis, disease-related malnutrition, etc.), and less prevalent pathologies (acromegaly, Cushing's syndrome, etc.), all of which have a high level of complexity in their diagnosis and treatment.^{2–5} In recent years, the specialty of Endocrinology and Nutrition has incorporated multiple technological advances into many of its areas of work, such continuous interstitial glucose monitoring,⁶ "hybrid" artificial pancreas systems,⁷ high-resolution consultations for nodular thyroid pathology,⁸ and nutritional diagnosis using imaging procedures,⁹ modernising and raising the technical level of the specialty to adapt it to a 21st-century population's needs.

Despite this, previous studies have shown that there is less interest in the specialty of Endocrinology and Nutrition in Spain, judging by the progressive increase in the mean number of choice in the resident medical intern examination (MIR), though it would be justified. In part, by the increased number of places available in the specialty.¹⁰ In other countries in our setting, this reduced interest in Endocrinology

and Diabetology has been made evident by the difficulty in filling all the places offered in these training areas.¹¹

A prior survey carried out among an extensive sample of medical students in the final year of their degree, or prior to sitting their MIR Exam, in order to evaluate the perception of the specialty of Endocrinology and Nutrition showed the importance of undergraduate teaching in those students who have the specialty of Endocrinology and Nutrition as their first choice.¹² Consequently, there is a need to improve the undergraduate training offered to all medical students in order to improve knowledge on Endocrinology and Nutrition, to recognise its relevance, and to arouse interest in our specialty, improving care and reducing variability in clinical practice for patients with endocrinological, metabolic and nutritional diseases.

In 2019, the Governing Board of the Spanish Society of Endocrinology and Nutrition (SEEN), in collaboration with the Society's Management Advisory Board, carried out a critical assessment of the state of undergraduate teaching in the specialty, and concluded that:

- 1 More information needs to be made available on undergraduate teaching of the subject in Spain.
- 2 A common syllabus needs to be established for the subject.
- 3 Collaboration agreements need to be established with the associations representing medical students and with MIR

Training academies to improve the visibility of and knowledge on our specialty among future trainee doctors.

The aim of our study is to extend the information available on the undergraduate teaching of the subject of Endocrinology and Nutrition in Spain, and to serve as a basis for establishing a proposal for a common syllabus for the subject.

Material and methods

The study was a cross-sectional observational study designed as a web survey. Firstly, a list of all the Medical schools, both public and private, registered with the Spanish Ministry of Science, Innovation, and Universities was drawn up. Then, all the Medical schools which were duplicated and those in which the subject of Endocrinology and Nutrition had not been taught during the 2020–2021 academic year, owing to their being recently established Medical schools,¹³ were excluded.

Thus, a total of 42 Medical schools were identified which had taught the subject of Endocrinology and Nutrition during the 2020–2021 academic year (Table 1). Specialists in Endocrinology and Nutrition related to the teaching of the subject were identified who helped in the identification of a valid interlocutor to complete the generated survey (Appendix B Annex 2). Thus, one single person was selected to complete the information in each Medical school. Finally a survey was designed which was reviewed by all the members of the current SEEN Managing Board, in order to respond to the study objectives (Appendix B Annex 3). Once agreed upon, the survey was translated into form format, using the Google Forms® tool for data collection and processing. The survey was open from 12 February until 23 May 2021.

Results

The results from 41 of the 42 (97.6%) Medical schools identified are presented.

Teaching staff

In 14 of the 41 (34.1%) Medical schools contacted, there is a specialist in Endocrinology and Nutrition holding the post of university professor (Table 1). In 20 of the 41 (48.8%) Medical schools contacted, there is at least one specialist in Endocrinology and Nutrition holding the post of tenured university lecturer (Table 1). In total, there are 35 specialists in Endocrinology and Nutrition with the post of tenured university lecturer (Fig. 1). On the other hand, there are currently six Medical schools which have specialists in Endocrinology and Nutrition accredited by ANECA (Agencia Nacional de Evaluación de la Calidad y Acreditación [National Agency for Quality Assessment and Accreditation]),¹⁴ but without the status of tenured lecturer.

Organisation of teaching

The subject of Endocrinology and Nutrition is taught in the fifth year in 58.6%, in the fourth year in 34.1%, and in the third year in 7.3% of the Medical schools contacted. It has between 4 and 7 ECTS credits in 74.3% of the Medical schools contacted, but there is a high degree of variability, ranging from 3 to 10 ECTS credits (Fig. 2). There is a high degree of variability in the number of students per theoretical teaching group. 47.5% of the Medical schools have between 25 and 74 students per theory class, and 50% between 75 and more than 100 students per theory class.

58.5% dedicate between 4 and 6 h to the theoretical teaching of hypothalamo-pituitary pathology (Table 2) and in 24.4% other specialists participate in its theoretical teaching. 58.5% dedicate between 4–6 h to the theoretical teaching of thyroid pathology (Table 2) and in 75.6 % other specialists participate in its theoretical teaching. 63.4% dedicate between 4–6 h to the theoretical teaching of adrenal pathology (Table 2) and in 70.7 % other specialists participate in its theoretical teaching.

The time dedicated to the theoretical teaching of diabetes mellitus shows a high degree of variability, ranging from 1 to 3 h up to 10–12 h (Table 2). In 75.6% of them, between 4 and 9 are dedicated. The participation of other specialists in the theoretical teaching of diabetes mellitus arises in 17.1% of the Medical schools.

Similarly, the time dedicated to the theoretical teaching of clinical nutrition also shows a high degree of variability, ranging from 1 to 3 h up more than 12 h (Table 2). In 65.9% of the Medical schools, the time dedicated is 1–6 h. On the other hand, in 15 of the Medical schools contacted (36.6%), there is a specific subject of Clinical Nutrition, with the departments of Endocrinology and nutrition participating in the theoretical teaching of the subject in 66.7% of them.

Table 2 shows the time dedicated to dyslipidaemias, calcium-phosphorus metabolism, disorders affecting multiple endocrine glands and gastroenteropancreatic neuroendocrine tumours, and disorders of sexual development and sexual identity and differentiation.

Practical training

Practical training in Endocrinology and Nutrition is obligatory for all students in the setting of the specialty in 62.5% of the Medical schools. There is considerable variation in the percentage of students doing practical training, and in the time that the students spend performing their practical training (Fig. 3). In 51.3% of medical schools more than 80% of students do practical training, as opposed to the 23.1% of Medical schools in which less than 20% of the students do practical training. In one Medical school (2.5%) the time dedicated to practical training is less than 5 h, in 5 (12.5%) between 5 and 10 h, in 7 (17.5%) between 11 and 15 h, in 7 (17.5%) between 16 and 20 h and in 20 (50%) it is more than 20 h.

In only 34.1% of Medical schools are students scheduled practical training in a diabetes technology practice, in 36.6% in a high-resolution thyroid nodular pathology practice, and

Table 1 Medical schools teaching the subject of Endocrinology and Nutrition during the 2020–2021 academic year, post of university professor and of tenured university lecturer. Training guides.

Medical school	Post of the individual who has completed the form.	Specialist in Endocrinology and Nutrition with the post of university professor	Specialist in Endocrinology and Nutrition with the post of tenured university lecturer	Link to the training programme
University of Murcia	Contracted doctoral lecturer			https://www.um.es/en/web/estudios/grados/medicina/plan-guias
Faculty of Albacete. UCLM	Associate lecturer			https://blog.uclm.es/medicinaab/135-2/plan-de-estudios/
University of Valladolid	Professor of Endocrinology and Nutrition	Yes	Yes	https://www.uva.es/resources/docencia/_ficheros/2021/478/asignaturas.pdf
Saint Vincent Martyr Catholic University, Valencia	Contracted doctoral lecturer			https://www.ucv.es/oferta-academica/facultades/facultad-de-medicina-y-ciencias-de-la-salud/grado-en-medicina
39 University of La Laguna, Tenerife	Associate lecturer			https://www.ull.es/grados/medicina/
Catalonia-University of Barcelona	Contracted doctoral lecturer	Yes		https://www.ub.edu/web/ub/es/estudis/oferta_formativa/graus/fitxa/M/G1046/index.html
University of the Basque Country	Tenured Lecturer		Yes	https://www.ehu.eus/es/grado-medicina/creditos-y-asignaturas-por-curso
University of Valencia	Professor of Medicine	Yes	Yes	https://www.uv.es/uvweb/universidad/es/estudios-grado/oferta-grados/oferta-grados/grado-medicina-1285846094474/Titulacio.html?id=1285847387054
University of Cádiz Faculty of Ciudad Real, UCLM	Professor of Medicine Associate lecturer			https://medicina.uca.es/ https://www.uclm.es/ciudad-real/medicina
Francisco de Vitoria University, Madrid	Contracted doctoral lecturer			https://www.ufv.es/estudiar-gradomedicina-madrid/

Medical schools teaching the subject of Endocrinology and Nutrition during the 2020–2021 academic year, post of university professor and of tenured university lecturer. Training guides.

Medical school	Post of the individual who has completed the form.	Specialist in Endocrinology and Nutrition with the post of university professor	Specialist in Endocrinology and Nutrition with the post of tenured university lecturer	Link to the training programme
University of Santiago de Compostela	Tenured Lecturer		Yes	https://www.usc.gal/es/centro/facultad-medicina-odontologia?plan=14002
University of Extremadura	Tenured Lecturer		Yes	https://www.unex.es/conoce-la-uex/centros/medicina/titulaciones/info/asignaturas?id=0212
Rey Juan Carlos University, Madrid	Associate lecturer			https://www.urjc.es/universidad/calidad/596-medicina
University of the Balearic Islands	Associate lecturer			https://estudis.uib.es/es/estudis-de-grau/grau/medicina/GMED-P/
Autonomous University of Madrid	Tenured Lecturer	Yes	Yes	https://www.uam.es/Medicina/Grado/1234890396092.htm?language=es
University of Oviedo	Tenured Lecturer		Yes	https://directo.uniovi.es/catalogo/Tipo_Asignaturas.asp?plan=MEDICINN
University of Zaragoza	Associate lecturer			https://medicina.unizar.es/plan-de-estudios-del-grado-en-medicina
San Pablo University-CEU, Madrid	Associate lecturer			https://www.uspceu.com/oferta-formativa/grado/grado-en-medicina
University of Granada	Tenured Lecturer	Yes	Yes	https://medicina.ugr.es/docencia/grados/graduadoa-medicina
University of Vic - Central University of Catalonia	Tenured Lecturer		Yes	https://www.uvic.cat/es/grado/medicina
Autonomous University of Barcelona	Tenured Lecturer	Yes	Yes	https://www.uab.cat/web/estudiar/listado-de-grados/plan-de-estudios/plan-de-estudios-y-horarios/medicina-1345467893054.html?param1=1263281708763

Medical schools teaching the subject of Endocrinology and Nutrition during the 2020–2021 academic year, post of university professor and of tenured university lecturer. Training guides.

Medical school	Post of the individual who has completed the form.	Specialist in Endocrinology and Nutrition with the post of university professor	Specialist in Endocrinology and Nutrition with the post of tenured university lecturer	Link to the training programme
University of Córdoba	Associate lecturer			http://www.uco.es/organiza/centros/medicinayenfermeria/es/planificacion-ensenanza-med
University of Girona	Professor of Medicine	Yes	Yes	https://www.udg.edu/es/estudia/Oferta-formativa/Graus/Fitxes?IDE=1003&ID=3109G0111
Catalonia-International University of Catalonia [UIC Barcelona]	Associate lecturer	Yes	Yes	https://www.uic.es/es/estudis-uic/medicina-y-ciencias-de-la-salud/grado-en-medicina
CEU Cardenal Herrera University. Castellón Campus	Associate lecturer			https://www.uchceu.es/estudios/grado/medicina?_adin=0896444253
Jaume I University, Castellón	Associate lecturer			https://www.uji.es/estudis/oferta/base/graus/2020/medicina-p17/?urlRedirect=https://www.uji.es/estudis/oferta/base/graus/2020/medicina-p17/&url=/estudis/oferta/base/graus/2020/medicina-p17/&p=2017/page-indice-contenidos
University of Lleida (Arnau de Vilanova)	Tenured Lecturer		Yes	http://www.graumedicina.udl.cat/es/pla-formatiu/pla-estudis-guies-docents/
European University of Madrid	Professor of Endocrinology and Nutrition	Yes	Yes	https://universidadeuropea.com/grado-medicina-madrid/
Rovira i Virgili University	Professor of Medicine	Yes	Yes	https://www.urv.cat/es/estudios/grados/oferta/graudemedicina/
University of Seville	Associate lecturer			https://www.us.es/estudiar/que-estudiar/oferta-de-grados/grado-en-medicina
Public University of Navarre	Associate lecturer		Yes	https://www.unav.edu/web/grado-en-medicina/plan-de-estudios

Medical schools teaching the subject of Endocrinology and Nutrition during the 2020–2021 academic year, post of university professor and of tenured university lecturer. Training guides.

Medical school	Post of the individual who has completed the form.	Specialist in Endocrinology and Nutrition with the post of university professor	Specialist in Endocrinology and Nutrition with the post of tenured university lecturer	Link to the training programme
Complutense University, Madrid	Tenured Lecturer		Yes	https://medicina.ucm.es/guias-docentes
Miguel Hernández University, Alicante	Tenured Lecturer			https://www.umh.es/contenido/Estudios/:titulo_132_M1/datos.es.html?frm=pintaPlanEstudios
University of Las Palmas de Gran Canaria	Tenured Lecturer	Yes	Yes	https://www2.ulpgc.es/index.php?pagina=estudios&ver=weees002&tipoplan=&codigo=165_4029_40_00
Universidad de Alcalá de Henares [Alcalá de Henares University]	Professor of Medicine	Yes		http://medicinaycienciasdelasalud.uah.es/estudios/grado-int.asp?cd=101&plan=G215
University of Salamanca	Associate lecturer	Yes		https://www.usal.es/grado-en-medicina
University of Málaga	Professor of Endocrinology and Nutrition	Yes	Yes	https://www.uma.es/grado-en-medicina/info/9466/plan-de-estudios-medicina/
University of Cantabria	Associate lecturer			https://web.unican.es/estudios/Documents/GUIAS/GRADO/G-MEDICINA.pdf
Alfonso X el Sabio University	Associate lecturer			https://www.uax.com/titulaciones/grado-en-medicina
Catholic University of Murcia	Associate lecturer		Yes	https://www.ucam.edu/estudios/grados/medicina-presencial/plan-de-estudios
Pompeu Fabra University (ND)				https://www.upf.edu/web/biomed/grau-en-medicina/pla-d-estudis-medicina

ND: no data available; UCLM: University of Castilla-La Mancha.
Consulted 11 Feb 2022.

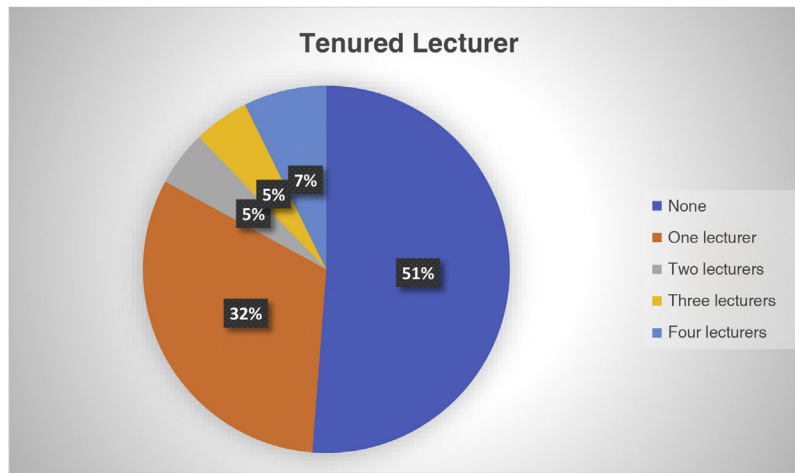


Figure 1 Specialists in Endocrinology and Nutrition with the post of tenured university lecturer.

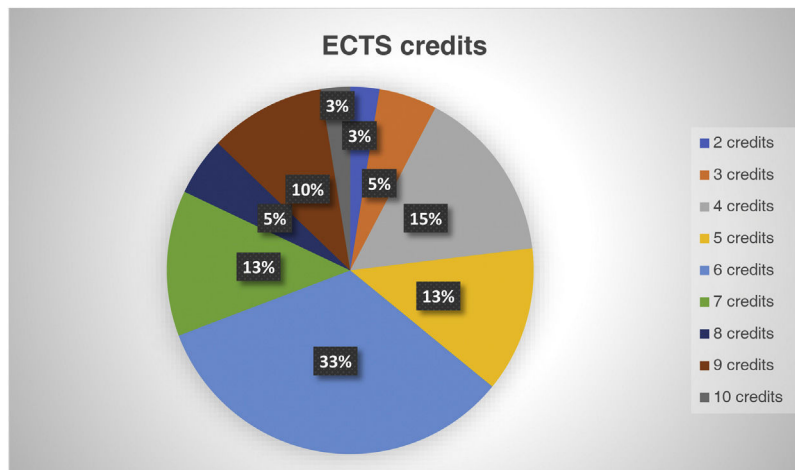


Figure 2 ECTS Credits for the subject of Endocrinology and Nutrition.

Table 2 Time devoted to theoretical teaching.

	Fewer than 4 h	From 4 to 6 h	From 7 to 9 h	From 10 to 12 h	More than 12 h
Hypothalamo-pituitary pathology	29%	59%	12%		
Thyroid pathology	15%	58%	27%		
Adrenal pathology	22%	63%	15%		
Diabetes mellitus	5%	49%	27%	19%	
Clinical Nutrition	29%	37%	20%	7%	7%
Lipid disorders	100%				
Calcium-phosphorus metabolism	73%	27%			
Disorders affecting multiple endocrine glands and GEP-NETs	77%	23%			
Sexual development, sexual identity and sexual differentiation	89%	11%			

GEP-NET: Gastroenteropancreatic neuroendocrine tumour.

in 41.5% on clinical nutrition and endocrinology inpatient wards.

In 35 of the Medical schools contacted (85.5%), practical seminars (not linked to health care activity) are organised to facilitate learning for medical students. In

all of them, at least two areas of learning are included, and the majority include more than 5 areas of learning (hypothalamo-pituitary pathology, thyroid pathology, adrenal pathology, diabetes mellitus, clinical nutrition, calcium metabolism disorders, etc.). Additionally, in 36 of the

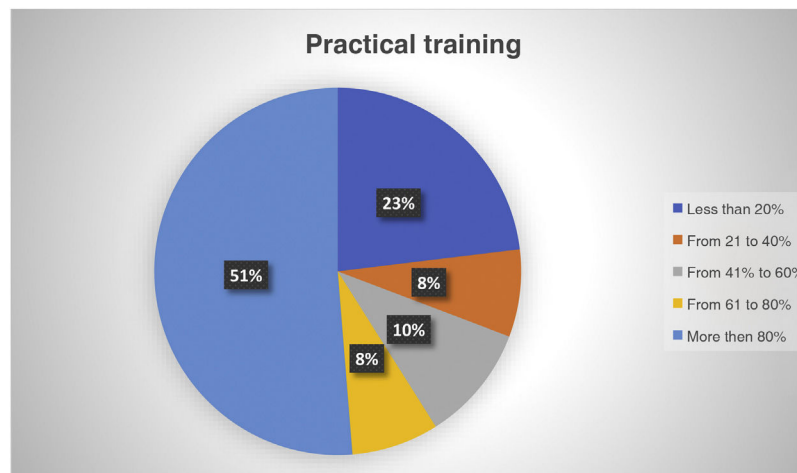


Figure 3 Percentage of students doing practical training in Endocrinology and Nutrition.

Medical schools (90%), classes are scheduled for the resolution of practical cases in the subject.

Assessment

In 18 of the Medical schools contacted (45%), the student's assessment of the subject is exclusively by means of a multiple-choice test. In addition to the multiple-choice test, open-ended development questions, the resolution of practical cases with actors, and the resolution of practical cases with computer-based methods, among others, are included.

In all the Medical schools contacted, there is an evaluation of the teaching staff by the students themselves. Additionally, in three of them (7.5%) independent individuals intervene, and in 4 of them (10%), the method is not defined in the survey.

End-of-degree project and official master's degrees

In 37 Medical schools contacted (90.2%), end-of-degree projects (EDP) are offered to medicine students. The number of EDPs offered annually over the last 3 years is not constant throughout all the Medical schools (Fig. 4). In total, the annual offer of EDPs is 128.

In 22 of the Medical schools contacted (53.7%), the specialists in Endocrinology and Nutrition participate in one of the University's official Master's degrees.

Discussion

Endocrinology and Nutrition is the medical specialty which addresses the study and treatment of diseases of the endocrine system, metabolic diseases, and all those diseases resulting from the nutritional process. It includes theoretical and practical knowledge of the corresponding diagnostic techniques, dietary and therapeutic measures, as well as the preventive medicine standards relating to these fields.¹ Thus, specialised training in Endocrinology and Nutrition guarantees that specialists in Endocrinology and Nutrition have the proper training in order to attend directly to and coordinate the healthcare processes of diseases with

a high prevalence and/or a high impact on the morbidity and mortality of the population, such as diabetes mellitus, overweight-obesity, dyslipidaemia, thyroid disease, osteoporosis, disease-related malnutrition, among others.²⁻⁵ On the other hand, the specialist in Endocrinology and Nutrition continues to be the reference specialist for less prevalent pathologies, such as acromegaly, Cushing's syndrome, etc., all of which have a high level of complexity in their diagnosis and treatment. The organisation of our healthcare system means that all doctors need to have received adequate undergraduate teaching on these low-prevalence pathologies, which will allow the identification and early referral of patients at risk of suffering from them.^{14,15} That is why from the SEEN and the SEEN Foundation (FSEEN), we consider that the teaching of Endocrinology and Nutrition in Medical schools deserves special consideration.

Prior studies have enabled us to ascertain that medical students who show an interest in the specialty of Endocrinology and Nutrition consider that the influence of the teaching of the subject during their degree was highly positive, reaching a median of 8 and a mode of 10 (where 10 equates to a highly positive influence, and 0 to a highly negative one).¹²

After the analysis carried out in 2019, the SEEN Governing Board, in collaboration with the Society's Management Advisory Board, considered that one of the aspects that should be assessed in relation to the teaching of the subject of Endocrinology and Nutrition is the existence of a high degree of heterogeneity in the teaching of the subject among the different Medical schools, with differences in the ECTS credits and in the curricula which could depend on the training and area of expertise of the educational leaders. It was considered that lecture methodology still predominates, with a vision of the specialty closer to that of last century than to the current period. It is also highlighted that, generally speaking, clinical nutrition is not sufficiently or adequately addressed, and that it was frequently not assumed by specialists in Endocrinology and Nutrition.

Despite the enormous importance that the undergraduate teaching of Endocrinology and Nutrition may have for the development of our specialty and the proper care of the population, the information that can be obtained from the different curricula in the Medical schools is very limited and

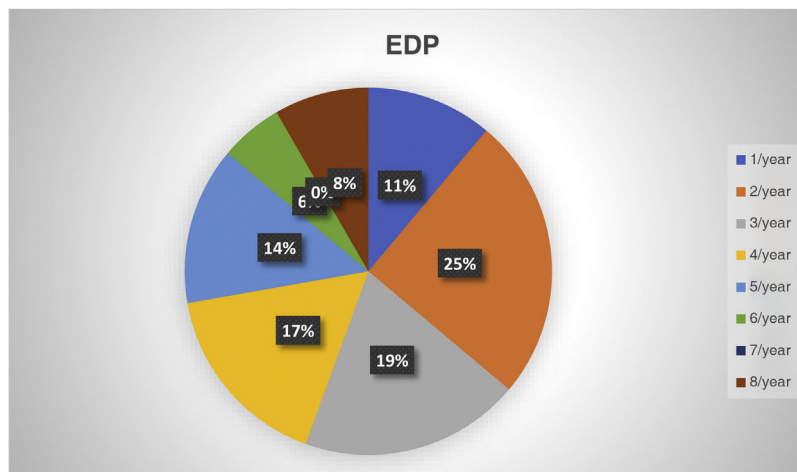


Figure 4 Number of end-of-degree projects (EDP) submitted during the last 3 years.

does not allow for a more in-depth study of how the subject is actually taught in each Medical School.

For all these reasons, we proposed a survey to collect basic information on the subject to allow for in-depth reflection.

Firstly, it should be mentioned that specialists in Endocrinology and Nutrition are well placed within the Spanish university system's positions of responsibility, in line with the research relevance of its field of action.¹⁵ Currently, 1 in 3 Medical schools has a specialist in Endocrinology and Nutrition as a university professor. However, less than half of the Medical schools have a specialist in Endocrinology and Nutrition as a tenured university lecturer. On the other hand, there are an important number of specialists in Endocrinology and Nutrition accredited by the ANECA¹⁶ who still do not hold a position as a tenured university lecturer. To the best of our knowledge, there are no public data which would enable us to establish a comparison, but the results suggest that specialists in Endocrinology and Nutrition maintain an adequate level of research activity that allows them access to university professorships, but access to the post of tenured university lecturer would need to be improved. In this regard, there are different strategies that could increase the presence of the specialist in Endocrinology and Nutrition in the University: the creation of the subject of Clinical Nutrition as a compulsory subject, independent of Endocrinology and taught by the specialist in Endocrinology and Nutrition, would support this growth. On the other hand, there is a need to promote the presence of specialists in Endocrinology and Nutrition as associate lecturers in the university, and to explore other university-linked recruitment alternatives, such as the contracted doctoral lecturer.

A recent report from the National Conference of Medical School Deans highlighted that the estimated deficit for public universities in permanent teaching staff and doctoral assistants was 2654 linked and 1163 non-linked in order to have a similar student/lecturer ratio to that of the field of sciences. It is estimated that this deficit increases by 300 lecturers year on year.¹⁷ Among the different proposals from the Medical schools, it is considered necessary to develop the figure of linked contracted doctoral lecturer, create the post of linked assistant doctoral lecturer, and properly recognise the functions carried out by associate lecturers, tutors and honorary clinical collaborators. This critical situation should undoubtedly serve as an opportunity to position a greater number of specialists in Endocrinology and Nutrition in Medical schools, thus ensuring the proper teaching of our specialty.

As expected, there is a large degree of variability in the teaching plans for the subject of Endocrinology and Nutrition among the different Medical schools. In 3 Medical schools (7%), the subject of Endocrinology and Nutrition is taught in the third year, although the eminently clinical nature of the subject would make it advisable for it to be taught in the fourth or fifth year in all Medical schools, ensuring that students would have the maturity and the possibility of integrating additional knowledge into the curriculum, as well as the possibility of completing their training with rotating practical training in their reference hospitals.

The majority of Medical schools dedicate 6 ECTS Credits to the subject of Endocrinology and Nutrition, although more than a third have fewer than 6 ECTS credits assigned. If we

take into account that the specialty of Endocrinology and Nutrition is directly or indirectly involved in various diseases with a high prevalence and or high impact on the morbidity and mortality of the population, it would be recommendable to raise number of ECTS credits dedicated to the subject to 7 or 8, in order to cover these needs.

Currently, more than two thirds of Medical schools still have theoretical teaching groups with 50 or more students per class, which would reflect the use of lecture methodology with limited interaction between teacher and student. Even though it was not an objective of this study, there is no apparent relationship between the number of students and the age of the university or its public or private affiliation.

There is a certain degree of unanimity regarding the time devoted to the teaching of hypothalamo-pituitary pathology, thyroid pathology, and adrenal pathology, (between 4 and 6 h); however, there is a great deal of discrepancy regarding the time devoted to other areas of the specialty, such as diabetes mellitus and clinical nutrition. It is probably in these two areas of specialty in which the efforts should be focused to achieve greater homogeneity in the times and subject matter covered.

There are few published studies that have analysed these aspects, both within Spain and in our setting. Thus, the work by Sánchez et al.,¹⁸ published almost 20 years ago, highlights a growing interest in the creation of separate subjects of clinical nutrition and dietetics. The current data show that we are still far from a situation that could serve to promote medical students' interest in one of the pillars of our specialty.

The major obstacle detected during the study was that related with the practical learning of the subject. Even though there are practical seminars programmed to facilitate learning, we cannot overlook the fact that in 1 in 3 Medical schools the students are not obliged to rotate through Endocrinology and Nutrition in their practical training, and that in almost a quarter of medical schools, less than 20% of students rotate through Endocrinology and Nutrition. This situation stems from constraints on space and staffing, which in many cases force students to limit their practical training in departments of Endocrinology and Nutrition to only a few days, or to distribute them on the basis of logistical criteria rather than ones of academic or personal interest. Only half of the Medical schools guarantee that more than 80% of students carry out practical training in Endocrinology and Nutrition. In addition, less than half of their students have organised in their rotation time in high-resolution thyroid nodular pathology practice or technologies applied to diabetes, which could offer them a broader view of the techniques applied in Endocrinology and Nutrition.

These data are diametrically opposed to the objectives of implementing an integrated curriculum which limits classical teaching methods and enhances learning based on clinical cases, seminars and clinical practical training in departments of Endocrinology and Nutrition.^{19,20}

With regard to the evaluation of students, 45% of Medical schools still resort to multiple-choice tests as the only tool, it being possible to optimise this evaluation with the use of open-ended development questions, resolution of practical cases with actors, and the resolution of practical cases with computer-based methods.

Finally, there is a widespread collaboration among specialists for medical students to carry out EDPs (128 per year) and extensive participation in official university master's degrees. Still, we should not forget that the potential number of medical students per year in Spain is currently around 7000.²¹

For all these reasons, the SEEN and the FSEEN's objective must be to promote the participation of specialists in Endocrinology and Nutrition in undergraduate teaching, supporting their presence as associate lecturers, contracted doctoral lecturers, tenured lecturers and university professors; to promote the teaching of Endocrinology within curricula as a subject in its own right, and to agree on a common vision and objectives, establishing, for example, the minimum number of ECTS credits associated to the subject, the advantages and risks of establishing Clinical Nutrition as a subject independent of Endocrinology, and syllabi in line with the specialty's care demands. Nor can we overlook the relevance that the specialists in Endocrinology and Nutrition have in preclinical teaching in the Medical Schools through their leadership in the teaching of anatomy, physiology, biochemistry, pharmacology, etc., all of which are closely linked to our specialty.

One of the strengths of our work is that we have collected a wide range of information, including 97.6% of the Medical schools which taught the Subject of Endocrinology and Nutrition in Spain during the 2020–2021 academic year. Its main shortcoming is that the use of a questionnaire with close-ended questions hinders the capture of nuances that may prove to be decisive. Thus, we consider that information related to the teaching of Clinical Nutrition will need to be further developed in another way, this being the area where there was the greatest divergence in the data.

In conclusion: specialists in Endocrinology and Nutrition are well placed within the Spanish university system's positions of responsibility; there is a great deal of heterogeneity in the teaching structure of the subject among the different Medical schools, which principally affects the total number of ECTS Credits and the hours dedicated to diabetes mellitus; finally, the practical learning of the subject has been identified as the principal shortcoming.

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Conflicts of interest

None of the authors recognises any conflict of interests in relation to the content of this study.

Appendix. Supplementary material

Supplementary material related to this article can be found, in the online version, at <https://doi.org/10.1016/j.endinu.2022.05.005>.

Annex 2 List of the persons responsible and teaching collaborators of the subject of Endocrinology and Nutrition who participated in the data collection

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