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Original article

Is there the same requirement to obtain the PhD degree in all the departments of surgery of the Spanish universities?☆

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ABSTRACT

Introduction: The doctorate is the third cycle of official university studies, which, through the defense of the doctoral thesis leads to the acquisition of the title of doctor or PhD from the Anglo-Saxon countries. Royal Decree law 99/2011 regulates doctoral programs, with a wide margin on quality requirements. The objective of this study is to find out if there is this variation in the requirements of the doctorate programs of the different departments of surgery of the Spanish public universities and to establish a quality scale.

Methods: Cross-sectional observational study from 2/22/2021 to 3/3/2021, through a survey sent electronically to the professors of the departments of surgery.

Results: Thirty-five departments of surgery were consulted, obtaining a response in 29 of them (82.9%). The observed variation regarding requirements has been basically in the quality of the research project, in fact in 25 (86.2%) there are no regulations on this. When it is presented in the form of a compendium of articles, these are required to be original in 15 (51.7%). Regarding the position as author, the doctoral student must be the preferred author, at least in 2 articles in 14 (48.4%) of the programs. In 14 departments (48.4%) there are no

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regulations on the position of the articles and quartiles of journals. When scoring the different programs according to their requirements, the variability is high, ranging between 2 and 19 points. Funding for the development of the doctorate is meager.

Conclusions: There is a wide variability in the requirement of doctoral programs. Homogeneous levels of demand must be defined to promote and protect higher-level doctorates.

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¿Existe la misma exigencia en la obtención del doctorado (PhD) en todos los departamentos de cirugía de las universidades españolas?

R E S U M E N

Palabras clave:

Doctorado
Doctorado en Cirugía
Programa de Doctorado

Introducción: El doctorado es el tercer ciclo de estudios universitarios oficiales, que mediante la defensa de la tesis doctoral conduce a la adquisición del título de doctor. El Real Decreto 99/2011 regula los programas de doctorado, con un amplio margen en su exigencia. El objetivo de este estudio ha sido conocer si existe discrepancia de los programas de doctorado entre los departamentos de cirugía de las universidades públicas españolas y establecer una escala de calidad.

Métodos: Estudio observacional transversal mediante una encuesta enviada por vía telemática a los profesores de los departamentos de cirugía.

Resultados: Se ha consultado a los 35 departamentos de cirugía, obteniendo respuesta de 29 de ellos (82,9%). La variación en la exigencia se ha observado especialmente en la calidad del proyecto de investigación, sin existir normativa en 25 (86,2%) de los programas. En cuanto a la presentación de la tesis doctoral en forma de compendio de artículos, se exige que sean originales en 15 (51,7%). En 14 (48,4%) de los programas la posición como autor del doctorando debe ser de autor preferente al menos en 2 artículos. En 14 departamentos (48,4%) no existe normativa respecto a la posición por cuartiles de los artículos. Al puntuar los distintos programas según su exigencia, la variabilidad es elevada, oscilando entre 2 y 19 puntos. La financiación para el desarrollo del doctorado fue mínima.

Conclusiones: Existe una amplia variabilidad en la exigencia de los programas de doctorado. Sería aconsejable definir unos niveles mínimos de exigencia para salvaguardar aquellas tesis de mayor nivel.

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Introduction

The doctorate is understood to be the third cycle of official university studies, to acquire the competencies and skills for quality scientific research. A doctoral programme is the set of activities to acquire the competencies and skills required to be awarded a doctoral degree. This programme aims to develop the various aspects of doctoral student training and will establish the procedures and lines of research for the development of doctoral theses, as reflected in Royal Decree 99/2011, of 28 January¹.

The doctorate is the highest academic degree. However, there seems to be a significant discrepancy in the requirements to gain this degree. These differences range from programmes that require a compendium of original first quartile articles to others that demand an original research project without excessive quality.

Royal Decree 99/2011¹ was issued to standardise criteria with the European Union. However, analysis may reveal that it is not very specific on the conditions for obtaining a doctoral degree, as can be seen, for example, in these two quotes from

it: “The doctoral thesis will consist of an original research project conducted by the candidate in any field of knowledge. The thesis must enable the doctoral candidate to work independently in the field of R+D+I” and “The universities, through the Doctoral School or the corresponding unit overseeing the doctoral programme, will establish control procedures to guarantee the quality of doctoral theses, with particular emphasis on the quality of the training of the doctoral candidate and on supervision”.

This Royal Decree¹ does not define the minimum requirements for obtaining a doctorate degree. It does not specify the type of research project, nor does it specify how the doctorate degree is to be obtained through a compendium of articles, although it does place this responsibility on each university's Doctoral School.

The objectives of this study are to provide information on the characteristics of the doctorate programmes of the different departments of surgery of Spanish public universities through a survey addressed to their lecturers. A scale of the level of demand of the different doctoral programmes was also created, establishing a classification, or ranking of excellence of the best doctoral programmes.

Methods

Study design

A cross-sectional observational study was conducted, in compliance with the Declaration of Helsinki.

Setting and participants

The study was conducted through a survey sent telematically (personal e-mail) to lecturers of the departments of surgery of the faculties of medicine of Spain's public universities.

This survey was conducted using the Google Forms system. It was accessible between 22/2/2021 and 3/3/2021. The surveys were sent blindly, without knowing the results of other respondents.

Variables

The survey questions were divided into 4 sections (Tables 1 and 2):

- 1) Variables on the university to which they belong and lecturer category.
- 2) Characteristics of the doctoral programme: maximum full-time and part-time duration; minimum duration in follow-up years for defence of the thesis; whether the university offers the doctoral student funding; how is each follow-up year of the doctoral programme approved?; is the doctorate degree obtained after defence of the doctoral thesis before a tribunal, which will be based on a research project and/or compendium of articles?
- 3) Research project. Fig. 1 shows the levels of evidence of research study designs^{2,3}. Regarding this format, they were asked for the minimum design accepted in their programmes.
- 4) Thesis by compendium of articles: is the minimum number of articles that must be accepted by an academic journal specified?; must they be original articles (i.e., no editorials, letters to the editor, clinical case articles, project articles, published book chapters or systematic review articles)?; is it mandatory that they belong to the first or second quartile of the Journal Citation Reports (JCR)?⁴; must the doctoral student be listed in the first or second quartile of the Journal

Table 1 – Characteristics of the doctoral programme.

Survey questions	Response, n (%)
<i>Maximum duration of the full-time doctoral programme, counting extra time</i>	
There is no limit	1 (3.4)
Less than 2 years	4 (13.8)
Three years	6 (20.7)
Four years	2 (6.9)
Five years	6 (20.7)
Six or more years	2 (6.9)
Don't know	8 (27.6)
<i>Maximum duration of the part-time doctoral programme, counting extra time</i>	
There is no limit	3 (10.3)
There is no part-time doctorate option	1 (3.4)
Less than 3 years	3 (10.3)
From 4 to 6 years	8 (27.6)
Seven years	3 (10.3)
Eight years	1 (3.4)
Don't know	10 (34.5)
<i>Minimum duration for defence of the thesis and being awarded the doctoral degree</i>	
There is no minimum limit	2 (6.9)
From enrolment at any time (first enrolment)	6 (20.7)
From second enrolment in the programme	13 (44.8)
From third enrolment in the programme	1 (3.4)
From fourth enrolment in the programme	2 (6.9)
From the fifth enrolment in the programme	0 (0)
Don't know	5 (17.2)
<i>Does the university offer funding to doctoral students? (That allows them to engage full-time and exclusively in their research)</i>	
Funding is not offered	18 (62.1)
Funding is offered to SOME doctoral students, but the purpose of this funding is NOT to enable students to engage full-time/exclusively in research	2 (6.9)
Funding is offered to ALL doctoral students, but the purpose of this funding is NOT to enable students to engage full-time/exclusively in research	1 (3.4)
Funding is offered to SOME doctoral students, with the aim that students will engage full-time/ exclusively in research	3 (10.3)
Funding is offered to ALL doctoral students, with the aim that students engage full-time/exclusively in research	0 (0)
Don't know	4 (13.8)

Table 2 – Questions on the doctoral programme regarding follow-up and defence of the thesis by research project or compendium or articles.

Survey answers	Score	Response, n (%)
<i>How is each year of follow-up of the doctoral programme approved?</i>		
There is NO control, it is systematically approved every year until defence of the thesis	0	0 (0)
It is done administratively with the agreement of the director and/or tutor	1	7 (24.1)
A report and approval from the tutor and director are required	2	16 (55.2)
In the first year, a presentation and oral defence of the project is required. A report and approval from the tutor and director are then required for the rest of the years	3	6 (20.7)
Don't know	0	(0)
<i>The doctoral degree is awarded after defence of the doctoral thesis before a board, which will be based on:</i>		
Only the original research project	1	2 (6.9)
Research Project and/or compendium of articles on the subject of the thesis	2	26 (89.7)
Only by compendium of articles on the subject of the thesis	3	0 (0)
Neither the type of research Project nor the compendium or articles is specified in the doctoral programme	0	1 (3.4)
Don't know	0	0 (0)
<i>If defence of the thesis by means of an original research project is chosen, this should be</i>		
There are no regulations regarding type of project	0	25 (86.2)
At least descriptive observational	1	0 (0)
At least analytical observational	2	0 (0)
At least non-randomised experimental and laboratory projects	3	4 (13.8)
At least randomised experimental	4	0 (0)
<i>If defence of thesis by means of a compendium of articles is chosen, is the minimum number of articles specified that must be accepted by an academic journal?</i>		
No	0	1 (3.4)
One	1	1 (3.4)
Two	2	12 (41.4)
Three	3	10 (34.5)
Four or more	4	2 (6.9)
<i>If defence of thesis by means of a compendium of articles is chosen, should these be original articles? (i.e., editorials, letters to the editor, clinical case articles, project articles, published book chapters or systematic review articles)</i>		
No	0	3 (10.3)
At least one	1	2 (6.9)
At least 2	2	7 (24.1)
All	3	15 (51.7)
<i>If defence of thesis by means of a compendium of articles is chosen, is it compulsory that they belong to the first or second quartile?</i>		
They do not have to be from the first or second quartile (not specified or there are no regulations)	0	14 (58.4)
At least one must be	1	5 (17.2)
At least 2 must be	2	5 (17.2)
All must be	3	5 (17.2)
<i>If defence of thesis by means of a compendium of articles is chosen, Should the doctoral student be listed in a preferred position? (As first, corresponding, or last author)</i>		
No (not specified or there are no regulations)	0	9 (31)
In at least one of the articles	1	6 (20.7)
In at least 2 of the articles	2	6 (20.7)
In all of the articles	3	8 (27.6)

Citation Reports (JCR)?; must the doctoral student be listed in the first or second quartile of the Journal Citation Reports (JCR)?; is the doctoral student listed in the first or second quartile of the Journal Citation Reports (JCR) (as first, corresponding or last author, according to the National Agency for Quality Assessment and Accreditation⁵)?.

Table 2 describes the objective scale of the level of demand of the different doctoral programmes. It is based on the level of demand of the doctoral programmes. This requirement is

based on the quality of the projects in terms of scientific evidence and of the articles presented. A maximum score of 23 points can be obtained, weighted out of 10 to be more understandable.

Source of data and biases

The surveys were sent out blindly, without knowing the results of other respondents. The survey was sent a second time for further motivation. STROBE guidelines for cross-sectional observational studies were followed.

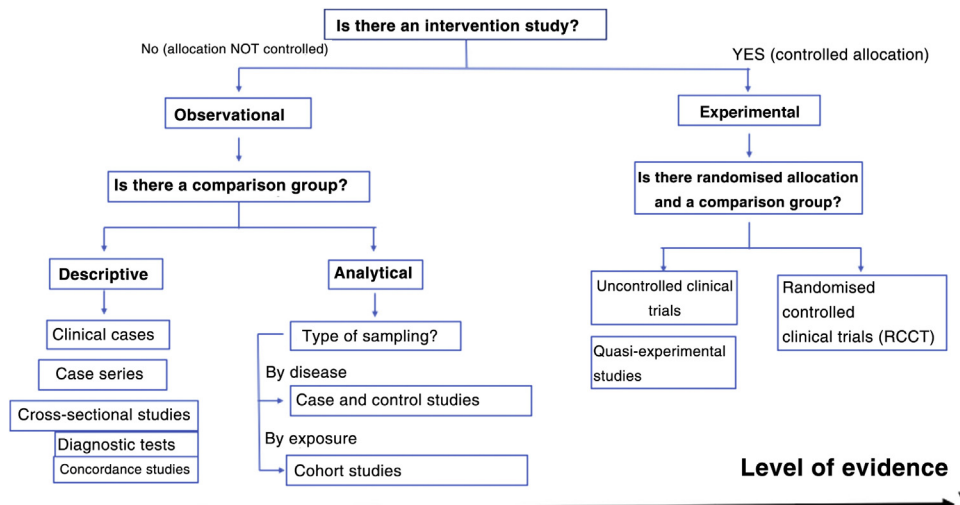


Fig. 1 – Classification of research studies by design according to their level of evidence.

Statistical analysis

SPSS® version 26 was used for the statistical analysis. To describe quantitative variables, mean and standard deviation values were given, provided they met conditions of normality. Categorical variables were described in absolute numbers and percentages.

Results

The 35 departments of surgery of the Spanish public universities that offer degrees in medicine were consulted. We obtained responses from 29 departments (82.9%). Most of the responses came from full and associate lecturers, with 13 (44.8%) and 11 (39.9%) cases, respectively.

Table 1 describes the characteristics of the programmes in relation to their duration and funding. Full-time duration varies between 3-5 years in 18 departments (78.3%), while

part-time duration ranges between 4-8 years in 12 (41.4%) programmes. A considerable number of lecturers did not know the duration of the programmes; this was the case in 8 (27.6%) full-time and in 10 (34.5%) part-time.

There is a wide variation in the length of time from when a student is enrolled in the programme until they can present the defence of their thesis. In 8 (27.6%) programmes there is no limit, or they can be submitted at any time. However, in a majority (13; 44.8%) this can be done from enrolment in the second year of follow-up.

Funding for doctorates by the departments is meagre. There is no support whatsoever in 18 (62.1%). Only 3 (10.3%) offer funding to some doctorate students, with the aim that students engage full-time and exclusively in research.

In terms of approval of follow-up of the doctoral programme, 16 departments (55.2%) require a report and the approval of the tutor and the director. In 6 (20.7%) a presentation and oral defence of the project is required in the first year. In 26 programmes (89.7%), defence of the thesis

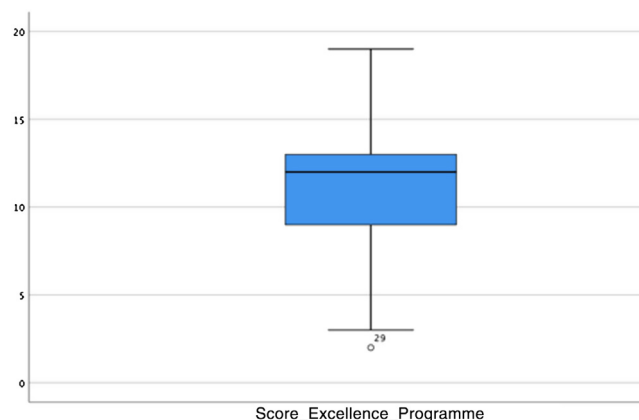


Fig. 2 – Boxplot of the variation in excellence score of different surgical department programmes.

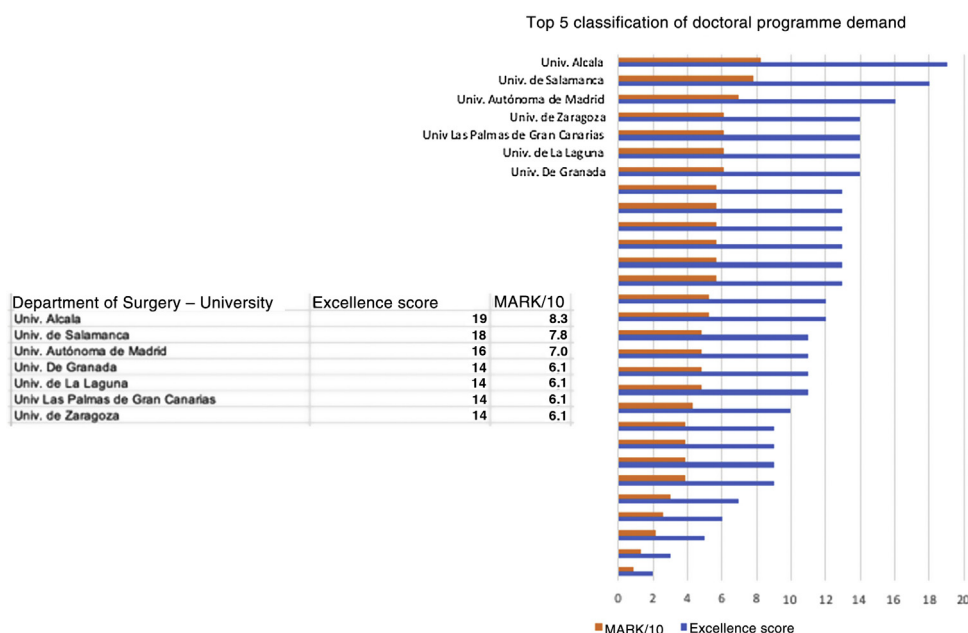


Fig. 3 – Classification of the excellence scores of the doctoral programmes out of 23 points and their scales out of 10. The programmes with the top 5 scores are depicted.

is based on a research project and/or a compendium of articles. There are few requirements as to the quality of the research project; thus, in 25 departments (86.2%) there are no regulations regarding the type of project (Table 2).

There are higher requirements when it is presented in the form of a compendium of articles. Thus, in 24 (83.2%) of the departments, a minimum of 2 articles must be submitted, and 3 or more in 12 (41.4%). All articles must be original in 15 departments (51.7%). In about half of the programmes (14; 48.4%), the doctoral student must be the author in a preferred position⁵ in at least 2 of the articles they submit. Regarding the position of the journals in the JCR⁴ quartiles, in 14 departments (48.4%) there are no regulations at all.

The lecturers' knowledge of their doctoral programme was partial, or they did not know it in 16 (55.2%) of the cases.

Using the scale we generated, we scored the different doctoral programmes according to their requirements, and found that there was a high degree of variability (Fig. 2). This ranges from 19 to 2 points, with a mean of 11.2 and a standard deviation of 4 points (Shapiro-Wilk normality test, $p = .265$). Fig. 3 shows the scores and grades out of 10 of the universities with the 5 best scores in the demand of the doctoral programmes of the surgical departments. The distribution of the scores for the rest of the programmes is also shown.

Discussion

The doctorate was established in its current design in our country in 1847, where doctorate studies culminate in a speech or thesis⁶. In English-speaking countries, the doctorate is known by the acronym "PhD", from the Latin phrase *Philosophiae doctor* (Doctor of Philosophy). The term "philo-

sophy" can be translated as love (*philo*) of knowledge (*sophia*, to know).

Doctoral studies are organised through programmes, as determined by the statutes of the universities and in accordance with the criteria established in Royal Decree 99/2011¹. This decree regulates third cycle university studies within the framework of the European Higher Education Area. However, the quality of the doctoral thesis is not defined, and is the responsibility of each university's Doctoral School. Hence the wide variability that we detect in the results of this study.

The duration of doctoral programmes, both full-time and part-time, is regulated by Royal Decree 99/2011¹. Our doctoral programmes do not offer financial support. Of the programmes, 62.1% offer no financial support at all. A study of the MD-PhD programmes at medical school in the United States of America, noted that a key factor in abandoning these programmes was their lack of funding⁷.

The diversity in the requirements of the programmes can be seen primarily by looking at the way the annual follow-up is evaluated. In more than two thirds of the programmes, follow-up is done administratively or based on a report by the director or tutor.

In most of the departments surveyed (26 out of 29; 89.7%), defence of the thesis takes the form of an original research project and/or a compendium of articles. A thesis through scientific articles offers, in principle, the greatest guarantee of the quality of a doctoral thesis, because an editorial committee impartially evaluates it, provided that these articles are accepted by scientific journals indexed in the JCR⁴. These are characterised by peer review and are objectively quantified with an internationally recognised impact factor.

Royal Decree 99/2011¹ requires defence of the doctoral thesis through an original research project, but does not

specify its characteristics. The quality of study designs is well defined by the level of scientific evidence. This varies widely from descriptive observational studies to prospective, randomised clinical trials (Fig. 1). Studies differ in complexity, development, and significance of conclusions. In our results, we observe that in 25 programmes (86.2%) there are no regulations regarding the type of project. Royal Decree 99/2011¹ does not regulate this type of presentation, it does not regulate whether the articles must be original or on the quality of the journals, nor does it regulate the position of the doctoral student as author in the publication.

In relation to the number of articles, 27 (93.2%) departments request more than 2 articles. However, it is important to know the type of article, whether it should be an original article, a letter to the editor, or image of the month. All of them are potentially cited as a reference. In relation to this question, we note that 22 (75.8%) of the programmes require at least 2 of their articles to be original.

Acceptance of publications in first quartile journals in the JCR is much more difficult to achieve than in the last quartile. However, more than half of the doctoral programmes (14; 58.4%) do not specify or have no regulations⁴ in this respect.

Scientific journals require that the authors of articles have a real role in the development of a study, as described in the International Committee of Medical Journals Editors, in its section "Defining the role of authors and contributors"⁸. The position or order of appearance of authors in an article is always controversial, as it does not always reflect importance or true involvement in the study. Spain's National Agency for Quality Assessment and Accreditation⁵ defines first author, last author, or corresponding author as preferred authorship. However, apart from these "preferred" authors, the second and third authors are often the real executors of the study and are not recognised as such. In the doctoral programmes surveyed, 8 (27.6%) indicate that they should always have a preferred position, but in 9 (31%) this is not specified or there are no regulations in this respect.

The scale established in this study is based on the level of stringency of doctoral programmes. The scale is intended to express the wide variation in the standards of doctoral programmes. Fig. 2 shows the wide difference in the scores of the programmes, ranging from 2 to 19 points. Fig. 3 shows the top 5 scores of the doctoral programmes of the surgical departments. We emphasise that this ranking does not refer to the quality of the department's theses, but to their level of demand.

As a final comment, surgeons do their doctorates with little support, as very few of them obtain funding.

The requirements of the doctoral programmes in the surgical departments of the Spanish public universities vary widely. We believe that it could be very important to define minimum standards to promote these doctoral programmes and to safeguard theses of the highest level. Theses based on a compendium of articles must be original and published in the first 2 quartiles. Theses by research project must be of excellence, based on high quality experimental or analytical studies.

We suspect that there are such contrasts in the programmes of surgical departments in other countries, and in medical departments and those of other professions. Therefore, our

department is developing further studies with the aim of assessing these potential differences with the same survey so that the results can be comparable.

Conflict of interests

The authors have no conflict of interests to declare.

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