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# What perception do Spanish doctors have of vitamin D?

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## Introduction

The last few years have seen a notable advance in the understanding of practically all the fields of study related vitamin D, which has resulted in it being considered to be a vitamin which is recognised as a steroid hormone<sup>1-4</sup>.

Although vitamin D is classically related with bone mineral metabolism, its effects on practically the whole organism, the so-called “extra-bone” effects of vitamin D, are becoming increasingly better understood<sup>2,3,5-8</sup>, and which have been reviewed in another article in this Monograph<sup>9</sup>.

In the literature consulted we found scant reference to the opinions of Spanish doctors regarding different aspects of vitamin D in the Spanish population in general or in their patients, their views on desirable levels of vitamin D, and lastly, the dose they would recommend be administered. In this study we would like to make a first approximation of these data, which will allow us to understand what knowledge Spanish doctors have of vitamin D.

## Material and method

To carry out this study we obtained data on the whole population of doctors specialising in primary care, rheumatology, traumatology, internal medicine, rehabilitation and endocrinology in Spain, classified according to their respective autonomous communities. Subsequently they were grouped as primary care specialists and other specialists (the rest).

The sample size in each study group (primary care, and other specialists), was determined in

order to estimate each proportion with an error quotient of 5%. To achieve this it was necessary that 381 questionnaires be completed in each of the groups.

The participants were invited to access a web page which contained a questionnaire designed for the study and where they had to enter the data directly. Each doctor could on access only one questionnaire by means of a code which had been provided earlier. The questionnaire was completed in approximately 2 minutes and the data exported to an Excel spreadsheet, and then imported into the SPSS<sup>®</sup> programme, where the statistical calculations were performed.

**Statistical analysis.** In all the groups considered, the variables were summarised as percentages, which were compared using the  $\chi^2$  test. A hypothesis test was considered statistically significant when the corresponding p value was less than 0.05. Those variables which showed a significant association with a specialism (primary care/other) were put through a multidimensional correspondence analysis. From the  $\chi^2$  distance between the categories in the Burt table a group of points was generated in a space with the dimension p -1. The first two principal components were then extracted and the variability percentages explained by each of the components were evaluated. The data were analysed using the statistical software package R.

In addition to classifying the participants as a function of their specialisms in two groups (primary care and other specialisms), a second stage addressed gender, so enabling the opinions of the men to be compared with those of the women.

Figure 1. Percentage of doctors who gave their opinion on the ideal levels of vitamin D (measured as 25-hydroxycolecalciferol – 25-HCC)

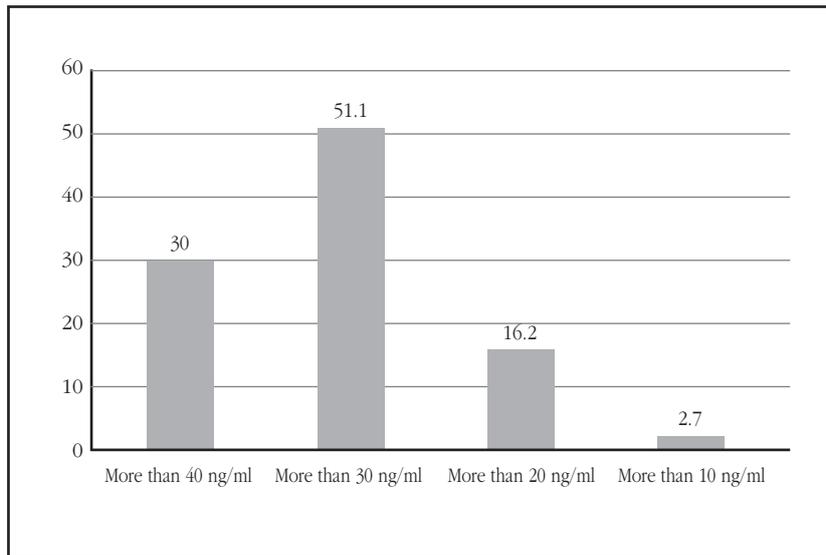
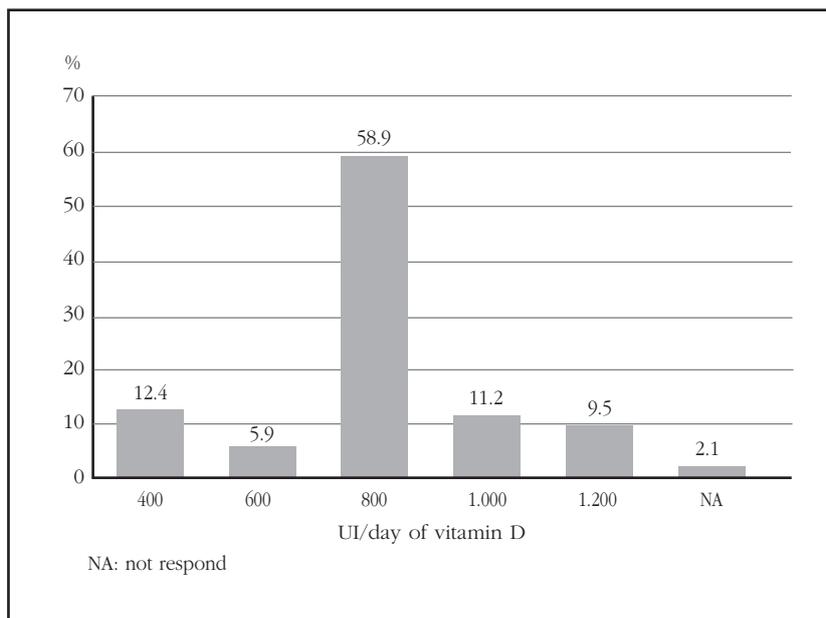


Figure 2. Ideal dose of vitamin D to be administered daily to patients according to the opinion of Spanish doctors



**Results**

*1. Description of the participants in the study*

A total of 777 doctors across Spain responded to the survey, 419 male (53.9%) and 358 (46.1%) female. The overall mean age was 46.6±8.9 years, with the males being older than the females (49.1±8.7 years vs 43.7±8.3 years, p<0.001).

Approximately half of the doctors, 377 (48.5%), worked in primary care. Of the remaining 400 (51.1%), who were hospital specialists, the most common specialisms were rheumatology (15.3%), traumatology (11.3%) and rehabilitation (9.5%).

Doctors from all 17 of the autonomous communities participated. Andalusia, with 98 doctors

(12.6%) was the autonomous community with the highest rate of participation, followed by Catalonia with 82 doctors (10.6%). Cantabria, with 19 doctors, was the autonomous community which had the lowest number of responses. Figure 1 shows the results obtained when the doctors were asked what they considered to be the ideal levels of vitamin D, measured by its reserve metabolite, 25-hydroxyvitamin D (25-HCC). As may be observed, more than 80% of those surveyed (81.1%) were of the opinion that patients needed to have a value of 25-HCC higher than 30 ng/ml. While only 2.7% thought that this value should be greater than 10 ng/ml.

*2. Results expressed as a function of the gender of the participants*

In Table 1 are recorded the opinions of Spanish doctors regarding different aspects of vitamin D, expressed globally on the one hand, and as a function of gender on the other. Only 36% thought that the Spanish population in general had sufficient levels of vitamin D, and those who thought that patients attending their clinics had sufficient levels of vitamin D amounted to less than 30% (28.8%). There were no statistically significant differences in these opinions as a function of the doctors' gender.

When asked where they thought vitamin D exerted its beneficial effects, almost 80% (79.8%) thought that this

effect occurred both in the bone and in the musculo-skeletal and immune systems. Furthermore, 72.1% of the doctors surveyed thought that there was a relationship between levels of vitamin D and falls. Again, no statistically significant differences were observed in these opinions as a function of the gender of the doctors. With regard to the way vitamin D was obtained, the majority of Spanish doctors (86.5%), thought that all available means should be used, which included exposure to sun, dietary intake or by means of drugs. So, in the specific case of older people, a great proportion of the doctors (87.5%) were in favour of the administration of vitamin D supplements to this group.

Table 1. Opinion of Spanish doctors (as a percentage) regarding levels of vitamin D, according to gender

		Total N=777	Male N=419	Female N=358	P
Suitable levels of vitamin D in	Spanish town	36.9	38.4	35.2	0.353
	Own doctor's office	28.8	31.3	26.0	0.105
Place to vitamin D is beneficial	Bone (1)	3.6	3.6	3.6	0.876
	Musculoskeletal (2)	0.8	0.7	0.8	
	Immunologic	0.1	0	0.3	
	All previous	79.8	80.0	79.6	
	Only 1 and 2	15.7	15.8	15.6	
There is an association between vitamin D and falls	Yes	72.1	69.0	75.7	0.100
	No	15.7	17.9	13.1	
	No opinion	12.2	13.1	11.2	
Obtaining source vitamin D	Sun	4.0	3.6	4.5	0.787
	Diet	3.6	3.3	3.9	
	Drug	5.3	5.5	5.0	
	All previous	86.4	87.1	85.5	
	None of the above	0.8	0.5	1.1	
Should vitamin D administered to the elderly?	Yes	87.5	89.5	85.2	0.157
	No	7.2	6.4	8.1	
	No opinion	5.3	4.1	6.7	
Is substantiated the importance assigned to the vitamin D?	Correct	81.1	81.9	80.2	0.528
	Correct but disproportionate	11.7	12.1	11.2	
	It is a fallacy of the pharmaceutical industry	0.6	0.5	0.8	
	No opinion	6.6	5.5	7.8	

With regard to whether the current interest in vitamin D is correct, disproportionate, or is a fallacy of the pharmaceutical industry, 81.1% of those surveyed thought that the interest was correct, and only 0.6% thought that it was an industry fallacy. On this question, 6.6% of all the doctors did not express an opinion.

Finally, in terms of the dose of vitamin D which should be administered, it was observed that even though there is a wide variety of opinions, more than 80% of the doctors thought that it was necessary to administer 800 or more UI daily of vitamin D (Figure 2).

### 3. Results expressed as a function of the specialisms of the doctors

Table 2 records the opinions of Spanish doctors regarding the same questions, but classified according to their specialisms, grouping on the one hand primary care doctors, and on the other, the other specialisms (traumatology, internal medicine, rehabilitation, rheumatology, endocrinology and gynaecology).

On this occasion there were statistically significant differences in the perceptions the primary care doctors had in comparison with the other specialists, with 40.8% having the view that the general popula-

tion had adequate levels of vitamin D, as opposed to 33.2% of the other specialists ( $p=0.028$ ). Concerning levels of vitamin D among patients attending their clinics, 34.7% of the primary care doctors thought that their patients had sufficient levels of vitamin D, as opposed to 23.2% in the other specialists ( $p=0.001$ ).

When asked where they thought vitamin D exerted its beneficial effects, whether there was an association between vitamin D and falls, and finally, what they thought should be the source of vitamin D, the responses did not show any statistically significant differences between the primary care specialists and the other specialists.

However, a significant difference was found with respect to their opinions on whether they thought it necessary to administer vitamin D to older people, with 84.9% of the primary care doctors believing that it was, as opposed to 90% of those of other specialisms ( $p=0.004$ ).

In terms of what would be the ideal dose of vitamin D to be administered daily to patients, in general less than 20% of doctors supported the idea of using doses lower than 800 UI/day. In Figure 2 it is observed that more than 80% of those surveyed thought that it was necessary to administer 800 UI/day or even more.

Table 2. Opinion of Spanish doctors (as a percentage) regarding levels of vitamin D, according to speciality

		Speciality		P
		Primary Care N=377	Other N=400	
Suitable levels of vitamin D in	Spanish town	40.8	33.2	0.028
	Own doctor's office	34.7	23.2	<0.001
Place to vitamin D is beneficial	Bone (1)	3.2	4.0	0.567
	Musculoskeletal (2)	1.1	0.5	
	Immunologic	0	0.2	
	All previous	78.8	80.8	
	Only 1 and 2	17.0	14.5	
There is an association between vitamin D and falls	Yes	72.1	72.0	0.864
	No	16.2	15.2	
	No opinion	11.7	12.8	
Obtaining source vitamin D	Sun	4.5	3.5	0.753
	Diet	3.7	3.5	
	Drug	4.5	6.0	
	All previous	86.7	86.0	
	None of the above	0.2	1.0	
Should vitamin D administered to the elderly?	Yes	84.9	90.0	0.004
	No	10.3	4.2	
	No opinion	4.8	5.8	
Is substantiated the importance assigned to the vitamin D?	Correct	76.9	85.0	0.018
	Correct but disproportionate	14.9	8.8	
	It is a fallacy of the pharmaceutical industry	1.1	0.2	
	No opinion	7.2	6.0	

Lastly, in Figure 3 the variability of the data with respect to opinions about vitamin D is observed as a function of the specialism of the doctors surveyed. The two axes used account for 74.9% of the variability of the data. The horizontal axis has the greater importance, accounting for 59.5% of the variability of the data. The second axis explains 15.4%.

In the multiple correspondence analysis those variables are introduced which show a significant association with the specialism (primary care/other specialisms). As can be seen, the profile of the primary care doctors differs from those of the other specialists in terms of their approach to treatment with vitamin D. The hospital specialists have a stronger conviction in relation to the importance of vitamin D and its administration to older people. More of them think that levels seen in both the patients in their clinics and in the general Spanish population are inadequate. There is an association between the opinion that levels are adequate in their clinics and that this might also apply in the Spanish population. The importance given to vitamin D being administered to

older people is also associated with the belief that the importance they be given it is correct.

## Discussion

Interest in vitamin D has increased notably in recent years. We understand better its physiology and physiopathology, above all that related to the extra-bone aspects of this hormone<sup>10-17</sup>.

The metabolite which determines the status of the reserves of vitamin D is 25-hydroxycolecalciferol (25-HCC). There is a consensus in recommending blood levels of vitamin D higher than 30 ng/mL of 25-HCC, so avoiding an increase in blood PTH and the development of secondary hyperparathyroidism<sup>18-23</sup>. A figure lower than 30 ng/mL is considered to be insufficient, while it has been agreed to establish vitamin D deficiency as a level of 25-HCC below 20 ng/mL<sup>22</sup>. The doctors surveyed knew of and agreed with these figures, with more than 80% of those surveyed (81.1%) giving the view that patients should have a value of 25-HCC higher than 30 ng/mL, as is seen in Figure 1. It is worth noting that up to 30% of the doctors thought that optimum levels were even higher, more than 40 ng/mL,

which coincides with similar views of recognised and prestigious authors such as Professors Heaney or Holick<sup>19,20,22</sup>.

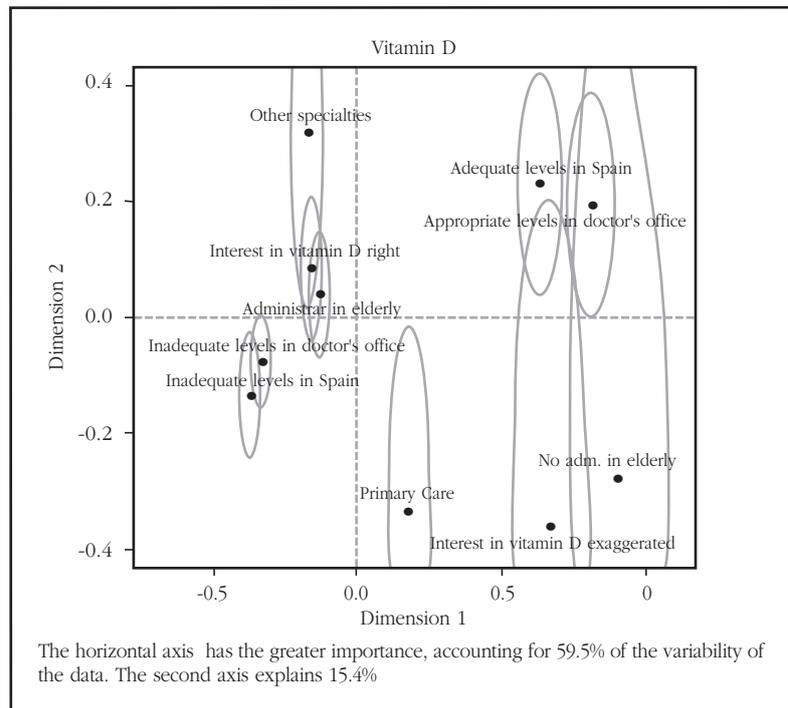
When we compared the doctors' opinions on various topics related to vitamin D, we observed that there were no differences as a function of their gender. We obtained no statistically significant differences in their opinions in any of the survey questions. In general terms, the Spanish doctors thought that both the general Spanish population, as well as their patients, were deficient in vitamin D. In fact they thought that more than 63% of the population and 70% of their patients had low levels of vitamin D. This is precisely what has been reported in various series carried out in our country, both in the healthy population and in patients with different pathologies<sup>24-28</sup>.

There is a widely-held opinion, in around 80% of those surveyed, regarding the beneficial effects of vitamin D in the bone, and in the musculo-skeletal and immune systems. Similarly, 72.1 % of the doctors thought that there was an association between vitamin D and falls, a fact that has been confirmed in various studies and meta-analyses<sup>29-31</sup>.

Also, the vast majority of the doctors (87.5%) thought, independently of their gender, that it was necessary to administer vitamin D to older people, and more than 80% believed that the importance which is currently being given to vitamin D was justified. It is, therefore, interesting to highlight the fact that some studies have shown that it is precisely those Spanish patients affected by osteoporosis who received little vitamin D. Thus, in a telephone study it was confirmed that older people over 75 years of age took daily amounts of 120 UI of vitamin D, a quantity clearly insufficient for their needs<sup>32</sup>. In another study, carried out in younger Spanish women, of between 16 and 60 years of age, it was confirmed that 72.6% of them did not achieve the recommended intake of either calcium or vitamin D<sup>33</sup>.

In another section of our work we compared the opinions of the doctors as a function of whether they were primary care specialists or specialists of another discipline, but related to osteoporosis. We found statistically significant differences in 3 questions. Thus, 40.8% of the primary care doctors considered that the Spanish population in general had adequate levels of vitamin D, while 33.2% of the doctors of the other specialisms had this view ( $p=0.028$ ). Similarly, 34.7% of the primary care doctors believed that the patients in

Figure 3. Variability of data with respect to the opinions as a function of the specialism of the doctors surveyed



their clinics had adequate levels of vitamin D, with 23.2% of the other specialists believing this ( $p<0.001$ ). There were also statistically significant differences in the opinions they had as to whether it is necessary or not to administer vitamin D to older people, with the proportion of doctors who believed that it is necessary higher among the other specialists than among the primary care specialists (90% as against 84.9%,  $p=0.004$ ).

The opinions of Spanish doctors coincide with those published for doctors from New Zealand, where a survey carried out in 1,089 primary care doctors came to practically the same conclusions as ours<sup>34</sup>.

In conclusion, Spanish doctors are highly aware of vitamin D and its beneficial effects both in bone and for the whole organism, and their opinions coincide in general terms with the position documents published on this issue.

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