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Drivers and strategies to avoid overuse. The experience of Spanish primary-care-providers handling uncertainty and patients' request

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3 **Drivers and strategies to avoid overuse. The experience of Spanish primary-care-providers**
4 **handling uncertainty and patients' request**

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ABSTRACT

Objectives: Identified the sources of overuse from the point of view of the Spanish primary care professionals, and analyze the frequency of overuse due to pressure from patients in addition to the responses when professionals facing these demands.

Design: A cross-sectional study was conducted.

Setting: Primary Care in Spain.

Participants: A total number of 2201 providers (general practitioners, pediatricians, and nurses) were recruited during the survey.

Primary and secondary outcome measures: The frequency, causes, and responsibility for overuse, and the frequency that patients demand unnecessary tests or procedures and the frequency that professionals satisfy such demands, the types of requests, the profile of the most demanding patients, and arguments to dissuade the patient.

Results: In all, 936 general practitioners, 682 pediatricians, and 286 nurses replied. Patients request (67%) and medicine defensive (40%) were the most cited causes of overuse. Five hundred twenty-two (27%) received requests from their patients almost every day for unnecessary tests or procedures, and 132 (7%) recognized granting the requests. Higher pressure and aggressiveness by patients increased overuse ($p < 0.001$). The lack of time in consultation, and printed and digital media contributed to the professional's inability to adequately counter this pressure by patients. Evidence and clinical safety were the arguments that dissuade patients from their requests the most ($p < 0.001$). Cost savings are not a convincing argument, above all for pediatricians ($p < 0.001$). General practitioners resisted more pressure from their patients ($p < 0.001$), while nurses admitted to carrying out more unnecessary procedures ($p < 0.001$).

Conclusion: Satisfy the patient and patient uncertainty about what should be done and the defensive medicine practices explains overuse. Providers differences facing patient request and avoiding defensive medicine are related to overuse.

KEYWORDS

Medical overuse; Physician stewardship; Cost-conscious care; Health care costs; Physician decision-making; Health literacy

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The strengths of the present study include its large sample of providers working on an ample number of Spanish primary care health organizations. This sample included general practitioners, pediatricians and nurses.
- Frequency and causes of overuse were analyzed beside the profile of the most demanding patients, and arguments to dissuade the patient.
- The differences among providers facing patient request and avoiding defensive medicine are related to overuse.
- Although data are derived only from Spain, it is likely to be representative of the rest of the health systems where physicians are the gatekeeper.
- The study did not on a random selection of participants with a limited number of males in the cases of pediatrics and nursing even though their number is proportional

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to that of their presence within these professional groups. The data correspond to a health model funded by taxes.

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Drivers and strategies to avoid overuse. The experience of Spanish primary-care-providers handling uncertainty and patients' request

INTRODUCTION

Among the causes of lack of quality are the incorrect use of diagnostic or therapeutic resources due to medical errors,[1-2] underuse,[3] and overuse.[4]

Overuse is understood as the provision of healthcare when lacking evidence or when the potential benefits from the procedure or treatment does not outweigh its risks.[5] Overuse of diagnostic and therapeutic resources is present in all specialties, all health systems,[4, 6] and at all care levels,[7] and it represents a threat to patient safety and the sustainability of health systems.[8] Reduce overuse in primary care is particularly relevant when the general practitioner is the gatekeeper of the health system. However, in many countries the actual pattern of overuse remains virtually unknown.[9]

Causes of overuse

The immediate causes of overuse include[10-15] insufficient updating of knowledge by professionals, defensive medicine, the custom of doing things that have always been done, lack of time in consultation, inadequate incentives, influence by the pharmaceutical industry, and inadequate communication with patients. Patients requesting diagnostic tests[9, 16-17] or treatments based on personal beliefs or from information obtained by other patients or from the Internet[9, 18-19] they have been also introduced as cause of overuse.

Patients in primary care usually request diagnostic tests, referrals to specialists, and medications, more frequently antimicrobials and for reducing pain.[9, 20] These requests generate dissatisfaction and make professionals uncomfortable[21] because they call their clinical expertise into question,[22] and this affects the quality of the relationship with the patient. Primary care physicians accept and handle the relationship with the patient better in the case of requests for tests and referrals to specialists than when the patient requests certain medications.[23] However, they often manifest in a desire to fulfill their patients' expectations increasing overuse.[24] Other drivers of medical overuse from a primary care perspective includes also the lack of communicative skills or medical work experience, insufficient time during consultation and fear of malpractice.[9, 24-25]

Questions to be replayed

There is little research on the role of the patient and professional in overuse, and most of it has been carried out in the USA, which has an organizational environment different from the models based on a national health system.[11] The few data there are suggest that medical recommendations to reduce overuse are difficult to follow and difficult for patients to accept,[26] although research is needed to discern profile of patients prone to accept or refuse these recommendations. It is hoped that the organizational model of the provision of healthcare has a direct influence on overuse. In the case of models where the primary care physician is the gatekeeper, one could expect greater pressure upon this professional.[27]

Objectives

This study identified the sources of overuse from the point of view of the Spanish primary care professionals, and analyze the frequency of overuse due to pressure from patients in addition to the responses when professionals facing these demands.

METHOD

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3 This is an observational study based on an online survey directed at a group of primary care
4 professionals in Spain: general practitioners, nurses, and pediatricians. The field study took
5 place between March and July 2017.

6 **Setting**

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8 In Spain, the primary care provides stepped care based on the right care at the right place at
9 the right time, balancing quality and costs. This system strengthens the gatekeeper role of
10 general practitioners (and pediatricians in the case of children). They are the ones who make
11 diagnostic and therapeutic decisions in every case, which includes the possibility of referrals to
12 other specialists at hospitals.

13 Spanish territory is divided into health districts, and in turn, these are divided into health
14 zones. Each zone contains a health center that is responsible for providing healthcare for that
15 territorial demarcation, with general practitioners, pediatricians, and nurses. One health
16 district attends to an average of some 250,000 residents. The composition of professionals on
17 primary health teams vary depending upon the population of the health zone (ratio around
18 1300 residents per general practitioner[28] and 1029 residents between the ages of 0 and 14
19 per pediatrician).[29] The number of nurses is similar to that of general practitioners and
20 pediatricians.[30]

21 **Materials**

22
23 The scope of the survey was based on the instrument employed by the ABIM Foundation.[11]
24 Seven blocks of questions were analyzed and 28 questions formulated. Specifically analyzed
25 were the causes and responsibility of overuse unnecessary, tests or procedures demanded
26 most by patients, the profile of the patient who insists upon these requests, the frequency of
27 receiving requests and the frequency that the professional orders them, the arguments
28 employed for dissuading the patient and the extent to which they succeed, the reactions by
29 the patient to the professional's refusal. A pilot test on comprehending the questions was
30 carried out with six professionals whose profiles were similar to those who participated in the
31 study. Proposals for changes to the wording or response scales were incorporated into the
32 final draft of the questions.

33 **Participants**

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35 To carry out the survey on a population of 63753 professionals (28294 general practitioners,
36 6251 pediatricians and 29208 nurses), a minimal sample of 2201 professionals from all groups
37 (general practitioners, pediatricians, and nurses) was determined, considering a 1% error, a
38 confidence level of 95%, $p=q=0.50$ and a response rate of 20%.

39
40 The field study was conducted with collaboration by the health services of Andalucía, Aragón,
41 Madrid, Navarra, and the Comunidad Valenciana, the Spanish Association of Primary Care
42 Pediatrics (AEPap), the Spanish Society of Outpatient and Primary Care Pediatrics (SEPEAP),
43 the Illustrious Official College of Physicians of Valencia, the Council of Nursing of the Valencian
44 Community (CECOVA), and the Spanish Society of General and Family Practitioners (SEMG).
45 These organizations invited their associates to participate in this study by email. They
46 explained the study's scope to each group of primary care givers, its voluntary nature and the
47 guarantees for the confidentiality of their responses, instructions on how to respond, and it
48 provided a link to a Google Forms page where they could respond. A reminder to motivate
49 responses was given.

50 **Non-eligible participants**

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52 The responses from professionals who indicated that they worked at hospitals or other centers
53 different from primary care were excluded. Also, participants were excluded when three or
54 more questions were not replayed.

Potential sources of bias

The reasons why some professionals answered the survey and others did not could affect the meaning of their answers. A sampling error of 1% was defined to reduce its effect. A leading questions bias was controlled using validate questions although some participants encouraged answers expected from the researcher.

Statistical methods

Data analysis was completed using descriptive and inferential descriptive statistics, with chi-square and ANOVA to establish relationships between qualitative variables and between qualitative and quantitative variables, respectively. The overuse experience was distinguished by different types of providers. The null hypothesis was rejected when $P < 0.05$.

Ethical approbation

This study was assessed and approved by the Ethics Committee of Primary Care Research of the Valencian Community, Spain.

RESULTS

In all, 2098 professionals provided complete response, achieving a 95.3% of the responses expected. Of these, 194 indicated they were working in hospitals, so the responses from 1904 professionals (936 general practitioners, 682 pediatricians, and 286 nurses) (Table 1) were coded and analyzed. Most of these, 1190 (62.5%), were recruited by invitation from professional societies, and 714 (37.5%) were invited by their health services. There were 1816 (95.4%) working at health centers from the Spanish public health system, with the remainder either working in private health or practicing in both professional fields. Three-quarters of the sample ($N=1432$, 75.2%) had more than 15 years of professional experience. Males in pediatrics and nursing, in addition to the professionals from the private sector, were underrepresented in a manner similar to their proportion in the makeup of primary care in Spain.[31]

Table 1. Description of the sample of professionals whose responses were analyzed.

	Nurses (N = 286)		General practitioners (N = 936)		Pediatricians (N = 682)	
	N	%	N	%	N	%
Professional experience						
≤ 5 years	20	7	38	4.1	65	9.5
Between 6 and 15 years	41	14.3	142	15.2	166	24.3
Between 16 and 29 years	129	45.1	470	50.2	268	39.3
More than 30 years	96	33.6	286	30.6	183	26.8
Gender						
Male	60	21	429	45.8	196	28.7
Female	226	79	507	54.2	486	71.3
Area of professional practice						
Public system	286	100	892	95.3	638	93.5
Private or both	0	0	44	4.7	44	6.5
Belongs to (institution or organism)						
Public health system	259	90.6	317	33.9	138	20.2

	CECOVA	27	9.4	--	--	--	--
	SEMG	--	--	464	49.6	--	--
	Illustrious Official College of Physicians of Valencia	--	--	155	16.6	62	9.1
	AEPap	--	--	--	--	280	41.1
	SEPEAP	--	--	--	--	202	29.6

CECOVA - Council of Nursing of the Valencian Community

SEMG - Spanish Society of General and Family Practitioners

AEPap - Spanish Association of Primary Care Pediatrics

SEPEAP - Spanish Society of Outpatient and Primary Care Pediatrics

Causes of overuse

The reasons that general practitioners and pediatricians gave as being more directly responsible for inappropriate overuse were patient (or guardian) insistence and the need to attain greater safety or control over the process (Table 2). Male general practitioners, compared to their female counterparts, showed a greater tendency to justify inappropriate overuse on the grounds of satisfying the patient ($\chi^2=5.2$, $p=0.024$). As causes of overuse, less experienced general practitioners indicated following regulations ($\chi^2=14.4$, $p=0.002$), making the patient feel satisfied with the care received ($\chi^2=11.0$, $p=0.011$), and avoiding possible claims ($\chi^2=8.6$, $p=0.035$). When comparing the opinions of general practitioners who only worked within the public sector with those who worked in both those public and private, it was observed that the former tended to consider the lack of time in consultation as a reason for overuse more frequently ($\chi^2=13.1$, $p=0.001$). However, for the latter (with activities in both the public and private systems), avoiding a claim by patients was more important ($\chi^2=21.2$, $p=0.001$), and they more frequently considered that the practice guides they used as reference were obsolete ($\chi^2=6.8$, $p=0.009$). Pediatricians who combined activities in both sectors reported more frequently on the difficulties of dissuading the guardian and making him/her see that the procedures requested for the child were unnecessary ($\chi^2=4.6$, $p=0.037$). General practitioners ($\chi^2=11.8$, $p=0.001$) and pediatricians ($\chi^2=5.8$, $p=0.018$) who only worked in the public sector felt more pressured by patients than those who practiced in both sectors.

Table 2. Reasons for ordering an unnecessary test or carrying out an unnecessary procedure.

	General practitioners (N = 936)		Pediatricians (N = 682)		Chi ²	P-Value
	N	%	N	%		
To gain greater control and safety of the case	359	38.4	291	42.7	3.1	0.081
Due to the standard or custom of making the order in the area	111	11.9	21	3.1	40.1	0.001
To avoid a future demand	200	21.4	92	13.5	16.6	0.001
To satisfy the patient	196	20.9	92	13.5	15.0	0.001
Out of respect for the patient's decisions	132	14.1	130	19.1	7.1	0.009
Due to lack of time for patient consultation	418	44.7	198	29.0	40.8	0.001
Because I do not know how to make the patient understand that it is unnecessary	262	28.1	150	22.0	7.5	0.007

To avoid a claim	177	18.9	80	11.7	15.2	0.001
To carry out epidemiological or clinical studies	19	2.0	26	3.8	4.6	0.045
Due to indications in obsolete guides	26	2.8	19	2.8	0.0	1.000
Due to insistent pressure by the patient	627	67	398	58.4	12.6	0.001

Responsibility for overuse

The responsibility for overuse was assigned to, in order, the patients' relatives, the mass media, the professionals themselves, health pages on the Internet, and defensive medicine practices (Table 3). Male professionals attributed the responsibility for overuse of resources due to pressure by patients more directly on health services senior management ($F=4.3$, $p=0.038$). Professionals with fewer years of experience attributed greater responsibility for this overuse to the very professionals ($F=9.6$, $p<0.001$) and defensive medicine ($F=4.4$, $p<0.001$). Those solely working in the public health system (as opposed to those who also worked in private practice) held the media ($F=6.4$, $p=0.011$) and patients' relatives ($F=4.5$, $p=0.03$) more directly accountable. No cross-effects from the interaction of these variables were observed.

Table 3. Responsibility for overuse in the opinion of the professionals surveyed.

	Nursing (N = 286)		General Medicine (N = 936)		Pediatrics (N = 682)		F	P-Value
	Average	SD	Average	SD	Average	SD		
Senior management of health systems	6.5	2.8	6.5	2.7	5.3	3.0	38.5	0.001
Center directors	6.0	2.8	5.4	2.8	4.4	2.9	37.1	0.001
Directors or Coordinators of nursing/physicians	5.9	2.7	4.7	2.8	4.2	2.8	39.3	0.001
Nurses/Physicians	6.7	2.4	7.0	2.1	7.4	2.2	13.2	0.001
Patient associations	5.7	2.5	6.2	2.7	5.4	2.8	15.5	0.001
Press, radio, and television	7.0	2.6	7.6	2.5	6.8	2.6	21.2	0.001
Managers of Internet health platforms	6.8	2.4	7.0	2.6	6.3	2.6	14.8	0.001
Patients	7.7	2.1	7.5	2.1	5.0	3.3	194.7	0.001
Relatives of patients	7.8	1.9	7.5	2.2	7.7	2.2	3.6	0.027
As a defensive measure against possible future claims	7.4	2.3	6.8	2.3	6.4	2.4	18.8	0.001

Scale from 0 to 10, minimum and maximum responsibility, respectively.

Pressure by patients and responses from professionals

Only 31 (1.6%) of those surveyed said that they had not received any requests from patients (more frequent among professionals with more than 15 years of experience), while 103 (5.4%) said that they received requests like these from patients every day (normally younger professionals). General practitioners were those who claimed to be under greater pressure to carry out unnecessary tests or procedures ($\chi^2=88.8$, $p<0.001$). However, it was the nurses who admitted to carrying out these types of unnecessary procedures more frequently; pediatrics did so the least ($\chi^2=175.7$, $p<0.001$) (Table 4).

Table 4. Pressure from patients and response by professionals.

	Patients (or their guardians) request unnecessary tests and procedures from you		You order/carry out unnecessary tests or procedures due to pressure from a patient (or guardian)		You convince the patient (or guardian) that it is unnecessary and can pose significant risk		The patient's response is negative, or even aggressive, when you refuse to carry out a procedure that the patient requests from you		
	N	%	N	%	N	%	N	%	
General practitioners (N = 936)									
Never	12	1.3	118	12.6	55	5.9	237	25.3	Never
Monthly	192	20.5	463	49.5	248	26.5	400	42.7	Sometimes
Almost every week	396	42.3	271	29.0	356	38.0	168	17.9	One-half of the time
Almost every day	260	27.8	69	7.4	227	24.3	92	9.8	Most of the time
Every day	76	8.1	15	1.6	50	5.3	39	4.2	All the time
Pediatricians (N = 682)									
Never	9	1.3	188	27.6	14	2.1	231	33.9	Never
Monthly	228	33.4	401	58.8	182	26.7	343	50.3	Sometimes
Almost every week	316	46.3	84	12.3	262	38.4	73	10.7	One-half of the time
Almost every day	113	16.6	6	0.9	188	27.6	30	4.4	Most of the time
Every day	16	2.3	3	0.4	36	5.3	5	0.7	All the time
Nurses (N = 286)									
	N	%	N	%	N	%	N	%	

Never	10	3.5	37	12.9	9	3.1	36	12.6	Never
Monthly	82	28.7	123	43.0	106	37.1	158	55.2	Sometimes
Almost every week	137	47.9	87	30.4	71	24.8	36	12.6	One-half of the time
Almost every day	46	16.1	31	10.8	92	32.2	54	18.9	Most of the time
Every day	11	3.8	8	2.8	8.0	2.8	2	0.7	All the time

The professionals who reported receiving requests from patients for unnecessary tests or procedures more frequently were those who acknowledged either ordering tests (every day or almost every day) for them or carrying out unnecessary procedures themselves for patients ($\chi^2=490.3$, $p<0.001$). They also stated that the reaction by the patient (or guardian) when a request for tests or procedures was denied was more negative or aggressive ($\chi^2=475.8$, $p<0.001$). Those who said they were less capable of convincing patients that such request was unnecessary or that it increased the risk of an adverse event claimed to receive requests by patients for unnecessary tests or procedures more frequently ($\chi^2=123.5$, $p<0.001$), and they also said more frequently that the reaction by the patient (or guardian) when refusing such request was aggressive ($\chi^2=476.9$, $p<0.001$).

Male nurses, compared to their female counterparts, reported greater pressure from patients to carry out unnecessary procedures ($\chi^2=14.8$, $p=0.005$) and, compared with the females, carried out these unnecessary procedures more frequently ($\chi^2=14.1$, $p=0.007$). The ability to dissuade patient requests was similar in men and women in all three professional profiles. However, male nurses, compared to those female, reported receiving an aggressive response more frequently ($\chi^2=13.6$, $p=0.009$).

Pediatricians with less than 5 years of experience reported receiving requests for unnecessary tests or procedures most frequently ($\chi^2=52.6$, $p<0.001$). Pediatricians who had practiced fewer years stated that when refusing a patient's request, the patient's reaction was frequently more negative or even aggressive in comparison to their more experienced colleagues ($\chi^2=68.4$, $p<0.001$).

What patients request

The most frequent requests from patients were for routine analytical examinations, referrals to specialists, antimicrobial treatments, radiological studies, and requests for healing materials without indication (Table 5). The profile of the patient who requested unnecessary nursing procedures the most corresponded to that of a woman (145, 50.7%) over 66 years of age (158, 55.2%) who suffered various chronic conditions (154, 53.8%). In the case of general practitioners, these were usually women (604, 64.5%) between 51 and 65 years of age (411, 43.9%) with a low prevalence pathology (296, 31.6%) or one that was unspecified (219, 23.4%) and who consulted the Internet about their concerns (172, 18.4%). In pediatrics, the profile of the guardian who most persistently requested unnecessary tests or procedures corresponded to the mother of a patient (480, 70.4%) who suffered an unspecified pathology (367, 53.8%) and who usually sought information on health webpages (130, 19.1%).

Table 5. Unnecessary tests and procedures patients usually request.

General practitioners (N = 936)	N	%	Pediatricians (N = 682)	N	%	Nurses (N = 286)	N	%
Routine checkup analysis	709	75.7	Routine checkup analysis	510	74.8	Taking vital signs	225	78.7
Referrals to specialists without any concerning features [§]	628	67.1	Administration of antibiotics when is not recommended [§]	491	72.0	Administration of treatment that does not require professionals	175	61.2
Radiological studies without any concerning features [§]	570	60.9	Referrals to other specialists without any concerning features [§]	450	66.0	Delivery of healing materials without indication	84	29.4
Magnetic Resonance without any concerning features [§]	380	40.6	Radiological studies without any concerning features [§]	197	28.9	Delivery of glucometer without the patient having started hypoglycemia treatment	72	25.2
PSA* in asymptomatic patients	358	38.2				Administer vaccinations outside the vaccine calendar without indication by pediatrician	34	11.9
Administration of antibiotics when is not recommended [§]	348	37.2						
Computed Tomography when is not recommended [§]	280	29.9						

*PSA - prostate-specific antigen

[§]following Do not DO Recommendations from Grupo de trabajo de la SEMFyC para el proyecto Recomendaciones «NO HACER». Recomendaciones NO HACER. Barcelona: SEMFyC ediciones, 2014, and Asociación Española de Pediatría (AEP). Recomendaciones de “no hacer” en Pediatría. 2014 [consultado 24-06-2017]: Available in: <http://www.aeped.es/documentos/recomendaciones-no-hacer-en-pediatria>.

Ideas that work to dissuade the patient

According to the majority of those surveyed, the arguments that worked best for dissuading the patient or guardian that the request was inadequate were clinical reasons and for patient safety (Table 6). The safety of ($\chi^2=31.7$, $p<0.001$) and avoiding discomfort in the child ($\chi^2=57.7$, $p<0.001$) were considered more effective arguments, above all for pediatricians. Cost savings was the least effective argument for pediatricians ($\chi^2=43.9$, $p<0.001$), while avoiding patient discomfort was least effective for general practitioners ($\chi^2=57.7$, $p<0.001$). For more experienced pediatricians ($\chi^2=30.6$, $p=0.002$) and nurses ($\chi^2=23.6$, $p=0.023$), arguing clinical reasons to dissuade the patient or guardian's request worked better.

Table 6. Degree of effectiveness as reported by the professionals about the arguments for convincing the patient that the treatment or procedure is unnecessary.

Argument	General practitioners N = 936	Pediatricians N = 682	Nurses N = 286	Chi ²	P- Value=	Total N = 1904
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	N	%	N	%	N	%		N	%	
Patient safety	361	60.8	311	73.5	106	57.0	23.3	0.000	778	64.7
Clinical reasons based on knowledge	352	58.3	297	66.1	102	55.1	9.5	0.009	751	60.7
The result is achieved by other procedures	320	56.5	254	61.8	91	50.3	7.2	0.028	665	57.4
Saves patient discomfort	119	18.4	144	33.6	65	32.7	36.9	0.000	328	25.8
Saves time and money that have a positive effect on other patients	68	8.6	29	4.8	32	14.0	20.0	0.000	129	8.0

High and Very High degrees of effectiveness shown

Pediatricians were more successful than general practitioners and nurses at dissuading their patient that the requested test or procedure was unnecessary or that it posed unnecessary risk ($\chi^2=45.0$, $p<0.001$). Nurses reported more frequently that the patient's reaction to a request being refused due to being unnecessary was either negative or aggressive ($\chi^2=129.5$, $p<0.001$). Men and women from all three professional profiles expressed a similar ability for dissuading a patient's request. Less experienced pediatricians stated they were able to dissuade patients more frequently than other pediatricians ($\chi^2=23.9$, $p=0.021$).

Patients who requested healing materials to take home (24/48, $\chi^2=15.2$, $p=0.004$), vaccinations outside the vaccine calendar (11/34, $\chi^2=10.1$, $p=0.039$), and antibiotic treatments (31/491, $\chi^2=33.4$, $p<0.001$) were those who, in the opinion of the professionals surveyed, were least willing to accept explanations and refusals by the professionals for their request.

According to 1231 (64.7%) of those surveyed, an educational campaign directed at the population would help reduce the number of requests for unnecessary tests and procedures by patients. Such a campaign was seen as most useful by general practitioners (general practitioners, 8.0, SD 2.1, CI 95% 7.9-8.0; pediatricians, 7.7, SD 2.0, CI 95% 7.6-7.9; nurses, 7.7, SD 2.0; CI 95% 7.6-7.8). This opinion was independent of the respondent's experience as to whether the patient's response to the request being denied was negative ($F=1.3$, $p=0.266$) and the ability the professional believed to have in dissuading the patient ($F=1.7$, $p=0.140$).

DISCUSSION

The results of this study confirm the role that patients' requests and the medicine defensive play in overuse. In this study, women patients and patients who suffer an unspecified or yet-undiagnosed pathology exerted greater pressure upon the professionals. For the former group, and in order to interpret this result, it needs to be taken into consideration that in many European countries females frequently accompany the patient in the consultation (adult or minor).[36] As for the latter case, one needs to consider that in addition to the fears the very patient experiences due to the uncertainty of not knowing what is happening to him/her, there is added pressure from family members, the effect from consulting health news on the Internet, and news from the printed and digital media about medical advances and new techniques. Although professionals are directly responsible for overuse, and this and other research recognize this as such,[27, 33] we must also consider the role that patient associations, accreditation systems of websites, and associations of health news informers could play to succeed, among everybody, in reducing overuse figures.

In this case, it has been proven that overuse also has roots in the insecurity that an ill-defined pathology instills within the professional, the fear of an uncertain outcome for the indicated treatment, as well as the potential effects from a subsequent complaint by the patient or a

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3 lawsuit filed in a court of law. If we take into account the lack of a diagnosis, and then to it add
4 on the lack of time in consultation and the need for greater security for the very professional,
5 we find another of the main causes of overuse.[36]

6 For a significant portion of physicians, and for those surveyed in this study as well, maintaining
7 a positive relationship with the patient was essential,[25, 27] probably because it is one of the
8 basic therapeutic resources in primary care.[32] Not responding to a request or not knowing
9 how to dissuade the patient muddies the relationship. Furthermore, when the patient
10 questions the physician's clinical expertise, their relationship worsens and defensive medicine
11 tends to increase.[4, 8]

12
13 Previous research had found that, when compared to other specialties, general practitioners
14 were under greater pressure from their patients for unnecessary medical tests or procedures
15 to be carried out on them.[33] The fact that patients in primary care exert greater pressure
16 than in hospitals is observed in both organizational models of payment for medical acts as well
17 as in systems where the physician is the gatekeeper.[27, 33-34] These results should be
18 interpreted keeping in mind the assessment that patients give about both care levels in every
19 country and the belief that super specialization might be a key to quality medicine.

20
21 This study's findings reveal that as pressure from patients becomes more insistent, the
22 professionals either order or carry out a greater number of unnecessary test and procedures,
23 extending the initial observations general practitioners tend to accept requests from their
24 patients more so than other specialists.[34] General practitioners are pressured more by their
25 patients than pediatricians or nurses, although the latter are those who carry out unnecessary
26 procedures more frequently, probably because this group acknowledges being on the
27 receiving end of more aggressive responses from patients when turning down requests.
28 Nevertheless, these results should be qualified based on the request the patient makes and by
29 the dissemination of practice guides between professionals. It is unlikely that ordering a test
30 such as the Prostate-Specific Antigen test (PSA) in an asymptomatic male who insists so he can
31 "rest easy" is the same as initiating a totally contraindicated treatment and one that poses
32 risks for the patient. Most physicians accept the first situation more easily,[35] but resist the
33 second.[23, 36]

34
35 Information does not always contribute to fulfill these recommendations.[26] However,
36 providing the patient with clear and direct information about the clinical and safety reasons
37 that advise against carrying out certain tests or starting certain treatments contributes to
38 reducing overuse.[37-38] These results follow this line and confirm findings from research
39 conducted in other countries where primary care physicians draw on evidence to dissuade a
40 patient's request for a certain diagnostic test when they deem it unnecessary.[23] The other
41 argument that has also demonstrated its usefulness for dissuading the patient is safety, above
42 all for pediatricians. Considering the Spanish study with hospital physicians,[39] the
43 effectiveness of general practitioners and pediatricians in dissuading patients is similar to that
44 of their colleagues at hospitals. The pediatricians in this study did not report a dissuasive
45 capacity any different from that of their colleagues who care for adults.

46
47 The professionals who fail to dissuade patients from their requests feel as if they are under
48 greater pressure, they end up carrying out more unnecessary tests and procedures, and they
49 also receive more aggressive responses from their patients when refusing to carry out any of
50 their requests. Curiously enough, these results show that as requests from patients become
51 more misguided, for example vaccinating a minor outside the vaccine calendar, an antibiotic
52 when it is contraindicated, or giving healing materials to the patient so he/she can take them
53 home, the response from these patients is more negative, and even aggressive. Both of these
54 results could support the opinions of those surveyed about the usefulness of carrying out an
55 educational campaign among the population and the measures that have been adopted to
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1
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3 prevent aggression towards professionals. Although we do know that the lack of time in
4 consultation has a negative effect on clinical safety,[40] these data do not permit us to
5 determine whether the ability to dissuade patients from their requests might be different if
6 more time were dedicated per patient.

7
8 The frequency of requests for medical tests or procedures in the study by Zambrana & Lozano
9 [39] in Spanish hospitals exceeded the frequency of requests that physicians in American
10 hospitals reported by 16 percentage points. In this study in primary care, the frequency that
11 general practitioners said they receive requests from their patients was 38 percentage points
12 higher than what American physicians reported (78% versus 40%). The tendency in published
13 figures of overuse from organizational models of primary care similar to that of the Spanish
14 model [27] point in a similar direction, and suggests the gatekeeper's implication could not
15 enough to prevent (or at least reduce) overuse. Moreover, this debate remains open because
16 other studies conducted in the USA [34] indicate that overuse in the wake of patient requests
17 is similar at health centers in both wealthy areas and others with lower income levels.

18
19 Ignorance on behalf of the population has been analyzed in other research, especially that
20 regarding the use of therapies and requests for diagnostic imaging tests irrespective of the risk
21 from the ionizing radiation involved.[41] The frequency of overuse resulting from movements
22 grouped together under the "Less is More Medicine" label[42] has begun to be studied
23 systematically, and various campaigns have been launched to raise awareness in professionals
24 about what must not be done,[43-45] but studies analyzing the roles of patients and
25 professionals in overuse and the impact from campaigns to reduce overuse directed at the
26 population are still scarce. Furthermore, campaigns for reducing overuse in the style of
27 Choosing Wisely [45] confirm the need to influence health education, but also directed
28 especially at drawing attention to the risks from interpreting health websites without the
29 appropriate information, like, for example, considering their latest update, sources of
30 information, and the commitment to the quality of their contents,[46] and reducing the
31 negative impact that these sources of information are beginning to have on the relationship
32 between patients and professionals.[14, 47] This is also true in the case of publicly financed
33 health systems, to carry out campaigns to fortify solidarity behavior and properly use
34 diagnostic and therapeutic resources.

35 36 **Practical implications**

37
38 These results have direct implications on the professional level. First, fostering training in
39 communication skills, highlighting how to approach communication with a patient who applies
40 pressure to receive an unnecessary and/or harmful test or treatment for him or herself. For
41 example, by promoting the so-called web prescription by recommending safe sites to patients
42 where they can become informed, an aspect in which Spain lags somewhat behind.[47]
43 Second, establishing a framework of greater legal security for professionals who act in
44 accordance with practice guides.

45
46 On the health organization level, these results reinforce the need to establish the
47 implementation in primary care of up-to-date practice guides and to establish alerts and
48 assistance algorithms (including arguments for patients) on the ordering of tests, referrals, and
49 prescriptions for limiting overuse. Management indicators and annual or biennial targets could
50 include indicators related to overuse, especially in those cases where, furthermore, the risk to
51 patient safety increases.

52 53 **Generalizability**

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55 These results and recommendations could be applied to the healthcare systems where the
56 general practitioners (or pediatricians in the case of children) are the gatekeeper.

56 57 **Limitations**

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3 This study was based on a non-random selection of participants. The willingness to respond
4 could bias the sample selection. Although the public sector is overrepresented, this
5 overrepresentation is also observed in the reference population. The limited number of males
6 who answered in the cases of pediatrics and nursing limits the strengths of the comparisons,
7 even though their number is proportional to that of their presence within these professional
8 groups. The data correspond to a health model funded by taxes.

9
10 Overuse is a challenge for health systems, particularly those where the general practitioner is
11 the system gatekeeper, and it requires responses from both the clinical as well as economic
12 points of view.

13 **CONTRIBUTORS**

14
15 JJM and JMA-A conceived and designed the study. CS, PP-P, CN, OG and JG acquired the data
16 for the work. IC prepared the data and together with JJM and JMA-A conducted statistical
17 analysis. All interpreted data for the work. JJM and IC prepared a first draft of the manuscript.
18 All authors revised the paper critically for important intellectual content and approved the
19 final version.

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23
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27 **COMPETING INTERESTS**

28
29 None

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33
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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3-4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3-4
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	3-4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	4
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	4
		(b) Describe any methods used to examine subgroups and interactions	4
		(c) Explain how missing data were addressed	4
		(d) If applicable, describe analytical methods taking account of sampling strategy	--
		(e) Describe any sensitivity analyses	--
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	4-5
		(b) Give reasons for non-participation at each stage	4-5
		(c) Consider use of a flow diagram	--
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	TABLE 1
		(b) Indicate number of participants with missing data for each variable of interest	12-16
Outcome data	15*	Report numbers of outcome events or summary measures	5-6
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-6
		(b) Report category boundaries when continuous variables were categorized	5-6
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	--
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	--
Discussion			
Key results	18	Summarise key results with reference to study objectives	7
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	8
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	7-8
Generalisability	21	Discuss the generalisability (external validity) of the study results	9
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	10

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Drivers and strategies for avoiding overuse. A cross-sectional study to explore the experience of Spanish primary care providers handling uncertainty and patients' requests

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Drivers and strategies for avoiding overuse. A cross-sectional study to explore the experience of Spanish primary care providers handling uncertainty and patients' requests

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ABSTRACT

Objectives: Identify the sources of overuse from the point of view of the Spanish primary care professionals, and analyze the frequency of overuse due to pressure from patients in addition to the responses when professionals face these demands.

Design: A cross-sectional study was conducted.

Setting: Primary care in Spain.

Participants: A non-randomized sample of 2201 providers (general practitioners, pediatricians, and nurses) were recruited during the survey.

Primary and secondary outcome measures: The frequency, causes, and responsibility for overuse, the frequency that patients demand unnecessary tests or procedures, the profile of the most demanding patients, and arguments for dissuading the patient.

Results: In all, 936 general practitioners, 682 pediatricians, and 286 nurses replied (response rate 18.6%). Patient requests (67%) and defensive medicine (40%) were the most cited causes of overuse. Five hundred twenty-two (27%) received requests from their patients almost every day for unnecessary tests or procedures, and 132 (7%) recognized granting the requests. Persistence and aggressiveness by patients increased overuse ($p<0.001$). The lack of time in consultation, and information about new medical advances and treatments that patients could find on printed and digital media contributed to the professional's inability to adequately counter this pressure by patients. Evidence and clinical safety were the arguments that dissuade patients from their requests the most ($p<0.001$). Cost savings are not a convincing argument, above all for pediatricians ($p<0.001$). General practitioners resisted more pressure from their patients ($p<0.001$), while nurses admitted to carrying out more unnecessary procedures ($p<0.001$).

Conclusion: Satisfying the patient and patient uncertainty about what should be done and defensive medicine practices explains overuse. Safety arguments are useful to dissuade patients from their requests.

KEYWORDS

Medical overuse; Physician stewardship; Cost-conscious care; Health care costs; Physician decision-making; Health literacy

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The strengths of the present study include its large sample of providers working on an ample number of Spanish primary care health organizations. This sample included general practitioners, pediatricians, and nurses.
- Frequency and causes of overuse were analyzed beside the profile of the most demanding patients, and arguments to dissuade the patient.
- Although data are derived only from Spain, it is likely to be representative of the rest of the health systems where physicians are the gatekeeper.
- The study did not on a random selection of participants. A limited number of males in the cases of pediatrics and nursing were involved even though their number is proportional to that of their presence within these professional groups. The data correspond to a health model funded by taxes.

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INTRODUCTION

Among the causes of lack of quality are the incorrect use of diagnostic or therapeutic resources due to medical errors,[1-2] underuse,[3] and overuse.[4]

Overuse is understood as the provision of healthcare when lacking evidence or when the potential benefits from the procedure or treatment do not outweigh its risks.[5] Overuse of diagnostic and therapeutic resources is present in all specialties, all health systems,[4, 6] and at all care levels,[7] and it represents a threat to patient safety and the sustainability of health systems.[8] Reducing overuse in primary care is particularly relevant when the general practitioner is the gatekeeper of the health system. However, in many countries the actual pattern of overuse remains virtually unknown.[9]

Causes of overuse

The immediate causes of overuse include [10-15] insufficient updating of knowledge by professionals, defensive medicine, the custom of doing things that have always been done, lack of time in consultation, inadequate incentives, influence by the pharmaceutical industry, and inadequate communication with patients. Patients requesting diagnostic tests [9, 16-17] or treatments based on personal beliefs or from information obtained by other patients or from the Internet [9, 18-19] have been also introduced as a cause of overuse.

Patients in primary care usually request diagnostic tests, referrals to specialists, and medications, more frequently antimicrobials and for reducing pain.[9, 20] These requests generate dissatisfaction and make professionals uncomfortable [21] because they call their clinical expertise into question,[22] and this affects the quality of the relationship with the patient. Primary care physicians accept and handle the relationship with the patient better in the case of requests for tests and referrals to specialists than when the patient requests certain medications.[23] However, they often manifest in a desire to fulfill their patients' expectations, increasing overuse.[24] Other drivers of medical overuse from a primary care perspective also includes the lack of communicative skills or medical work experience, insufficient time during consultation, and fear of malpractice.[9, 24-25]

Questions to be answered

There is little research on the role of the patient and professional in overuse, and most of it has been carried out in the USA, which has an organizational environment different from the models based on a national health system.[11] The little data there are suggest that medical recommendations to reduce overuse are difficult to follow and difficult for patients to accept,[26] although research is needed to discern the profile of patients prone to accept or refuse these recommendations. It is hoped that the organizational model of the provision of healthcare has a direct influence on overuse. In the case of models where the primary care physician is the gatekeeper, one could expect greater pressure upon this professional.[27]

Objectives

This study identified the sources of overuse from the point of view of Spanish primary care professionals, and analyzed the frequency of overuse due to pressure from patients in addition to the responses when professionals face these demands. Specifically, this study searched for answers to the following questions:

- Perceived causes and responsibility of overuse from the primary-care-front-line-providers.

- Patient profiles and their requests and responses from healthcare professionals and how they dissuade patients.

METHOD

A cross-sectional study was conducted based on an online survey directed at a group of primary care professionals in Spain: general practitioners, nurses, and pediatricians. The field study took place between March and July 2017.

Setting

In Spain, primary care provides stepped care based on the right care at the right place at the right time, balancing quality and costs. This system strengthens the gatekeeper role of general practitioners (and pediatricians in the case of children). They are the ones who make diagnostic and therapeutic decisions in every case, which includes the possibility of referrals to other specialists at hospitals.

Spanish territory is divided into health districts, and in turn, these are divided into health zones. Each zone contains a health center that is responsible for providing healthcare for that territorial demarcation, with general practitioners, pediatricians, and nurses. One health district attends to an average of some 250,000 residents. The composition of professionals on primary health teams varies depending upon the population of the health zone (ratio around 1300 residents per general practitioner [28] and 1029 residents between the ages of 0 and 14 per pediatrician).[29] The number of nurses is similar to that of general practitioners and pediatricians.[30]

Materials

The scope of the survey was based on the instrument employed by the ABIM Foundation.[11] Seven blocks of questions were analyzed and 28 questions formulated. Specifically analyzed were the causes and responsibility of unnecessary overuse, tests or procedures demanded most by patients, the profile of the patient who insists upon these requests, the frequency of receiving requests and the frequency that the professional orders them, the arguments employed for dissuading the patient and the extent to which they succeed, the reactions by the patient to the professional's refusal. A pilot test on comprehending the questions was carried out with six professionals whose profiles were similar to those who participated in the study. Proposals for changes to the wording or response scales were incorporated into the final draft of the questions.

Participants

A non-randomized sample of primary care providers was surveyed. To carry out this survey on a population of 63753 professionals (28294 general practitioners, 6251 pediatricians and 29208 nurses), a minimal sample of 2201 professionals from all groups (general practitioners, pediatricians, and nurses) was determined, considering a 1% error, a confidence level of 95%, $p=q=0.50$ and a response rate of 20%.

The field study was conducted with collaboration by the health services of Andalucía, Aragón, Madrid, Navarra, and the Comunidad Valenciana, the Spanish Association of Primary Care Pediatrics (AEPap), the Spanish Society of Outpatient and Primary Care Pediatrics (SEPEAP), the Illustrious Official College of Physicians of Valencia, the Council of Nursing of the Valencian Community (CECOVA), and the Spanish Society of General and Family Practitioners (SEMG). These organizations invited their associates to participate in this study, and sent a total of 12787 emails (88% of the emails were expected to be opened). They explained the study's scope to each group of primary care givers, its voluntary nature and the guarantees for the

confidentiality of their responses, instructions on how to respond, and it provided a link to a Google Forms page where they could respond. A reminder to motivate responses was given.

Non-eligible participants

The responses from professionals who indicated that they worked at hospitals or other centers different from primary care were excluded. Also, participants were excluded when three or more questions were not answered. Incomplete questionnaires were not considered during the statistical analysis.

Patient and Public Involvement

Patients and public were not involved in this study.

Potential sources of bias

The reasons why some professionals answered the survey and others did not could affect the meaning of their answers. A sampling error of 1% was defined to reduce its effect. A leading questions bias was controlled using validated questions, although this bias could not have been controlled at all, and some participants encouraged answers expected from the researcher.

Statistical methods

The answers by physicians, pediatricians, and nurses were compared. Professional experience and gender were used to compare the responses of each group and to assess their trends. The opinions of these professionals working in the public or private sectors were compared.

Data analysis was completed using descriptive and inferential descriptive statistics, with chi-square and ANOVA to establish relationships between qualitative variables and between qualitative and quantitative variables, respectively. The overuse experience was distinguished by different types of providers. The null hypothesis was rejected when $P < 0.05$.

Ethical approval

This study was assessed and approved by the Ethics Committee of Primary Care Research of the Valencian Community, Spain.

RESULTS

In all, 2098 professionals provided complete responses (response rate 18.6%), achieving 95.3% of the expected responses. Of these, 194 indicated they were working in hospitals, so the responses from 1904 professionals (936 general practitioners, 682 pediatricians, and 286 nurses) (Table 1) were coded and analyzed. Most of these, 1190 (62.5%), were recruited by invitation from professional societies, and 714 (37.5%) were invited by their health services. There were 1816 (95.4%) working at health centers from the Spanish public health system, with the remainder either working in private health or practicing in both professional fields. Three-quarters of the sample ($N=1432$, 75.2%) had more than 15 years of professional experience. Males in pediatrics and nursing, in addition to the professionals from the private sector, were underrepresented in a manner similar to their proportion in the makeup of primary care in Spain.[30]

Table 1. Description of the sample of professionals whose responses were analyzed.

	General practitioners (N = 936)		Pediatricians (N = 682)		Nurses (N = 286)	
	N	%	N	%	N	%
Professional experience						
≤ 5 years	38	4.1	65	9.5	20	7

Between 6 and 15 years	142	15.2	166	24.3	41	14.3
Between 16 and 29 years	470	50.2	268	39.3	129	45.1
More than 30 years	286	30.6	183	26.8	96	33.6
Gender						
Male	429	45.8	196	28.7	60	21
Female	507	54.2	486	71.3	226	79
Area of professional practice						
Public system	892	95.3	638	93.5	286	100
Private or both	44	4.7	44	6.5	0	0
Belongs to (institution or organism)						
Public health system	317	33.9	138	20.2	259	90.6
CECOVA	--	--	--	--	27	9.4
SEMG	464	49.6	--	--	--	--
Illustrious Official College of Physicians of Valencia	155	16.6	62	9.1	--	--
AEPap	--	--	280	41.1	--	--
SEPEAP	--	--	202	29.6	--	--

CECOVA - Council of Nursing of the Valencian Community
 SEMG - Spanish Society of General and Family Practitioners
 AEPap - Spanish Association of Primary Care Pediatrics
 SEPEAP - Spanish Society of Outpatient and Primary Care Pediatrics

Causes of overuse

The reasons that general practitioners and pediatricians gave as being more directly responsible for inappropriate overuse were patient (or guardian) insistence and the need to attain greater safety or control over the process (Table 2). Male general practitioners, compared to their female counterparts, showed a greater tendency to justify inappropriate overuse on the grounds of satisfying the patient ($\chi^2=5.2$, $p=0.024$, percentage difference [PD]=6.1). As causes of overuse, less experienced general practitioners indicated following regulations ($\chi^2=14.4$, $p=0.002$, PD=19.1), making the patient feel satisfied with the care received ($\chi^2=11.0$, $p=0.011$, PD=21.2), and avoiding possible claims ($\chi^2=8.6$, $p=0.035$, PD=14.8). When comparing the opinions of general practitioners who only worked within the public sector with those who worked in both those public and private, it was observed that the former tended to consider the lack of time in consultation as a reason for overuse more frequently ($\chi^2=13.1$, $p=0.001$, PD=27.8). However, for the latter (with activities in both the public and private systems), avoiding a claim by patients was more important ($\chi^2=21.2$, $p=0.001$, PD=27.9), and they more frequently considered that the practice guides they used as reference were obsolete ($\chi^2=6.8$, $p=0.009$, PD=6.6). Pediatricians who combined activities in both sectors reported more frequently on the difficulties of dissuading the guardian and making him/her see that the procedures requested for the child were unnecessary ($\chi^2=4.6$, $p=0.037$, PD=13.8). General practitioners ($\chi^2=11.8$, $p=0.001$, PD=25.0) and pediatricians ($\chi^2=5.9$, $p=0.018$, PD=18.7) who only worked in the public sector felt more pressured by patients than those who practiced in both sectors.

Table 2. Reasons for ordering an unnecessary test or carrying out an unnecessary medical procedure.

	General	Pediatricians	Total
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	practitioners (N = 936)		(N = 682)		(N = 1904)	
	N	%	N	%	N	%
Due to insistent pressure by the patient	627	67	398	58.4	1025	63.3
Due to lack of time for patient consultation	418	44.7	198	29.0	616	38.1
To gain greater control and safety of the case	359	38.4	291	42.7	650	40.2
Because I do not know how to make the patient understand that it is unnecessary	262	28.1	150	22.0	412	25.5
To avoid a future demand	200	21.4	92	13.5	292	18.1
To satisfy the patient	196	20.9	92	13.5	288	17.8
To avoid a claim	177	18.9	80	11.7	257	15.9
Out of respect for the patient's decisions	132	14.1	130	19.1	262	16.2
Due to the standard or custom of making the order in the area	111	11.9	21	3.1	132	8.2
To carry out epidemiological or clinical studies	19	2.0	26	3.8	45	2.8
Due to indications in obsolete guides	26	2.8	19	2.8	45	2.8

Responsibility for overuse

The responsibility for overuse was assigned to, in order, the patients' relatives, the mass media, the professionals themselves, health pages on the Internet, and defensive medicine practices (Table 3). Male professionals attributed the responsibility for overuse of resources due to pressure by patients more directly on health services senior management ($F=4.3$, $p=0.038$, $CI\ 95\%=-0.01-0.53$). Those solely working in the public health system (as opposed to those who also worked in private practice) held the media ($F=6.4$, $p=0.011$, $CI\ 95\%=0.20-1.52$) and patients' relatives ($F=4.5$, $p=0.03$, $CI\ 95\%=-0.07-1.06$) more directly accountable. No cross-effects from the interaction of these variables were observed.

Table 3. Responsibility for overuse in the opinion of the professionals surveyed.

	General Medicine (N = 936)		Pediatrics (N = 682)		Nursing (N = 286)		Total		F	P-Value
	Average	SD	Average	SD	Average	SD	Average	SD		
Press, radio, and television	7.6	2.5	6.8	2.6	7.0	2.6	7.2	2.6	21.2	0.001
Patients	7.5	2.1	5.0	3.3	7.7	2.1	6.6	2.9	194.7	0.001
Relatives of patients	7.5	2.2	7.7	2.2	7.8	1.9	7.6	2.2	3.6	0.027
Nurses/Physicians	7.0	2.1	7.4	2.2	6.7	2.4	7.1	2.2	13.2	0.001
Managers of Internet health platforms	7.0	2.6	6.3	2.6	6.8	2.4	6.8	2.6	14.8	0.001
As a defensive measure against possible future claims	6.8	2.3	6.4	2.4	7.4	2.3	6.7	2.4	18.8	0.001

Senior management of health systems	6.5	2.7	5.3	3.0	6.5	2.8	6.1	2.9	38.5	0.001
Patient associations	6.2	2.7	5.4	2.8	5.7	2.5	5.8	2.7	15.5	0.001
Center directors	5.4	2.8	4.4	2.9	6.0	2.8	5.1	2.9	37.1	0.001
Directors or Coordinators of nursing/physicians	4.7	2.8	4.2	2.8	5.9	2.7	4.7	2.8	39.3	0.001

Scale from 0 to 10, minimum and maximum responsibility, respectively.

Pressure by patients and responses from professionals

Only 31 (1.6%) of those surveyed said that they had not received any requests from patients (more frequent among professionals with more than 15 years of experience), while 103 (5.4%) said that they received requests like these from patients every day (normally younger professionals). General practitioners were those who claimed to be under greater pressure to carry out unnecessary tests or procedures ($\chi^2=88.8$, $p<0.001$, $PD=17.0$). However, it was the nurses who admitted to carrying out these types of unnecessary procedures more frequently; pediatrics did so the least ($\chi^2=175.7$, $p<0.001$, $PD=12.3$) (Table 4).

Table 4. Pressure from patients and response by professionals.

	Patients (or their guardians) request unnecessary tests and procedures from you		You order/carry out unnecessary tests or procedures due to pressure from a patient (or guardian)		You convince the patient (or guardian) that it is unnecessary and can pose significant risk		The patient's response is negative, or even aggressive, when you refuse to carry out a procedure that the patient requests from you			
	N	%	N	%	N	%	N	%		
General practitioners (N = 936)										
Never	12	1.3	118	12.6	55	5.9	237	25.3	Never	
Monthly	192	20.5	463	49.5	248	26.5	400	42.7	Sometimes	
Almost every week	396	42.3	271	29.0	356	38.0	168	17.9	One-half of the time	
Almost every day	260	27.8	69	7.4	227	24.3	92	9.8	Most of the time	
Every day	76	8.1	15	1.6	50	5.3	39	4.2	All the time	
Pediatricians (N = 682)										
Never	9	1.3	188	27.6	14	2.1	231	33.9	Never	
Monthly	228	33.4	401	58.8	182	26.7	343	50.3	Sometimes	
Almost every week	316	46.3	84	12.3	262	38.4	73	10.7	One-half of the time	
Almost every day	113	16.6	6	0.9	188	27.6	30	4.4	Most of the time	
Every day	16	2.3	3	0.4	36	5.3	5	0.7	All the time	
Nurses (N = 286)										
	N	%	N	%	N	%	N	%		

Never	10	3.5	37	12.9	9	3.1	36	12.6	Never
Monthly	82	28.7	123	43.0	106	37.1	158	55.2	Sometimes
Almost every week	137	47.9	87	30.4	71	24.8	36	12.6	One-half of the time
Almost every day	46	16.1	31	10.8	92	32.2	54	18.9	Most of the time
Every day	11	3.8	8	2.8	8.0	2.8	2	0.7	All the time

The physicians who reported receiving requests from patients for unnecessary tests or procedures more frequently were those who acknowledged either ordering tests (every day or almost every day) for them or carrying out unnecessary procedures themselves for patients ($\chi^2=419.0$, $p<0.001$, PD = 16.8). They also stated that the reaction by the patient (or guardian) when a request for tests or procedures was denied was more negative or aggressive ($\chi^2=247.7$, $p<0.001$, PD = 20.1).

Male nurses, compared to their female counterparts, reported greater pressure from patients to carry out unnecessary procedures ($\chi^2=14.8$, $p=0.005$, PD=12.7) and, compared with the females, carried out these unnecessary procedures more frequently ($\chi^2=14.1$, $p=0.007$, PD=10.2). The ability to dissuade patient requests was similar in men and women in all three professional profiles. However, male nurses, compared to those female, reported receiving an aggressive response more frequently ($\chi^2=13.6$, $p=0.009$, PD=11.1).

Pediatricians with less than 5 years of experience reported receiving requests for unnecessary tests or procedures most frequently ($\chi^2=52.6$, $p<0.001$, PD=21.3). Pediatricians who had practiced fewer years stated that when refusing a patient's request, the patient's reaction was frequently more negative or even aggressive in comparison to their more experienced colleagues ($\chi^2=68.4$, $p<0.001$, PD=6.5).

What patients request

The most frequent requests from patients were for routine analytical examinations, referrals to specialists, antimicrobial treatments, radiological studies, and requests for healing materials without indication (Table 5). The profile of the patient who requested unnecessary nursing procedures the most corresponded to that of a woman (145, 50.7%) over 66 years of age (158, 55.2%) who suffered various chronic conditions (154, 53.8%). In the case of general practitioners, these were usually women (604, 64.5%) between 51 and 65 years of age (411, 43.9%) with a low prevalence pathology (296, 31.6%) or one that was unspecified (219, 23.4%) and who consulted the Internet about their concerns (172, 18.4%). In pediatrics, the profile of the guardian who most persistently requested unnecessary tests or procedures corresponded to the mother of a patient (480, 70.4%) who suffered an unspecified pathology (367, 53.8%) and who usually sought information on health webpages (130, 19.1%).

Table 5. Unnecessary tests and procedures patients usually request.

General practitioners (N = 936)	N	%	Pediatricians (N = 682)	N	%	Nurses (N = 286)	N	%
Routine checkup analysis	709	75.7	Routine checkup analysis	510	74.8	Taking vital signs	225	78.7
Referrals to specialists without any concerning features [§]	628	67.1	Administration of antibiotics when is not recommended [§]	491	72.0	Administration of treatment that does not require professionals	175	61.2

Radiological studies without any concerning features [§]	570	60.9	Referrals to other specialists without any concerning features [§]	450	66.0	Delivery of healing materials without indication	84	29.4
Magnetic Resonance without any concerning features [§]	380	40.6	Radiological studies without any concerning features [§]	197	28.9	Delivery of glucometer without the patient having started hypoglycemia treatment	72	25.2
PSA* in asymptomatic patients	358	38.2				Administer vaccinations outside the vaccine calendar without indication by pediatrician	34	11.9
Administration of antibiotics when is not recommended [§]	348	37.2						
Computed Tomography when is not recommended [§]	280	29.9						

*PSA - prostate-specific antigen

[§]following Do not DO Recommendations from Grupo de trabajo de la SEMFyC para el proyecto Recomendaciones «NO HACER». Recomendaciones NO HACER. Barcelona: SEMFyC ediciones, 2014, and Asociación Española de Pediatría (AEP). Recomendaciones de “no hacer” en Pediatría. 2014 [consultado 24-06-2017]: Available in: <http://www.aeped.es/documentos/recomendaciones-no-hacer-en-pediatria>

Ideas that work to dissuade the patient

According to the majority of those surveyed, the arguments that worked best for dissuading the patient or guardian that the request was inadequate were clinical reasons and for patient safety (Table 6). The safety of ($\chi^2=31.7$, $p<0.001$, PD=8.5) and avoiding discomfort in the child ($\chi^2=57.7$, $p<0.001$, PD=10.0) were considered more effective arguments, above all for pediatricians. Cost savings was the least effective argument for pediatricians ($\chi^2=43.9$, $p<0.001$, PD=6.9), while avoiding patient discomfort was least effective for general practitioners ($\chi^2=57.7$, $p<0.001$). For more experienced pediatricians ($\chi^2=30.6$, $p=0.002$, PD=17.0) and nurses ($\chi^2=23.6$, $p=0.023$, PD=28.8), arguing clinical reasons to dissuade the patient or guardian's request worked better.

Table 6. Degree of effectiveness as reported by the professionals about the arguments for convincing the patient that the treatment or procedure is unnecessary.

Argument	General practitioners N = 936		Pediatricians N = 682		Nurses N = 286		Total N = 1904		Chi ²	P-Value=
	N	%	N	%	N	%	N	%		
Patient safety	361	60.8	311	73.5	106	57.0	778	64.7	23.3	0.000
Clinical reasons based on knowledge	352	58.3	297	66.1	102	55.1	751	60.7	9.5	0.009
The result is achieved by other procedures	320	56.5	254	61.8	91	50.3	665	57.4	7.2	0.028

Saves patient discomfort	119	18.4	144	33.6	65	32.7	328	25.8	36.9	0.000
Saves time and money that have a positive effect on other patients	68	8.6	29	4.8	32	14.0	129	8.0	20.0	0.000

High and Very High degrees of effectiveness shown

Pediatricians were more successful than general practitioners and nurses at dissuading their patient that the requested test or procedure was unnecessary or that it posed unnecessary risk ($\chi^2=45.0$, $p<0.001$, $PD=5.4$). Nurses reported more frequently that the patient's reaction to a request being refused due to being unnecessary was either negative or aggressive ($\chi^2=129.5$, $p<0.001$, $PD=14.4$). Men and women from all three professional profiles expressed a similar ability for dissuading a patient's request. Less experienced pediatricians stated they were able to dissuade patients more frequently than other pediatricians ($\chi^2=23.9$, $p=0.021$, $PD=12.4$).

Patients who requested healing materials to take home (24/48, $\chi^2=15.2$, $p=0.004$, $PD=14.4$), vaccinations outside the vaccine calendar (11/34, $\chi^2=10.1$, $p=0.039$, $PD=14.5$), and antibiotic treatments (31/491, $\chi^2=33.4$, $p<0.001$, $PD=4.2$) were those who, in the opinion of the professionals surveyed, were least willing to accept explanations and refusals by the professionals for their request.

According to 1231 (64.7%) of those surveyed, an educational campaign directed at the population would help reduce the number of requests for unnecessary tests and procedures by patients. Such a campaign was seen as most useful by general practitioners (general practitioners, 8.0, SD 2.1, CI 95% 7.9-8.0; pediatricians, 7.7, SD 2.0, CI 95% 7.6-7.9; nurses, 7.7, SD 2.0; CI 95% 7.6-7.8).

DISCUSSION

The results of this study confirm the role that patients' requests and defensive medicine play in overuse. In this study, female patients and patients who suffer an unspecified or yet-undiagnosed pathology exerted greater pressure upon the professionals. For the former group, and in order to interpret this result, it needs to be taken into consideration that in many European countries females frequently accompany the patient in the consultation (adult or minor).[31] As for the latter case, one needs to consider that in addition to the fears the very patient experiences due to the uncertainty of not knowing what is happening to him/her, there is added pressure from family members, the effect from consulting health news on the Internet, and news from the printed and digital media about medical advances and new techniques.

In this case, it has been proven that overuse also has roots in the insecurity that an ill-defined pathology instills within the professional, the fear of an uncertain outcome for the indicated treatment, as well as the potential effects from a subsequent complaint by the patient or a lawsuit filed in a court of law. If we take into account the lack of a diagnosis, and then to it add on the lack of time in consultation and the need for greater security for the very professional, we find another of the main causes of overuse.[31] Curiously enough, these results show that as requests from patients become more insistent, for example vaccinating a minor outside the vaccine calendar, an antibiotic when it is contraindicated, or giving healing materials to the patient so he/she can take them home, the response from these patients is more negative. Both of these results could support the opinions of those surveyed about the usefulness of carrying out an educational campaign among the population [32] and the measures that have been adopted to prevent aggression towards professionals.

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3 Previous research had found that, when compared to other specialties, general practitioners
4 were under greater pressure by their patients for unnecessary medical tests or procedures to
5 be carried out on them.[33] The fact that patients in primary care exert greater pressure than
6 in hospitals is observed in both organizational models of payment for medical acts as well as in
7 systems where the physician is the gatekeeper.[27, 33-34] These results should be interpreted
8 keeping in mind the assessment that patients give about both care levels in every country and
9 the belief that super specialization might be a key to quality medicine.

10 The frequency of requests for medical tests or procedures in the study by Zambrana & Lozano
11 [35] in Spanish hospitals exceeded the frequency of requests that physicians in American
12 hospitals reported by 16 percentage points. In this study in primary care, the frequency that
13 general practitioners said they receive requests from their patients was 38 percentage points
14 higher than what American physicians reported (78% versus 40%). The tendency in published
15 figures of overuse from organizational models of primary care similar to that of the Spanish
16 model [27] point in a similar direction, and suggests the gatekeeper's implication could not
17 prevent (or at least reduce) overuse. Moreover, this debate remains open because other
18 studies conducted in the USA [34] indicate that overuse in the wake of patient requests is
19 similar at health centers in both wealthy areas and others with lower income levels.

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21 This study's findings reveal that as pressure from patients becomes more insistent, the
22 professionals either order or carry out a greater number of unnecessary test and procedures,
23 extending the initial observations that general practitioners tend to accept requests from their
24 patients more so than other specialists [34]. General practitioners are pressured more by their
25 patients than pediatricians or nurses, although the latter are those who carry out unnecessary
26 procedures more frequently, probably because this group acknowledges being on the
27 receiving end of more aggressive responses from patients when turning down requests.
28 Nevertheless, these results should be qualified based on the request the patient makes and by
29 the dissemination of practice guides between professionals. It is unlikely that ordering a test
30 such as the prostate-specific antigen test (PSA) in an asymptomatic male who insists so he can
31 "rest easy" is the same as initiating a totally contraindicated treatment and one that poses
32 risks for the patient. Most physicians accept the first situation more easily,[36] but resist the
33 second.[23, 31]

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35 Although professionals are directly responsible for overuse, and this and other research
36 recognize this as such,[27, 33] we must also consider the role that patient associations,
37 accreditation systems of websites, and associations of health news informers could play to
38 succeed, among everybody, in reducing overuse figures. Ignorance on behalf of the population
39 has been analyzed in other research, especially that regarding the use of therapies and
40 requests for diagnostic imaging tests irrespective of the risk from the ionizing radiation
41 involved.[37]

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43 Information does not always contribute to fulfill these recommendations.[26] However,
44 providing the patient with clear and direct information about the clinical and safety reasons
45 that advise against carrying out certain tests or starting certain treatments contributes to
46 reducing overuse.[38-39] These results follow this line and confirm findings from research
47 conducted in other countries where primary care physicians draw on evidence to dissuade a
48 patient's request for a certain diagnostic test when they deem it unnecessary.[23] The other
49 argument that has also demonstrated its usefulness for dissuading the patient is safety, above
50 all for pediatricians. Considering the Spanish study with hospital physicians,[35] the
51 effectiveness of general practitioners and pediatricians in dissuading patients is similar to that
52 of their colleagues at hospitals. The pediatricians in this study did not report a dissuasive
53 capacity any different from that of their colleagues who care for adults.
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3 The professionals who fail to dissuade patients from their requests feel as if they are under
4 greater pressure, they end up carrying out more unnecessary tests and procedures, and they
5 also perceive more aggressive responses from their patients when refusing to carry out any of
6 their requests. Although we do know that the lack of time in consultation has a negative effect
7 on clinical safety,[32] these data do not permit us to determine whether the ability to dissuade
8 patients from their requests might be different if more time were dedicated per patient. For a
9 significant portion of physicians, and for those surveyed in this study as well, maintaining a
10 positive relationship with the patient was essential,[25, 27] probably because it is one of the
11 basic therapeutic resources in primary care.[40] Not responding to a request or not knowing
12 how to dissuade the patient muddies the relationship. Furthermore, when the patient
13 questions the physician's clinical expertise, their relationship worsens and defensive medicine
14 tends to increase.[4, 8]

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16 The frequency of overuse resulting from movements grouped together under the "Less is
17 More Medicine" label [41] has begun to be studied systematically, and various campaigns have
18 been launched to raise awareness in professionals about what must not be done,[42-44] but
19 studies analyzing the roles of patients and professionals in overuse and the impact from
20 campaigns to reduce overuse directed at the population are still scarce. Furthermore,
21 campaigns for reducing overuse in the style of Choosing Wisely [44] confirm the need to
22 influence health education, but also directed especially at drawing attention to the risks from
23 interpreting health websites without the appropriate information, like, for example,
24 considering their latest update, sources of information, and the commitment to the quality of
25 their contents,[45] and reducing the negative impact that these sources of information are
26 beginning to have on the relationship between patients and professionals.[14, 46] This is also
27 true in the case of publicly financed health systems, to carry out campaigns to fortify solidarity
28 behavior and properly use diagnostic and therapeutic resources.

30 **Practical implications**

31 These results have direct implications on the professional level. First, fostering training in
32 communication skills, highlighting how to approach communication with a patient who applies
33 pressure to receive an unnecessary and/or harmful test or treatment for him or herself. For
34 example, by promoting the so-called web prescription by recommending safe sites to patients
35 where they can become informed, an aspect in which Spain lags somewhat behind.[46]
36 Second, establishing a framework of greater legal security for professionals who act in
37 accordance with practice guides. Third, identifying if Do not Do has a higher chance to produce
38 an adverse event to define it as a target in a public campaign to reduce patients requests.

39
40 On the health organization level, these results reinforce the need to establish the
41 implementation in primary care of up-to-date practice guides and to establish alerts and
42 assistance algorithms (including safety arguments for patients) on the ordering of tests,
43 referrals, and prescriptions for limiting overuse. The lessons learned using decision aids to
44 reduce more aggressive choices could be applied to design these algorithms.[47] Management
45 indicators and annual or biennial targets could include indicators related to overuse, especially
46 in those cases where, furthermore, the risk to patient safety increases.

48 **Generalizability**

49 These results and recommendations could be applied to the healthcare systems where the
50 general practitioners (or pediatricians in the case of children) are the gatekeeper.

52 **Limitations**

53 This study was based on a non-random selection of participants. This sample included
54 approximately 3% of the general practitioners, 11% of the pediatricians, and 1% of the nurses
55 in terms of the total of healthcare professionals in Spanish primary care in 2016. Studies using
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3 email and electronic questionnaires are frequent; however, some professionals might have
4 considered that these systems would not guarantee their privacy and so decided not to
5 answer. The willingness to respond could bias the sample selection, and in some other cases
6 physicians or nurses might not admit to overuse. Although the public sector is
7 overrepresented, this overrepresentation is also observed in the reference population. The
8 limited number of males who answered in the cases of pediatrics and nursing limits the
9 strengths of the comparisons, even though their number is proportional to that of their
10 presence within these professional groups. The data correspond to a health model funded by
11 taxes. Although the questionnaire was used in a previously study,[12] it has not been
12 previously validated. This quantitative approach should be complemented with qualitative
13 studies exploring experiences and coping styles to avoid overuse.

14 15 **Outlook**

16 Overuse is a challenge for health systems, particularly those where the general practitioner is
17 the system gatekeeper, and it requires responses from both the clinical as well as economic
18 points of view.
19

20 21 **CONTRIBUTORS**

22 JJM and JMA-A conceived and designed the study. CS, PP-P, CN, OG, and JG acquired the data
23 for the work. IC prepared the data, and together with JJM and JMA-A, conducted statistical
24 analysis. All interpreted data for the work. JJM and IC prepared a first draft of the manuscript.
25 All authors revised the paper critically for important intellectual content and approved the
26 final version.
27

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32

33 34 **COMPETING INTERESTS**

35 None.
36

37 38 **DATA SHARING STATEMENT**

39 No additional data available.
40

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49

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3-4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3-4
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	3-4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	4
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	4
		(b) Describe any methods used to examine subgroups and interactions	4
		(c) Explain how missing data were addressed	4
		(d) If applicable, describe analytical methods taking account of sampling strategy	--
		(e) Describe any sensitivity analyses	--
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	4-5
		(b) Give reasons for non-participation at each stage	4-5
		(c) Consider use of a flow diagram	--
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	TABLE 1
		(b) Indicate number of participants with missing data for each variable of interest	12-16
Outcome data	15*	Report numbers of outcome events or summary measures	5-6
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-6
		(b) Report category boundaries when continuous variables were categorized	5-6
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	--
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	--
Discussion			
Key results	18	Summarise key results with reference to study objectives	7
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	8
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	7-8
Generalisability	21	Discuss the generalisability (external validity) of the study results	9
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	10

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Drivers and strategies for avoiding overuse. A cross-sectional study to explore the experience of Spanish primary care providers handling uncertainty and patients' requests

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Drivers and strategies for avoiding overuse. A cross-sectional study to explore the experience of Spanish primary care providers handling uncertainty and patients' requests

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ABSTRACT

Objectives: Identify the sources of overuse from the point of view of the Spanish primary care professionals, and analyze the frequency of overuse due to pressure from patients in addition to the responses when professionals face these demands.

Design: A cross-sectional study was conducted.

Setting: Primary care in Spain.

Participants: A non-randomized sample of 2201 providers (general practitioners, pediatricians, and nurses) were recruited during the survey.

Primary and secondary outcome measures: The frequency, causes, and responsibility for overuse, the frequency that patients demand unnecessary tests or procedures, the profile of the most demanding patients, and arguments for dissuading the patient.

Results: In all, 936 general practitioners, 682 pediatricians, and 286 nurses replied (response rate 18.6%). Patient requests (67%) and defensive medicine (40%) were the most cited causes of overuse. Five hundred twenty-two (27%) received requests from their patients almost every day for unnecessary tests or procedures, and 132 (7%) recognized granting the requests. The lack of time in consultation, and information about new medical advances and treatments that patients could find on printed and digital media contributed to the professional's inability to adequately counter this pressure by patients. Clinical safety (49.9%) and evidence (39.4%) were the arguments that dissuade patients from their requests the most. Cost savings was not a convincing argument (6.8%), above all for pediatricians (4.3%). General practitioners resisted more pressure from their patients ($\chi^2=88.8$, $p<0.001$, $PD=17.0$), while nurses admitted to carrying out more unnecessary procedures ($\chi^2=175.7$, $p<0.001$, $PD=12.3$).

Conclusion: Satisfying the patient and patient uncertainty about what should be done and defensive medicine practices explains some of the frequent causes of overuse. Safety arguments are useful to dissuade patients from their requests.

KEYWORDS

Medical overuse; Physician stewardship; Cost-conscious care; Health care costs; Physician decision-making; Health literacy

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The strengths of the present study include its large sample of providers working on an ample number of Spanish primary care health organizations. This sample included general practitioners, pediatricians, and nurses.
- Frequency and causes of overuse were analyzed beside the profile of the most demanding patients, and arguments to dissuade the patient.
- Although data are derived only from Spain, it is likely to be representative of the rest of the health systems where physicians are the gatekeeper.
- The study did not on a random selection of participants. A limited number of males in the cases of pediatrics and nursing were involved even though their number is proportional to that of their presence within these professional groups. The data correspond to a health model funded by taxes.

Drivers and strategies for avoiding overuse. A cross-sectional study to explore the experience of Spanish primary care providers handling uncertainty and patients' requests

INTRODUCTION

Among the causes of lack of quality are the incorrect use of diagnostic or therapeutic resources due to medical errors,[1-2] underuse,[3] and overuse.[4]

Overuse is understood as the provision of healthcare when lacking evidence or when the potential benefits from the procedure or treatment do not outweigh its risks.[5] Overuse of diagnostic and therapeutic resources is present in all specialties, all health systems,[4, 6] and at all care levels,[7] and it represents a threat to patient safety and the sustainability of health systems.[8] Reducing overuse in primary care is particularly relevant when the general practitioner is the gatekeeper of the health system. However, in many countries the actual pattern of overuse remains virtually unknown.[9]

Causes of overuse

The immediate causes of overuse include [10-15] insufficient updating of knowledge by professionals, defensive medicine, the custom of doing things that have always been done, lack of time in consultation, inadequate incentives, influence by the pharmaceutical industry, and inadequate communication with patients. Patients requesting diagnostic tests [9, 16-17] or treatments based on personal beliefs or from information obtained by other patients or from the Internet [9, 18-19] have been also introduced as a cause of overuse.

Patients in primary care usually request diagnostic tests, referrals to specialists, and medications, more frequently antimicrobials and for reducing pain.[9, 20] These requests generate dissatisfaction and make professionals uncomfortable [21] because they call their clinical expertise into question,[22] and this affects the quality of the relationship with the patient. Primary care physicians accept and handle the relationship with the patient better in the case of requests for tests and referrals to specialists than when the patient requests certain medications.[23] However, they often manifest in a desire to fulfill their patients' expectations, increasing overuse.[24] Other drivers of medical overuse from a primary care perspective also includes the lack of communicative skills or medical work experience, insufficient time during consultation, and fear of malpractice.[9, 24-25]

Questions to be answered

There is little research on the role of the patient and professional in overuse, and most of it has been carried out in the USA, which has an organizational environment different from the models based on a national health system.[11] The little data there are suggest that medical recommendations to reduce overuse are difficult to follow and difficult for patients to accept,[26] although research is needed to discern the profile of patients prone to accept or refuse these recommendations. It is hoped that the organizational model of the provision of healthcare has a direct influence on overuse. In the case of models where the primary care physician is the gatekeeper, one could expect greater pressure upon this professional.[27]

Objectives

This study identified the sources of overuse from the point of view of Spanish primary care professionals, and analyzed the frequency of overuse due to pressure from patients in addition to the responses when professionals face these demands. Specifically, this study searched for answers to the following questions:

- Perceived causes and responsibility of overuse from the primary-care-front-line-providers.

- Patient profiles and their requests and responses from healthcare professionals and how they dissuade patients.

METHOD

A cross-sectional study was conducted based on an online survey directed at a group of primary care professionals in Spain: general practitioners, nurses, and pediatricians. The field study took place between March and July 2017.

Setting

In Spain, primary care provides stepped care based on the right care at the right place at the right time, balancing quality and costs. This system strengthens the gatekeeper role of general practitioners (and pediatricians in the case of children). They are the ones who make diagnostic and therapeutic decisions in every case, which includes the possibility of referrals to other specialists at hospitals.

Spanish territory is divided into health districts, and in turn, these are divided into health zones. Each zone contains a health center that is responsible for providing healthcare for that territorial demarcation, with general practitioners, pediatricians, and nurses. One health district attends to an average of some 250,000 residents. The composition of professionals on primary health teams varies depending upon the population of the health zone (ratio around 1300 residents per general practitioner [28] and 1029 residents between the ages of 0 and 14 per pediatrician).[29] The number of nurses is similar to that of general practitioners and pediatricians.[30]

Materials

The scope of the survey was based on the instrument employed by the ABIM Foundation.[11] Seven blocks of questions were analyzed and 28 questions formulated. Specifically analyzed were the causes and responsibility of unnecessary overuse, tests or procedures demanded most by patients, the profile of the patient who insists upon these requests, the frequency of receiving requests and the frequency that the professional orders them, the arguments employed for dissuading the patient and the extent to which they succeed, the reactions by the patient to the professional's refusal. A pilot test on comprehending the questions was carried out with six professionals whose profiles were similar to those who participated in the study. Proposals for changes to the wording or response scales were incorporated into the final draft of the questions.

Participants

A non-randomized sample of primary care providers was surveyed. To carry out this survey on a population of 63753 professionals (28294 general practitioners, 6251 pediatricians and 29208 nurses), a minimal sample of 2201 professionals from all groups (general practitioners, pediatricians, and nurses) was determined, considering a 1% error, a confidence level of 95%, $p=q=0.50$ and a response rate of 20%.

The field study was conducted with collaboration by the health services of Andalucía, Aragón, Madrid, Navarra, and the Comunidad Valenciana, the Spanish Association of Primary Care Pediatrics (AEPap), the Spanish Society of Outpatient and Primary Care Pediatrics (SEPEAP), the Illustrious Official College of Physicians of Valencia, the Council of Nursing of the Valencian Community (CECOVA), and the Spanish Society of General and Family Practitioners (SEMIG). These organizations invited their associates to participate in this study, and sent a total of 12787 emails (88% of the emails were expected to be opened). They explained the study's scope to each group of primary care givers, its voluntary nature and the guarantees for the

confidentiality of their responses, instructions on how to respond, and it provided a link to a Google Forms page where they could respond. A reminder to motivate responses was given.

Non-eligible participants

The responses from professionals who indicated that they worked at hospitals or other centers different from primary care were excluded. Also, participants were excluded when three or more questions were not answered. Incomplete questionnaires were not considered during the statistical analysis.

Patient and Public Involvement

Patients and public were not involved in this study.

Potential sources of bias

The reasons why some professionals answered the survey and others did not could affect the meaning of their answers. A sampling error of 1% was defined to reduce its effect.

Statistical methods

The answers by physicians, pediatricians, and nurses were compared. Professional experience and gender were used to compare the responses of each group and to assess their trends. The opinions of these professionals working in the public or private sectors were compared.

Data analysis was completed using descriptive and inferential descriptive statistics, with chi-square and ANOVA to establish relationships between qualitative variables and between qualitative and quantitative variables, respectively. The overuse experience was distinguished by different types of providers. The null hypothesis was rejected when $P < 0.05$.

Ethical approval

This study was assessed and approved by the Ethics Committee of Primary Care Research of the Valencian Community, Spain.

RESULTS

In all, 2098 professionals provided complete responses (response rate 18.6%), achieving 95.3% of the expected responses. Of these, 194 indicated they were working in hospitals, so the responses from 1904 professionals (936 general practitioners, 682 pediatricians, and 286 nurses) (Table 1) were coded and analyzed. Most of these, 1190 (62.5%), were recruited by invitation from professional societies, and 714 (37.5%) were invited by their health services. There were 1816 (95.4%) working at health centers from the Spanish public health system, with the remainder either working in private health or practicing in both professional fields. Three-quarters of the sample ($N=1432$, 75.2%) had more than 15 years of professional experience. Males in pediatrics and nursing, in addition to the professionals from the private sector, were underrepresented in a manner similar to their proportion in the makeup of primary care in Spain.[30]

Table 1. Description of the sample of professionals whose responses were analyzed.

	General practitioners (N = 936)		Pediatricians (N = 682)		Nurses (N = 286)	
	N	%	N	%	N	%
Professional experience						
≤ 5 years	38	4.1	65	9.5	20	7
Between 6 and 15 years	142	15.2	166	24.3	41	14.3
Between 16 and 29 years	470	50.2	268	39.3	129	45.1

More than 30 years	286	30.6	183	26.8	96	33.6
Gender						
Male	429	45.8	196	28.7	60	21
Female	507	54.2	486	71.3	226	79
Area of professional practice						
Public system	892	95.3	638	93.5	286	100
Private or both	44	4.7	44	6.5	0	0
Belongs to (institution or organism)						
Public health system	317	33.9	138	20.2	259	90.6
CECOVA	--	--	--	--	27	9.4
SEMG	464	49.6	--	--	--	--
Illustrious Official College of Physicians of Valencia	155	16.6	62	9.1	--	--
AEPap	--	--	280	41.1	--	--
SEPEAP	--	--	202	29.6	--	--

CECOVA - Council of Nursing of the Valencian Community

SEMG - Spanish Society of General and Family Practitioners

AEPap - Spanish Association of Primary Care Pediatrics

SEPEAP - Spanish Society of Outpatient and Primary Care Pediatrics

Causes of overuse

The reasons that general practitioners and pediatricians gave as being more directly responsible for inappropriate overuse were patient (or guardian) insistence and the need to attain greater safety or control over the process (Table 2). Male general practitioners, compared to their female counterparts, showed a greater tendency to justify inappropriate overuse on the grounds of satisfying the patient ($\chi^2=5.2$, $p=0.024$, percentage difference [PD]=6.1). As causes of overuse, less experienced general practitioners indicated following regulations ($\chi^2=14.4$, $p=0.002$, PD=19.1), making the patient feel satisfied with the care received ($\chi^2=11.0$, $p=0.011$, PD=21.2), and avoiding possible claims ($\chi^2=8.6$, $p=0.035$, PD=14.8). When comparing the opinions of general practitioners who only worked within the public sector with those who worked in both those public and private, it was observed that the former tended to consider the lack of time in consultation as a reason for overuse more frequently ($\chi^2=13.1$, $p=0.001$, PD=27.8). However, for the latter (with activities in both the public and private systems), avoiding a claim by patients was more important ($\chi^2=21.2$, $p=0.001$, PD=27.9), and they more frequently considered that the practice guides they used as reference were obsolete ($\chi^2=6.8$, $p=0.009$, PD=6.6). Pediatricians who combined activities in both sectors reported more frequently on the difficulties of dissuading the guardian and making him/her see that the procedures requested for the child were unnecessary ($\chi^2=4.6$, $p=0.037$, PD=13.8). General practitioners ($\chi^2=11.8$, $p=0.001$, PD=25.0) and pediatricians ($\chi^2=5.9$, $p=0.018$, PD=18.7) who only worked in the public sector felt more pressured by patients than those who practiced in both sectors.

Table 2. Reasons for ordering an unnecessary test or carrying out an unnecessary medical procedure.

	General practitioners (N = 936)		Pediatricians (N = 682)		Total (N = 1618)	
	N	%	N	%	N	%

Due to insistent pressure by the patient	627	67	398	58.4	1025	63.3
Due to lack of time for patient consultation	418	44.7	198	29.0	616	38.1
To gain greater control and safety of the case	359	38.4	291	42.7	650	40.2
Because I do not know how to make the patient understand that it is unnecessary	262	28.1	150	22.0	412	25.5
To avoid a future demand	200	21.4	92	13.5	292	18.1
To satisfy the patient	196	20.9	92	13.5	288	17.8
To avoid a claim	177	18.9	80	11.7	257	15.9
Out of respect for the patient's decisions	132	14.1	130	19.1	262	16.2
Due to the standard or custom of making the order in the area	111	11.9	21	3.1	132	8.2
To carry out epidemiological or clinical studies	19	2.0	26	3.8	45	2.8
Due to indications in obsolete guides	26	2.8	19	2.8	45	2.8

Responsibility for overuse

The responsibility for overuse was assigned to, in order, the patients' relatives, the mass media, the professionals themselves, health pages on the Internet, and defensive medicine practices (Table 3). Male professionals attributed the responsibility for overuse of resources due to pressure by patients more directly on health services senior management ($F=4.3$, $p=0.038$, $CI\ 95\%=-0.01-0.53$). Those solely working in the public health system (as opposed to those who also worked in private practice) held the media ($F=6.4$, $p=0.011$, $CI\ 95\%=0.20-1.52$) and patients' relatives ($F=4.5$, $p=0.03$, $CI\ 95\%=-0.07-1.06$) more directly accountable. No cross-effects from the interaction of these variables were observed.

Table 3. Responsibility for overuse in the opinion of the professionals surveyed.

	General Medicine (N = 936)		Pediatrics (N = 682)		Nursing (N = 286)		Total		F	P-Value
	Average	SD	Average	SD	Average	SD	Average	SD		
Press, radio, and television	7.6	2.5	6.8	2.6	7.0	2.6	7.2	2.6	21.2	0.001
Patients	7.5	2.1	5.0	3.3	7.7	2.1	6.6	2.9	194.7	0.001
Relatives of patients	7.5	2.2	7.7	2.2	7.8	1.9	7.6	2.2	3.6	0.027
Nurses/Physicians	7.0	2.1	7.4	2.2	6.7	2.4	7.1	2.2	13.2	0.001
Managers of Internet health platforms	7.0	2.6	6.3	2.6	6.8	2.4	6.8	2.6	14.8	0.001
As a defensive measure against possible future claims	6.8	2.3	6.4	2.4	7.4	2.3	6.7	2.4	18.8	0.001
Senior management of health systems	6.5	2.7	5.3	3.0	6.5	2.8	6.1	2.9	38.5	0.001

Patient associations	6.2	2.7	5.4	2.8	5.7	2.5	5.8	2.7	15.5	0.001
Center directors	5.4	2.8	4.4	2.9	6.0	2.8	5.1	2.9	37.1	0.001
Directors or Coordinators of nursing/physicians	4.7	2.8	4.2	2.8	5.9	2.7	4.7	2.8	39.3	0.001

Scale from 0 to 10, minimum and maximum responsibility, respectively.

Pressure by patients and responses from professionals

Only 31 (1.6%) of those surveyed said that they had not received any requests from patients (more frequent among professionals with more than 15 years of experience), while 103 (5.4%) said that they received requests like these from patients every day (normally younger professionals). General practitioners were those who claimed to be under greater pressure to carry out unnecessary tests or procedures ($\chi^2=88.8$, $p<0.001$, $PD=17.0$). However, it was the nurses who admitted to carrying out these types of unnecessary procedures more frequently; pediatrics did so the least ($\chi^2=175.7$, $p<0.001$, $PD=12.3$) (Table 4).

Table 4. Pressure from patients and response by professionals.

	Patients (or their guardians) request unnecessary tests and procedures from you		You order/carry out unnecessary tests or procedures due to pressure from a patient (or guardian)		You convince the patient (or guardian) that it is unnecessary and can pose significant risk		The patient's response is negative, or even aggressive, when you refuse to carry out a procedure that the patient requests from you			
	N	%	N	%	N	%	N	%		
General practitioners (N = 936)										
Never	12	1.3	118	12.6	55	5.9	237	25.3	Never	
Monthly	192	20.5	463	49.5	248	26.5	400	42.7	Sometimes	
Almost every week	396	42.3	271	29.0	356	38.0	168	17.9	One-half of the time	
Almost every day	260	27.8	69	7.4	227	24.3	92	9.8	Most of the time	
Every day	76	8.1	15	1.6	50	5.3	39	4.2	All the time	
Pediatricians (N = 682)										
Never	9	1.3	188	27.6	14	2.1	231	33.9	Never	
Monthly	228	33.4	401	58.8	182	26.7	343	50.3	Sometimes	
Almost every week	316	46.3	84	12.3	262	38.4	73	10.7	One-half of the time	
Almost every day	113	16.6	6	0.9	188	27.6	30	4.4	Most of the time	
Every day	16	2.3	3	0.4	36	5.3	5	0.7	All the time	
Nurses (N = 286)										
Never	10	3.5	37	12.9	9	3.1	36	12.6	Never	
Monthly	82	28.7	123	43.0	106	37.1	158	55.2	Sometimes	

Almost every week	137	47.9	87	30.4	71	24.8	36	12.6	One-half of the time
Almost every day	46	16.1	31	10.8	92	32.2	54	18.9	Most of the time
Every day	11	3.8	8	2.8	8.0	2.8	2	0.7	All the time

The physicians who reported receiving requests from patients for unnecessary tests or procedures more frequently were those who acknowledged either ordering tests (every day or almost every day) for them or carrying out unnecessary procedures themselves for patients ($\chi^2=419.0$, $p<0.001$, PD = 16.8). They also stated that the reaction by the patient (or guardian) when a request for tests or procedures was denied was more negative or aggressive ($\chi^2=247.7$, $p<0.001$, PD = 20.1).

Male nurses, compared to their female counterparts, reported greater pressure from patients to carry out unnecessary procedures ($\chi^2=14.8$, $p=0.005$, PD=12.7) and, compared with the females, carried out these unnecessary procedures more frequently ($\chi^2=14.1$, $p=0.007$, PD=10.2). The ability to dissuade patient requests was similar in men and women in all three professional profiles. However, male nurses, compared to those female, reported receiving an aggressive response more frequently ($\chi^2=13.6$, $p=0.009$, PD=11.1).

Pediatricians with less than 5 years of experience reported receiving requests for unnecessary tests or procedures most frequently ($\chi^2=52.6$, $p<0.001$, PD=21.3). Pediatricians who had practiced fewer years stated that when refusing a patient's request, the patient's reaction was frequently more negative or even aggressive in comparison to their more experienced colleagues ($\chi^2=68.4$, $p<0.001$, PD=6.5).

What patients request

The most frequent requests from patients were for routine analytical examinations, referrals to specialists, antimicrobial treatments, radiological studies, and requests for healing materials without indication (Table 5). The profile of the patient who requested unnecessary nursing procedures the most corresponded to that of a woman (145, 50.7%) over 66 years of age (158, 55.2%) who suffered various chronic conditions (154, 53.8%). In the case of general practitioners, these were usually women (604, 64.5%) between 51 and 65 years of age (411, 43.9%) with a low prevalence pathology (296, 31.6%) or one that was unspecified (219, 23.4%) and who consulted the Internet about their concerns (172, 18.4%). In pediatrics, the profile of the guardian who most persistently requested unnecessary tests or procedures corresponded to the mother of a patient (480, 70.4%) who suffered an unspecified pathology (367, 53.8%) and who usually sought information on health webpages (130, 19.1%).

Table 5. Unnecessary tests and procedures patients usually request.

General practitioners (N = 936)	N	%	Pediatricians (N = 682)	N	%	Nurses (N = 286)	N	%
Routine checkup analysis	709	75.7	Routine checkup analysis	510	74.8	Taking vital signs	225	78.7
Referrals to specialists without any concerning features [§]	628	67.1	Administration of antibiotics when is not recommended [§]	491	72.0	Administration of treatment that does not require professionals	175	61.2
Radiological studies without any concerning features [§]	570	60.9	Referrals to other specialists without any concerning features [§]	450	66.0	Delivery of healing materials without indication	84	29.4

Magnetic Resonance without any concerning features [§]	380	40.6	Radiological studies without any concerning features [§]	197	28.9	Delivery of glucometer without the patient having started hypoglycemia treatment	72	25.2
PSA* in asymptomatic patients	358	38.2				Administer vaccinations outside the vaccine calendar without indication by pediatrician	34	11.9
Administration of antibiotics when is not recommended [§]	348	37.2						
Computed Tomography when is not recommended [§]	280	29.9						

*PSA - prostate-specific antigen

[§]following Do not DO Recommendations from Grupo de trabajo de la SEMFyC para el proyecto Recomendaciones «NO HACER». Recomendaciones NO HACER. Barcelona: SEMFyC ediciones, 2014, and Asociación Española de Pediatría (AEP). Recomendaciones de “no hacer” en Pediatría. 2014 [consultado 24-06-2017]: Available in: <http://www.aeped.es/documentos/recomendaciones-no-hacer-en-pediatria>

Ideas that work to dissuade the patient

According to the majority of those surveyed, the arguments that worked best for dissuading the patient or guardian that the request was inadequate were clinical reasons and for patient safety (Table 6). The safety of ($\chi^2=31.7$, $p<0.001$, $PD=8.5$) and avoiding discomfort in the child ($\chi^2=57.7$, $p<0.001$, $PD=10.0$) were considered more effective arguments, above all for pediatricians. Cost savings was the least effective argument for pediatricians ($\chi^2=43.9$, $p<0.001$, $PD=6.9$), while avoiding patient discomfort was least effective for general practitioners ($\chi^2=57.7$, $p<0.001$). For more experienced pediatricians ($\chi^2=30.6$, $p=0.002$, $PD=17.0$) and nurses ($\chi^2=23.6$, $p=0.023$, $PD=28.8$), arguing clinical reasons to dissuade the patient or guardian's request worked better.

Table 6. Degree of effectiveness as reported by the professionals about the arguments for convincing the patient that the treatment or procedure is unnecessary.

Argument	General practitioners N = 936		Pediatricians N = 682		Nurses N = 286		Total N = 1904		Chi ²	P-Value=
	N	%	N	%	N	%	N	%		
Patient safety	361	38.6	311	45.6	106	37.1	778	40.9	23.9	0.000
Clinical reasons based on knowledge	352	37.6	297	43.5	102	35.7	751	39.4	9.8	0.043
The result is achieved by other procedures	320	34.2	254	37.2	91	31.8	665	34.9	8.2	0.085
Saves patient discomfort	119	12.7	144	21.1	65	22.7	328	17.2	44.7	0.000
Saves time and money that have a positive effect on other patients	68	7.3	29	4.3	32	11.2	129	6.8	32.3	0.000

High and Very High degrees of effectiveness shown

Pediatricians were more successful than general practitioners and nurses at dissuading their patient that the requested test or procedure was unnecessary or that it posed unnecessary risk ($\chi^2=45.0$, $p<0.001$, $PD=5.4$). Nurses reported more frequently that the patient's reaction to a request being refused due to being unnecessary was either negative or aggressive ($\chi^2=129.5$, $p<0.001$, $PD=14.4$). Men and women from all three professional profiles expressed a similar ability for dissuading a patient's request. Less experienced pediatricians stated they were able to dissuade patients more frequently than other pediatricians ($\chi^2=23.9$, $p=0.021$, $PD=12.4$).

Patients who requested healing materials to take home (24/48, $\chi^2=15.2$, $p=0.004$, $PD=14.4$), vaccinations outside the vaccine calendar (11/34, $\chi^2=10.1$, $p=0.039$, $PD=14.5$), and antibiotic treatments (31/491, $\chi^2=33.4$, $p<0.001$, $PD=4.2$) were those who, in the opinion of the professionals surveyed, were least willing to accept explanations and refusals by the professionals for their request.

According to 1231 (64.7%) of those surveyed, an educational campaign directed at the population would help reduce the number of requests for unnecessary tests and procedures by patients. Such a campaign was seen as most useful by general practitioners (general practitioners, 8.0, SD 2.1, CI 95% 7.9-8.0; pediatricians, 7.7, SD 2.0, CI 95% 7.6-7.9; nurses, 7.7, SD 2.0; CI 95% 7.6-7.8).

DISCUSSION

The results of this study confirm the role that patients' requests and defensive medicine play in overuse. In this study, health professionals reported greater pressure from female patients and patients who suffer an unspecified or yet-undiagnosed pathology. For the former group, and in order to interpret this result, it needs to be taken into consideration that in many European countries females frequently accompany the patient in the consultation (adult or minor).[31] As for the latter case, one needs to consider that in addition to the fears the very patient experiences due to the uncertainty of not knowing what is happening to him/her, there is added pressure from family members, the effect from consulting health news on the Internet, and news from the printed and digital media about medical advances and new techniques.

In this case, it has been proven that overuse also has roots in the insecurity that an ill-defined pathology instills within the professional, the fear of an uncertain outcome for the indicated treatment, as well as the potential effects from a subsequent complaint by the patient or a lawsuit filed in a court of law. If we take into account the lack of a diagnosis, and then to it add on the lack of time in consultation and the need for greater security for the very professional, we find another of the main causes of overuse.[31] Curiously enough, these results show that as requests from patients become more insistent, for example vaccinating a minor outside the vaccine calendar, an antibiotic when it is contraindicated, or giving healing materials to the patient so he/she can take them home, the response from these patients is more negative. Both of these results could support the opinions of those surveyed about the usefulness of carrying out an educational campaign among the population [32] and the measures that have been adopted to prevent aggression towards professionals.

Previous research had found that, when compared to other specialties, general practitioners were under greater pressure by their patients for unnecessary medical tests or procedures to be carried out on them.[33] The fact that patients in primary care exert greater pressure than in hospitals is observed in both organizational models of payment for medical acts as well as in

1
2
3 systems where the physician is the gatekeeper.[27, 33-34] These results should be interpreted
4 keeping in mind the assessment that patients give about both care levels in every country and
5 the belief that super specialization might be a key to quality medicine.

6
7 The frequency of requests for medical tests or procedures in the study by Zambrana & Lozano
8 [35] in Spanish hospitals exceeded the frequency of requests that physicians in American
9 hospitals reported by 16 percentage points. In this study in primary care, the frequency that
10 general practitioners said they receive requests from their patients was 38 percentage points
11 higher than what American physicians reported (78% versus 40%). The tendency in published
12 figures of overuse from organizational models of primary care similar to that of the Spanish
13 model [27] point in a similar direction, and suggests the gatekeepers need rather support to
14 prevent (or at least reduce) overuse. Moreover, this debate remains open because other
15 studies conducted in the USA [34] indicate that overuse in the wake of patient requests is
16 similar at health centers in both wealthy areas and others with lower income levels.

17
18 This study's findings reveal that as perceived pressure from patients becomes more insistent,
19 the professionals either order or carry out a greater number of unnecessary test and
20 procedures, extending the initial observations that general practitioners tend to accept
21 requests from their patients more so than other specialists [34]. General practitioners perceive
22 more pressure from their patients than pediatricians or nurses, although the latter are those
23 who carry out unnecessary procedures more frequently, probably because this group
24 acknowledges being on the receiving end of more aggressive responses from patients when
25 turning down requests. Nevertheless, these results should be qualified based on the request
26 the patient makes and by the dissemination of practice guides between professionals. It is
27 unlikely that ordering a test such as the prostate-specific antigen test (PSA) in an
28 asymptomatic male who insists so he can "rest easy" is the same as initiating a totally
29 contraindicated treatment and one that poses immediate risks for the patient. Most physicians
30 accept the first situation more easily,[36] but resist the second.[23, 31]

31
32 Although professionals are directly responsible for overuse, and this and other research
33 recognize this as such,[27, 33] we must also consider the role that patient associations,
34 accreditation systems of websites, and associations of health news informers could play to
35 succeed, among everybody, in reducing overuse figures. Ignorance on behalf of the population
36 has been analyzed in other research, especially that regarding the use of therapies and
37 requests for diagnostic imaging tests irrespective of the risk from the ionizing radiation
38 involved.[37]

39
40 Information does not always contribute to fulfill these recommendations.[26] However,
41 providing the patient with clear and direct information about the clinical and safety reasons
42 that advise against carrying out certain tests or starting certain treatments contributes to
43 reducing overuse.[38-39] These results follow this line and confirm findings from research
44 conducted in other countries where primary care physicians draw on evidence to dissuade a
45 patient's request for a certain diagnostic test when they deem it unnecessary.[23] The other
46 argument that has also demonstrated its usefulness for dissuading the patient is safety, above
47 all for pediatricians. Considering the Spanish study with hospital physicians,[35] the
48 effectiveness of general practitioners and pediatricians in dissuading patients is similar to that
49 of their colleagues at hospitals. The pediatricians in this study did not report a dissuasive
50 capacity any different from that of their colleagues who care for adults.

51
52 The professionals who fail to dissuade patients from their requests feel as if they are under
53 greater pressure, they end up carrying out more unnecessary tests and procedures, and they
54 also perceive more aggressive responses from their patients when refusing to carry out any of
55 their requests. Although we do know that the lack of time in consultation has a negative effect
56 on clinical safety,[32] these data do not permit us to determine whether the ability to dissuade
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3 patients from their requests might be different if more time were dedicated per patient. For a
4 significant portion of physicians, and for those surveyed in this study as well, maintaining a
5 positive relationship with the patient was essential,[25, 27] probably because it is one of the
6 basic therapeutic resources in primary care.[40] Not responding to a request or not knowing
7 how to dissuade the patient muddies the relationship. Furthermore, when the patient
8 questions the physician's clinical expertise, their relationship worsens and defensive medicine
9 tends to increase.[4, 8]

10
11 The frequency of overuse resulting from movements grouped together under the "Less is
12 More Medicine" label [41] has begun to be studied systematically, and various campaigns have
13 been launched to raise awareness in professionals about what must not be done,[42-44] but
14 studies analyzing the roles of patients and professionals in overuse and the impact from
15 campaigns to reduce overuse directed at the population are still scarce. Furthermore,
16 campaigns for reducing overuse in the style of Choosing Wisely [44] confirm the need to
17 influence health education, but also directed especially at drawing attention to the risks from
18 interpreting health websites without the appropriate information, like, for example,
19 considering their latest update, sources of information, and the commitment to the quality of
20 their contents,[45] and reducing the negative impact that these sources of information are
21 beginning to have on the relationship between patients and professionals.[14, 46] This is also
22 true in the case of publicly financed health systems, to carry out campaigns to fortify solidarity
23 behavior and properly use diagnostic and therapeutic resources.

24 25 **Practical implications**

26 These results have direct implications on the professional level. First, fostering training in
27 communication skills, highlighting how to approach communication with a patient who applies
28 pressure to receive an unnecessary and/or harmful test or treatment for him or herself. For
29 example, by promoting the so-called web prescription by recommending safe sites to patients
30 where they can become informed, an aspect in which Spain lags somewhat behind.[46]
31 Second, establishing a framework of greater legal security for professionals who act in
32 accordance with practice guides. Third, identifying if Do not Do has a higher chance to produce
33 an adverse event to define it as a target in a public campaign to reduce patients requests.

34
35 On the health organization level, these results reinforce the need to establish the
36 implementation in primary care of up-to-date practice guides and to establish alerts and
37 assistance algorithms (including safety arguments for patients) on the ordering of tests,
38 referrals, and prescriptions for limiting overuse. The lessons learned using decision aids to
39 reduce more aggressive choices could be applied to design these algorithms.[47] Management
40 indicators and annual or biennial targets could include indicators related to overuse, especially
41 in those cases where, furthermore, the risk to patient safety increases.

42 43 **Generalizability**

44 These results and recommendations could be applied to the healthcare systems where the
45 general practitioners (or pediatricians in the case of children) are the gatekeeper.

46 47 **Limitations**

48 This study was based on a non-random selection of participants. This sample included
49 approximately 3% of the general practitioners, 11% of the pediatricians, and 1% of the nurses
50 in terms of the total of healthcare professionals in Spanish primary care in 2016. Studies using
51 email and electronic questionnaires are frequent; however, some professionals might have
52 considered that these systems would not guarantee their privacy and so decided not to
53 answer. The willingness to respond could bias the sample selection, and in some other cases
54 physicians or nurses might not admit to overuse. Although the public sector is
55 overrepresented, this overrepresentation is also observed in the reference population. The
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3 limited number of males who answered in the cases of pediatrics and nursing limits the
4 strengths of the comparisons, even though their number is proportional to that of their
5 presence within these professional groups. The data correspond to a health model funded by
6 taxes. Although the questionnaire was used in a previously study,[12] it has not been
7 previously validated. This quantitative approach should be complemented with qualitative
8 studies exploring experiences and coping styles to avoid overuse.

9 10 **Outlook**

11 Overuse is a challenge for health systems, particularly those where the general practitioner is
12 the system gatekeeper, and it requires responses from both the clinical as well as economic
13 points of view.
14

15 16 **CONTRIBUTORS**

17 JJM and JMA-A conceived and designed the study. CS, PP-P, CN, OG, and JG acquired the data
18 for the work. IC prepared the data, and together with JJM and JMA-A, conducted statistical
19 analysis. All interpreted data for the work. JJM and IC prepared a first draft of the manuscript.
20 All authors revised the paper critically for important intellectual content and approved the
21 final version.
22

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28

29 30 31 **COMPETING INTERESTS**

32 None.
33

34 35 **DATA SHARING STATEMENT**

36 No additional data available.
37

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	3-4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	3-4
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	3-4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	4
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4
Bias	9	Describe any efforts to address potential sources of bias	4
Study size	10	Explain how the study size was arrived at	4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	4
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	4
		(b) Describe any methods used to examine subgroups and interactions	4
		(c) Explain how missing data were addressed	4
		(d) If applicable, describe analytical methods taking account of sampling strategy	--
		(e) Describe any sensitivity analyses	--
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	4-5
		(b) Give reasons for non-participation at each stage	4-5
		(c) Consider use of a flow diagram	--
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	TABLE 1
		(b) Indicate number of participants with missing data for each variable of interest	12-16
Outcome data	15*	Report numbers of outcome events or summary measures	5-6
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	5-6
		(b) Report category boundaries when continuous variables were categorized	5-6
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	--
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	--
Discussion			
Key results	18	Summarise key results with reference to study objectives	7
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	8
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	7-8
Generalisability	21	Discuss the generalisability (external validity) of the study results	9
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	10

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.