

Patient perception and satisfaction with the electronic prescription system: results of the PERSA-RE questionnaire

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KEYWORDS

Patient satisfaction, electronic prescription, questionnaire

ABBREVIATIONS

PERSA-RE: cuestionario de percepción y satisfacción con receta electrónica [Questionnaire on the perception of and satisfaction with the electronic prescription]
EP: electronic prescription

ABSTRACT

Objective: To know patients' perception of and degree of satisfaction with the electronic prescription (e-prescription) system.

Method: A cross section of 290 patients were selected to answer the PERSA-RE questionnaire. Patients' sociodemographic variables and information on their adherence were collected through the Morisky Green Levine questionnaire. Differences in questionnaire scores were analysed according to sociodemographic variables and patient adherence.

Results: The mean total score of the questionnaire was 63.42 (SD 7.02) out of a total score of 85. The most highly scored attribute on the questionnaire was "Satisfaction" with a score of 4.32, suggesting that patients preferred electronic prescriptions over their paper counterpart. 96% of patients affirmed that they encountered no problems collecting their medication by showing their health card. The attribute with the lowest score was "Understanding" at 3.45. Younger patients assigned higher scores to the attributes "Satisfaction" and "Expenditure". 70% of patients said they "totally disagree" or "disagree" with the statement that the electronic prescription system has led to higher spending on pharmaceuticals. According to the Morisky Green Levine questionnaire, patients who adhered to their prescriptions had a better understanding of the electronic prescription system.

Conclusion: Users of e-prescriptions are very satisfied with this way of prescribing and dispensing pharmaceuticals. Educational level, age and adherence were the variables with the greatest influence on the questionnaire score.

INTRODUCTION

The electronic prescription system allows all physicians to electronically prescribe any medication requiring a prescription (regardless of whether or not it is reimbursed). The e-prescription system also allows drugs to be dispensed by emergency room physicians, in out-patient hospital consultations and is interoperable in those Autonomous Communities so authorizing.

One of the main objectives of the e-prescription was to make things easier for patients with chronic diseases who now do not have to go to their health centre every time they need their medication renewed. This has reduced the number of administrative appointments by as much as 60% (1) and has also centralized all the medications received by patients in a single health card thus enhancing safety by avoiding duplication, incompatibility and possible allergic reactions while also reducing errors since prescriptions are now perfectly legible, complete and in a standardized format (2).

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Despite these advantages, successful implementation of e-prescription systems is not guaranteed on its own merit and the key factors to be considered whilst introducing it in developed countries have been described (3). One of those factors is alignment of the interests, vision and benefits of the different stakeholders: physicians, pharmacists, patients, information technology specialists and nurses (4). To date, most research has focused on how satisfied physicians and pharmacists are with electronic prescriptions (5,6) but has not considered patients' views. In general, the opinions of physicians and patients coincide but their priorities may differ. Putting patients at the centre of the system, as a valid stakeholder in the design, implementation and evaluation of electronic prescription systems, complements the approach and fosters clinical commitment (4). However, little is yet known about patients' preferences or perceptions of this new system.

That was the underlying motive for this research project, the main objective being to gather information on patients' satisfaction with the electronic prescription system. The *PERSA-RE questionnaire* was used for this purpose: *questionnaire on the perception of and satisfaction with the electronic prescription which had previously been validated* (7). This project is part of the study called *REACT: Receta Electrónica, Adherencia y Cumplimiento Terapéutico* (Electronic Prescription, Adherence and Therapeutic Compliance) (still ongoing), which also analyses how closely chronic patients adhere to their electronically prescribed treatments.

MATERIAL AND METHODS

Design

An observational cross-sectional study was conducted on a sample of 290 patients recruited at a pharmacy in the Community of Madrid between the months of March and October 2020.

The first five patients entering in the morning and the first five patients in the afternoon were recruited, whenever possible, as recruitment was seriously hampered by COVID-19. Patients were appropriately informed about the purpose of the study and had to voluntarily sign an informed consent form and a document describing data protection in order to participate in the study.

Patients were instructed to answer the 17 items (grouped into 5 attributes) on the PERSA-RE questionnaire by scoring them on a scale of 1 to 5 on a Likert scale. The attributes and items relate to patients' perception of the electronic prescription system. The questionnaire had previously been validated by a group of experts by means of a pilot study (7).

This study was conducted in accordance with the good clinical practice guidelines laid down in the Declaration of

Helsinki and was approved by the Clinical Research Ethics Committee of the Hospital Universitario Puerta de Hierro in Majadahonda (protocol code ABG-ENA-2019-01), in the Autonomous Community of Madrid.

Inclusion and exclusion criteria

To participate in the study, patients had to be of legal age and had to have been using the electronic prescription system for treatment of a chronic condition for at least twelve months. Patients also had to be free of any functional or cognitive impairment that could prevent them from optimally managing their medication or adequately providing the required information.

Patients from NO6D groups being treated with drugs for dementia or cognitive impairment (Nervous system, psychoanaleptics, anti-dementia: donepezil, galantamine, memantine, rivastigmine and ginkgo), used as an indicator of disability, were excluded from the study. Institutionalized patients and those not meeting the inclusion criteria were likewise excluded.

Study variables

In addition to answering the PERSA-RE questionnaire (Table 1), an abbreviated version of the Morisky Green Levine questionnaire was used to gather information on their adherence to their prescribed treatments. Socio-demographic data was also collected.

Statistical analysis

Answers on the satisfaction questionnaire were processed using a descriptive statistical analysis where qualitative variables were subjected to absolute (n) and relative (percentage) frequency analysis, while quantitative variables were subjected to a mean analysis \pm standard deviation (SD) or median deviation \pm interquartile range, as appropriate.

Differences in questionnaire scores, as a factor of socio-demographic variables, were analysed using the Kruskal Wallis, Spearman's Rho coefficient, ANOVA and Chi square tests, depending on the characteristics of said variables.

A statistical significance level of 95% ($\alpha=0.05$) was used and the analysis was performed with the SPSS v26 programme (IBM Corporation, Armonk, NY, USA).

RESULTS

300 patients were initially selected but 10 failed to meet the inclusion criteria and therefore the sample was reduced to 290. The socio-demographic data of the patients is set out in Table 1. According to the Morisky Green questionnaire, 57.9% of the patients adhered to their long-term treatments (Figure 1).

Table 1 Socio-demographic data

	n = 290	%	CI 95%
Men	109	37.6	32.0-43.5
Women	181	62.4	56.5-68.0
Country of origin			
Spain	282	97.2	94.6-98.8
Academic level			
Primary/secondary school	148	51.0	45.12-56.92
Voc/High School	89	30.7	25.43-36.35
No studies	18	6.2	3.72-9.63
University	35	12.1	8.55-16.38
Living arrangement			
With friends	4	1.4	0.38-3.49
With children	20	6.9	4.26-10.45
With parents	14	4.8	2.66-7.97
With partne	144	49.7	43.7-55.5
Couple with children	59	20.3	15.86-25.44
Alone	49	16.9	12.77-21.72
Employment situation			
Active	58	20.0	15.55-25.07
Housewife	36	12.4	8.85-16.77
On sick leave / Disabled	6	2.1	0.76-4.45
Student	2	0.7	0.08-2.47
Retired / Pensioner	179	61.7	55.86-67.35
Unemployed	9	3.1	1.43-5.81

The mean total score of the questionnaire was 63.42 (SD 7.02) out of a total possible score of 85. The mean scores of each of the questionnaire items and attributes were analysed (Figure 2 and Table 2).

Regarding the "Satisfaction" attribute, a comparison of the electronic prescription system with its paper-based counterpart (item 2), featured a mean score of 4.29 (SD 0.80). Over 40% of study participants stated that they "totally agree" with the statement expressed in questions 1 and 2: "I am satisfied with the e-prescription system" and "I now prefer to collect my medication using the e-prescription system".

Regarding "Access to pharmaceuticals", 96% of the patients asserted that they were able to collect their medication without any problem by presenting their health card and 88% said that when their physician modified their treatment, this change was correctly reflected in the electronic prescription.

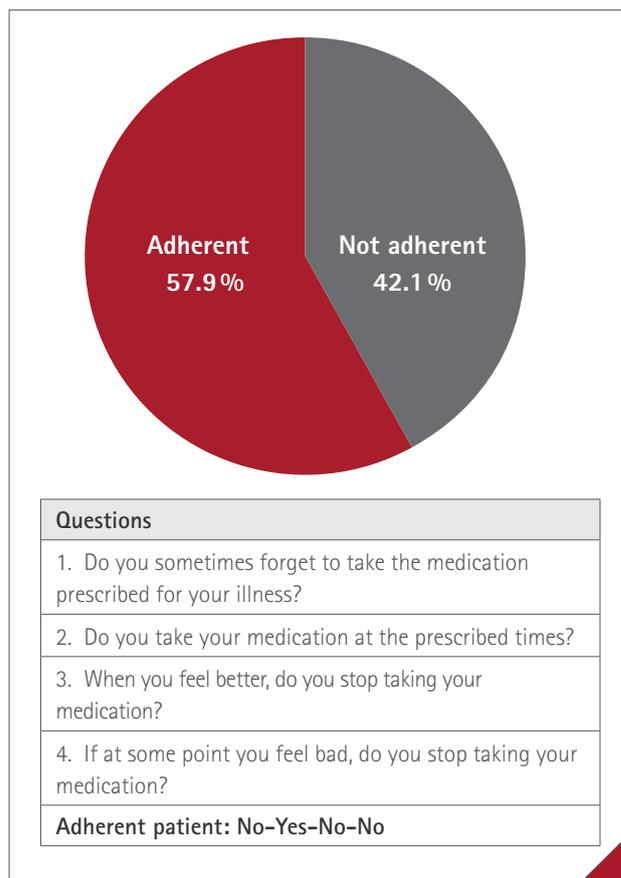


Figure 1 Morisky Green Levine Questionnaire

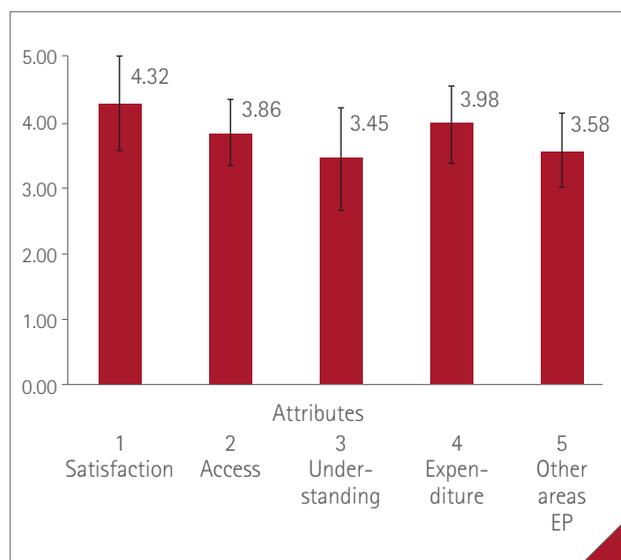


Figure 2 Mean score of questionnaire attributes

The attribute "Understanding" obtained a mean score of 3.45 (SD 0.78), the lowest of the five attributes on the questionnaire. In this case item 7, which refers to the 28-day period built into the electronic prescription system, scored 4.03 (SD 0.91). Regarding item 8 which refers to the deadline date by which prescriptions must be collected, over 80% of the participants agreed that prescriptions should

Table 2 Questionnaire on the perception of and satisfaction with the electronic prescription (PERSA-RE) and questionnaire results

Item	Item	Mean	SD	Attribute	Mean	SD
1	I am satisfied with the electronic prescription system	4.34	0.74	Satisfaction	4.32	0.74
2	I prefer to collect my medication now, with the electronic prescription system, than before with the paper prescription system	4.29	0.80			
3	Medications appear correctly on the electronic prescription when my physician modifies or initiates a new treatment	4.17	0.82	Access to medicines / Primary care treatments	3.86	0.50
4	With my health card I am able to collect my medication at the pharmacy without any problem	4.34	0.66			
5	My pharmacist frequently informs me that the medicines I need are out of stock and that I need to see my physician to get the prescription changed	2.15	1.04			
6	I have never had a problem collecting medication requiring an inspection visa	3.06	0.54	Understanding	3.45	0.78
7	I am fully aware that my medication appears every 28 days on my electronic prescription and that I cannot collect it before that time has elapsed	4.03	0.91			
8	I understand that my prescription is not indefinite and that I must be aware of the expiration date to renew it	3.93	1.03			
9	My physician has explained to me how the e-prescription system works and has answered all my questions	3.41	1.21			
10	My nurse has explained to me how the e-prescription system works and has answered all my questions	2.17	2.50			
11	My pharmacist has explained to me how the e-prescription system works and has answered all my questions	3.69	1.13	Expenditure	3.98	0.59
12	The amount of money I spend on medicines has increased with the electronic prescription system	2.18	0.88			
13	Regardless of my economic contribution, the new e-prescription system is worthwhile for me personally	4.14	0.65	Other areas of EP: Interoperability, Hospitals and Emergency rooms	3.58	0.59
14	I have encountered problems using e-prescriptions outside the Community of Madrid	2.66	0.90			
15	I have encountered problems collecting my medication with the e-prescription after an emergency room visit	2.61	0.83			
16	I have encountered problems collecting my medication with the e-prescription after an outpatient hospital visit	2.54	0.86			
17	I had to go to an emergency service or see my physician without an appointment to sort out a problem related to the electronic prescription	2.00	1.05			

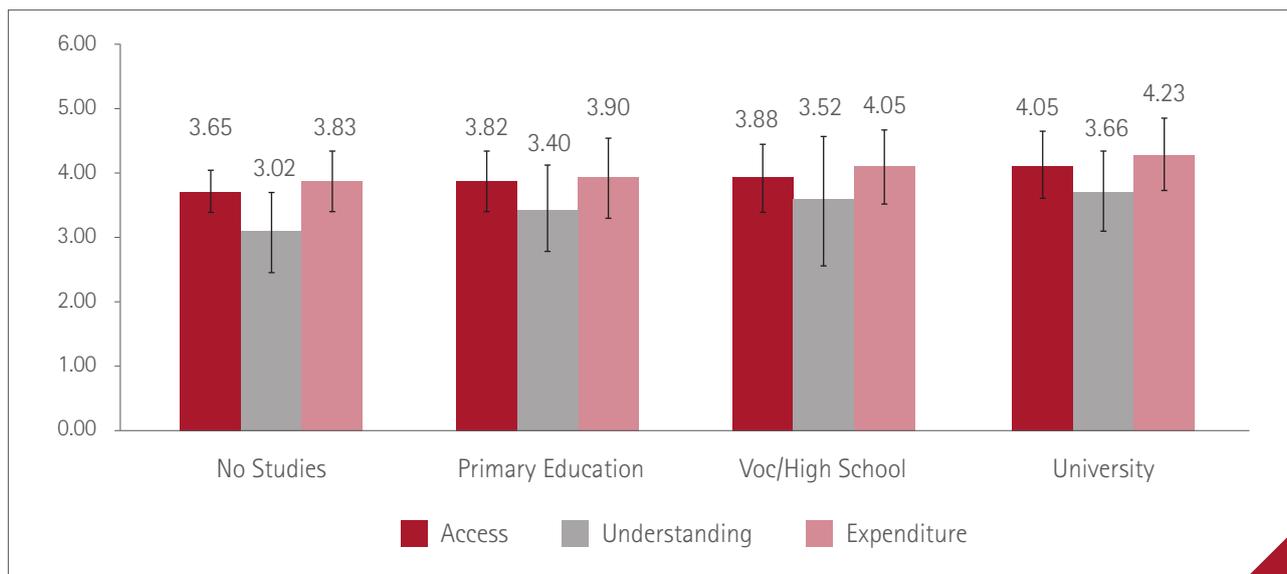


Figure 3 Score on the attributes "Access", "Understanding" and "Expenditure" according to academic level

not be indefinite. Responses to items 9, 10 and 11, which ask about what health-care professional explained to the patient how the electronic prescription system works and who answered their questions, revealed that physicians and pharmacists were mostly the ones who discussed these issues with the patients.

Regarding the perception of "Expenditure", 70% of the participants said they "totally disagree" or "disagree" with the statement that the electronic prescription system has led to higher spending on medicines. Item 13, which also reflects a preference for the electronic system over paper prescriptions in relation amounts spent on medicines, obtained a mean score of 4.14 (SD 0.65) with over 85% of patients expressing that preference.

The attribute "Other areas of electronic prescriptions" covers aspects related to interoperability, the use of electronic prescriptions in hospitals and in emergency services. Participants gave this attribute a mean score of 3.58 (SD 0.59). Most of the participants in the study responded "neither agree nor disagree" in response to having used the electronic prescription outside the Community of Madrid, in emergency services or in out-patient hospital consultations. Similarly, 80% of the patients reported not having had to go to an emergency service or to see the physician without an appointment to sort out a problem related to an e-prescription.

We analysed the possible correlation between the attributes of the questionnaire and other variables collected in the study related to the patients and their treatments. The attributes "Satisfaction" and "Expenditure" exhibited a statistically significant correlation with age (Spearman's Rho coefficient -0.12 and -0.0117, respectively). Younger patients gave higher scores on these attributes.

Patients with a university education gave a higher score to the attributes "Access", "Understanding" and "Expenditure" than patients without formal studies (ANOVA, $p=0.027$; $p=0.025$; $p=0.01$, respectively). This information is presented in **Figure 3**.

A statistically significant correlation was also found between adherence according to the Morisky Green Levine test and the attribute "Understanding" (Student's T, $p=0.027$). Compliant patients gave a higher score in the "Understanding" attribute of the e-prescription system as shown in **Figure 4**. The mean questionnaire score in compliant patients according to the Morisky Green Levine test was 64.05 (SD 7.02), compared to non-compliant patients who scored 62.57 (SD 6.96).

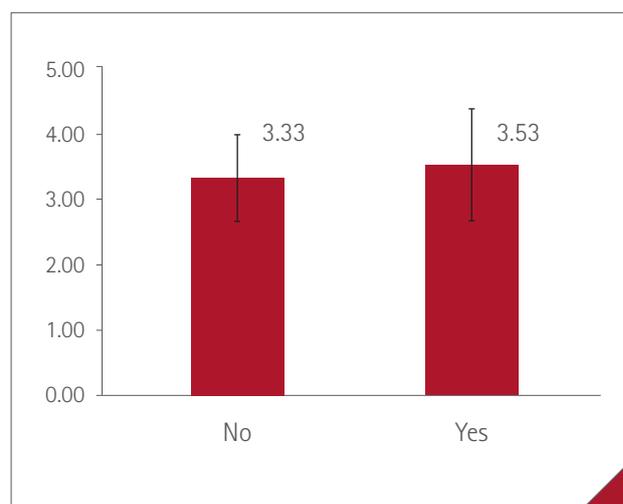


Figure 4 Average score according to the response to the Morisky Green Levine test in the "Understanding" attribute

DISCUSSION

The questionnaire was used as a methodological tool at the stage of the study that we have just described. This requires the collaboration of the patients who must have a basic level of education or sufficient cognitive function to respond to the questions (9). That is why the inclusion criteria excluded patients with cognitive disorders who were receiving medication for dementia.

Patient satisfaction in this study is higher than that found in the Villimar Rodríguez study conducted with primary care physicians in 2014 (5), but coincides with the opinion expressed by community pharmacists in the report done by the Spanish Society of Clinical, Family and Community Pharmacy (SEFAC) entitled "Analysis of the dispensing of pharmaceuticals by means of electronic medical prescriptions in Spanish community pharmacies. Proposals for improvement". In this report, community pharmacists affirm that e-prescriptions are practical, allow them to work more efficiently and reduce human errors in dispensing medicines (10). In our study, the opinions expressed are from mature patients who are perfectly familiar with how the system works. Moreover, patient satisfaction encompasses both general satisfaction and a comparison with paper prescriptions, a completely new element that has not been included in any other research conducted to date.

Patient satisfaction studies in neighbouring countries show results similar to ours and suggest that giving more information and instruction to patients is important in terms of their level of satisfaction and degree of compliance with the treatments prescribed, hence improving their adherence and prompting them to take an active role their own health (11).

An American study that measured the satisfaction of physicians and patients with e-prescriptions also concluded that both of these groups were very satisfied with the system once the learning curve had been overcome. In this latter study, as in ours, the youngest patients were the ones that expressed the highest levels of satisfaction with the system (12).

The Frail study showed that patients have a positive perception of e-prescriptions, especially owing to their convenience, comfort and enhanced quality and safety. However, patients claimed that they did not know the name of the prescribed treatment until after their interaction with the pharmacist, which could pose potential communication problems at the pharmacy, an aspect not evaluated in our study. Also, they did not believe that e-prescriptions impacted their degree of adherence (13).

In our study, patient satisfaction with the e-prescription system correlated inversely with age. The 2016 report entitled "Citizens and e-health", on the opinions and expectations of citizens regarding the use and application of ICTs in the health field, already confirmed that elderly citizens were less familiar with e-prescriptions and were more reluctant to use ICTs for health-related matters (14).

"Access" was an attribute that received high scores from patients. Although there are no other studies that assess this aspect per se, recent studies attribute improvements in dispensing processes to e-prescriptions (4) and this could be related to access. Available data link e-prescriptions with a decrease in the number of primary care appointments, especially those whose sole purpose is the renewal of prescriptions in the treatment of chronic ailments where they decreased by as much as 60% (1).

Data related to special authorizations (called "inspection visas" in Spain) needed for certain pharmaceuticals was also relevant. Many patients responded with a 3 ("neither agree nor disagree") as none of their medication required an inspection visa. However, pharmacists have no access to and are therefore unable to provide information about when inspection visas will be granted, despite frequent requests for such information from patients and even some physicians (15) about the availability of the prescribed medication. Inspection visas delay the dispensing of medication, decrease adherence and hinder access (16). Further study is needed to measure and assess the impact that inspection visas have on health outcomes.

The analysis showed that the higher one's level of education, the higher the score of the "Access" attribute. Many studies have highlighted the positive impact that literacy has on health (17,18). Some studies have pointed out that up to a third of American adults have an insufficient level of education which leads to poor health, affects patient safety and also affects access to and the quality of health care (19). In today's increasingly digital environment where applications abound, not only is formal academic training needed, but a whole series of technological skills defined as e-health literacy have become necessary. However, many of the same people lacking academic education are also deficient at navigating technology (20). Some authors have therefore suggested making these new sources of digital information more visual and more didactic thus providing new solutions for patients with a lower cultural level (21).

The attribute "Understanding" of the e-prescription system was scored the second lowest by patients. When we interviewed patients at the recruitment stage, one of the most striking and repeated aspects was the confusion that existed between "chronic treatment" and "indefinite treatment". Many patients were confused and believed that their "chronic" treatments (in clinical terms) were "indefinite" (in administrative terms) and they needed help in understanding the difference. This aspect, coupled with the difficulty of understanding the 28-day deadline system, being able to collect medication five days early, the fact that medication not dispensed ends up vanishing from the system, etc., make it easier for patients with a higher level of education to understand how the system works and could account for the strong positive correlation between the attribute "Understanding" and patients' level of education.

Under the "Understanding" attribute, it also became apparent that patients turned first to pharmacists, followed by physicians and then nurses for information about e-prescriptions. The studies by Frail and Lau reached opposite conclusions about how e-prescriptions affected communication between health-care professionals and patients. The former concluded that e-prescriptions reduced communication between patients and their prescribers and pharmacists (13) while the latter found that e-prescriptions improved communication between physicians and their patients in 86% of the cases (4). The questionnaire we designed does not address the aspect of communication between patients and care-givers but this is an interesting topic insofar as it would allow for evaluation of the impact new information technologies are having on the health field. But it is clear that it was the physicians and pharmacists who played an initial instructional role regarding e-prescriptions even though nursing staff have been campaigning for a prominent role in prescribing medicines through what are known as "nurse prescriptions" (22).

Analysis of the data also revealed a statistically significant correlation between the attribute "Understanding" and adherence according to the Morisky Green Levine test, which suggests that a better understanding of how e-prescriptions work positively impacts adherence.

Regarding the attribute "Expenditure", scores received on item 12 suggest that patients were not generally aware of having lost the possibility of reaching the monthly payment ceiling with prescriptions for three months-worth of medicines in one go with the paper prescription. A study conducted in the Community of Valencia found that patients reject a significantly higher number of prescriptions that involve co-payment than prescriptions that do not (23). Another study also conducted in the Community of Valencia with patients discharged from hospitals concluded that adherence was not influenced by co-payment for inexpensive medicines but was for expensive ones (24). Although the participation of patients in offsetting the cost of health-care services is a common practice and is conceived to reduce the risk of excessive consumption, the elasticity of demand for medicines, essential to assess the effects of co-payment, is not easy to calculate due to lack of experimental data. Moreover, changes in co-payment are not typically implemented in isolation but rather are usually coupled with changes in co-payment conditions of other services and "packages" of health-care and/or social policy measures. Practically all studies to date have found that co-payment reduces the use of health-care services, except for hospitalization and consumption of medicines, but until now there was no information on how co-payment affected e-prescriptions (25,26). Responses to item 13 coincide with those of the Schleiden study which found that 84% of patients

also preferred e-prescriptions over their paper counterpart owing to their convenience: time savings, fewer doctor's visits, fewer trips to the pharmacy and no more lost or damaged prescriptions (27).

Lastly, the attribute "Other areas of e-prescriptions" was broken down into interoperability, emergency room prescriptions and prescriptions from specialists. Here it was found that the use of e-prescriptions in these areas is not widespread thus accounting for a score of around 3 ("neither agree nor disagree"). E-prescriptions were implemented later in these areas (28,29) and therefore not many people have yet had the opportunity to use them and were unable to make an assessment. However, we did find a high rate of problems related to e-prescriptions that required patients to see their physician to resolve them. The Prats study found a 19% discrepancy rate for prescriptions in the system resulting in patients never collecting them because they were either cancelled treatments, incorrect doses or because the physician had changed the treatment and that change was not correctly reflected in the system (23).

Regarding the possible limitations of the study, we know that the use of questionnaires in health-care settings can lead to bias due to the way questions are posed, the language used and cultural factors (9). In our study, we trained community pharmacy staff to make the completion of the questionnaire as homogeneous as possible. All patients fully completed the questionnaire suggesting that it was not too long and was appropriate for community pharmacies. The main issue we had to contend with was the recruitment of participants while we were on lockdown during the first wave of COVID-19. This meant that the patients themselves were not always the ones who came to collect the medication but rather their care-givers who could not be asked to complete the questionnaire. This made recruitment difficult.

Also, the study was conducted at a single community pharmacy in the Community of Madrid with a very homogeneous population. It would be interesting to conduct similar studies in more community pharmacies in the Community of Madrid with a more diverse population, and also in other Autonomous Communities to provide more feedback on the different electronic prescription systems within Spain with a view to improving them.

Based on our analysis, it is safe to say that e-prescription users are very satisfied with this way of prescribing and dispensing pharmaceuticals. Educational level, age and adherence were the variables with the greatest influence on the questionnaire score.

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