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SPECIAL ARTICLE
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Outpatient pharmaceutical care satisfaction survey through Telepharmacy during COVID-19 pandemic in Spain

Encuesta de satisfacción en pacientes externos de la atención farmacéutica mediante Telefarmacia durante la pandemia COVID-19 en España

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Abstract

Objective: To present the results of a survey about the Telemedicine outpatients experience and satisfaction of a pharmaceutical care program through Telepharmacy, carried out from hospital pharmacy departments in Spain during COVID-19 Pandemic (ENOPEX survey), and identify differences across regions in Spain.

Method: An analysis of results of the national survey ENOPEX on outpatient Telepharmacy services during the lockdown due to the COVID-19 pandemic, analyzed by autonomous community in Spain. Data was collected in relation to point of delivery; pharmacotherapeutic follow-up; patient's opinion and satisfaction with Telemedicine; confidentiality; future development of pharmaceutical care, through Telepharmacy services; and coordination with the patient care team. Four multilevel regressions were performed to evaluate the differences between Spanish regions on the most relevant variables of the study, using the R version 4.0.3 software.

Results: A total of 8,079 interviews were valid, 52.8% of respondents were female, age was 41-65 years in 54.3% of participants; 42.7% had been receiving treatment for more than 5 years; 42.8% lived 10-50 km

KEYWORDS
Telemedicine; Telepharmacy; COVID-19; Pandemic; Outpatient; Pharmaceutical care; Patient satisfaction; Spain.

Resumen

Objetivo: Describir los resultados de la encuesta sobre experiencia y satisfacción de la Telemedicina en pacientes externos relativo a un programa de atención farmacéutica a través de la Telefarmacia, realizado desde los servicios de farmacia durante la pandemia COVID-19 (encuesta ENOPEX) e identificar las diferencias entre las comunidades autónomas de España.

Método: Se analizaron los resultados de la encuesta nacional ENOPEX sobre Telefarmacia en pacientes externos durante el confinamiento debido a la pandemia COVID-19, realizado en las diferentes comunidades autónomas de España. Se recogieron datos relativos a lugar de entrega, seguimiento farmacoterapéutico, opinión y satisfacción del paciente con la Telefarmacia, confidencialidad, desarrollo futuro de la atención farmacéutica a través de los servicios de Telefarmacia, y coordinación con el equipo de atención al paciente. Se realizaron cuatro regresiones multinivel para evaluar las diferencias entre comunidades autónomas sobre las variables más relevantes del estudio por medio del software R versión 4.0.3.

Resultados: Un total de 8.079 entrevistas fueron válidas: el 52,8% eran mujeres, el 54,3% tenía entre 41-65 años, el 42,9% estaban en tratamiento

PALABRAS CLAVE
Telemedicina; Telefarmacia; COVID-19; Pandemia; Paciente externo; Atención farmacéutica; Satisfacción del paciente; España.

from the hospital; the journey to hospital took more than one hour for 60.2% of participants. Globally, 85.7% received medicines at home. However, medicines were delivered at a community pharmacy in some communities, such as Cantabria (95.8%), or at primary care centers as in Castile La Mancha (16.5%). In total, 96.7% of participants were satisfied or very satisfied with Telemedicine pharmaceutical care, through Telepharmacy services, with differences across communities, with users in Andalusia reporting the highest satisfaction (OR = 1.58), and users in Castile-León being less satisfied with Telepharmacy services (OR = 0.66). Users in Catalonia are the ones more clearly in favor of Telemedicine pharmaceutical care, through Telepharmacy services as a complementary service, with an OR = 5.85 with respect to other users. The Telemedicine most frequently mentioned advantage was that Telepharmacy services avoided visits, especially in Cantabria (92.5%) and Extremadura (88.4%). Most patients prefer informed delivery of medicines at home when they do not have an appointment at the hospital: total of 75.6 %, from 50.1% of users in Cantabria to 96.3% in Catalonia ($p < 0.001$). The users less willing to pay for Telepharmacy services were the ones from Castile-León and Galicia, with users in Catalonia and Navarra showing higher willingness.
Conclusions: In general terms, patients were satisfied with Telemedicine pharmaceutical care, through Telepharmacy services during the COVID-19 pandemic, being mostly in favor of maintaining these services to avoid travels.

desde hacía más de 5 años, el 42,8% vivía a 10-50 km del hospital y el 60,2% tardaba más de una hora en acudir al hospital. Globalmente, el 85,7% recibieron medicación a domicilio, aunque hubo comunidades autónomas en las que se optó también por las oficinas de farmacia, como en Cantabria (95,8%), o los centros de atención primaria, como en Castilla-La Mancha (16,5%). El 96,7% de los pacientes refirieron estar satisfechos o muy satisfechos con la Telemedicina en la atención farmacéutica mediante el uso de la Telefarmacia, detectándose variabilidad en cuanto a la opinión entre comunidades, desde la mejor opinión en Andalucía (*odds ratio* =1,58) y la menos favorable en Castilla y León (*odds ratio* = 0,66). Por su parte, Cataluña es la comunidad que estaría más claramente a favor de la Telemedicina en la atención farmacéutica de usar la Telefarmacia como actividad complementaria, con una *odds ratio* de 5,85 respecto al resto. Las ventajas más mencionadas de la Telemedicina fue que los servicios de Telefarmacia evitaban desplazamientos, especialmente en Cantabria (92,5%) y Extremadura (88,4%). Los pacientes mayoritariamente prefieren el acercamiento y entrega informada de la medicación a domicilio cuando no tienen que acudir al hospital, el 75,6% globalmente, desde el 50,1% de pacientes de Cantabria al 96,3% en Cataluña ($p < 0,001$). Las comunidades autónomas menos dispuestas a pagar por el servicio de Telefarmacia fueron Castilla y León y Galicia, y las que más, Cataluña y Navarra.
Conclusiones: En líneas generales**,** los pacientes están satisfechos con la Telemedicina aplicada a la atención farmacéutica a través de los servicios de Telefarmacia durante la pandemia COVID-19, estando mayoritariamente a favor de mantenerla para evitar desplazamientos.

Introduction

National healthcare laws regulate drug dispensation in Spain and require that some therapeutic groups or medicines be dispensed at the Hospital Pharmacy (HP). This method ensures close monitoring of medicine use by a specialist pharmacist[1-4], following the guidelines of the national projects of the Marco Estratégico de Atención a los Pacientes Externos (MAPEX)[5] and the Capacidad-Motivación-Oportunidad (CMO)[6] program of the Spanish Society of Hospital Pharmacy (SEFH).

Technological advances have played a key role in facilitating Telemedicine[7], which use has increased substantially during the COVID-19 pandemic.

The declaration of the state of emergency in Spain[8] led to an urgent amendment of national laws to permit the delivery of medicines to HP patients at home, community pharmacies, or primary care centers, to facilitate access to their medicines during the pandemic[9]. This scenario forced HPs in Spain to establish Telepharmacy services, which had never been available before, except in research studies. Telepharmacy users received their medicines at home, which spared them from traveling to the hospital, and allowed adequate remote pharmacotherapy follow-up. This phenomenon occurred worldwide[10-14].

In May 2020, SEFH researchers conducted *ad hoc* interviews to assess the level of implementation and development of outpatient Telepharmacy services in HP in Spain during the COVID-19 pandemic[15]. The survey involved 185 hospitals over the country. Notably, before the pandemic, Telepharmacy services involving home delivery of medicines were not available in 83.2% of HPs, whereas all HPs offered this service during the pandemic. Throughout the study period, 119,972 patients received their medicines remotely, and 134,142 deliveries were performed. Of the total number of participants, 87.6% had a teleconsultation prior to the delivery of medicines, and near 60% had the Telepharmacy activity recorded in their record of appointments. HPs most frequently offered informed home delivery of medicines, followed by delivery at the closest primary care center and community pharmacy. This information is essential for the future development of Telepharmacy after the pandemic. The results of this survey will help redesign Pharmacy Hospital pathways and activities in relation to Telepharmacy, following the current national laws in force.

The ENOPEX survey was conducted subsequently to the national Survey on the Situation of Telepharmacy in Spain[16] (see interview script in Appendix 1) to poll the opinions and experiences of users of outpatient Telepharmacy services. To such purpose, we used an *ad hoc* questionnaire. A total of 9,442 questionnaires were distributed (8,079 were considered valid) among patients from 81 hospitals; 52.8% of respondents were female; age was 41-65 years in 54.3% of users; 42.7% had been receiving treatment for more than 5 years; 42.8 % lived 10-50 km from the hospital; and the journey to hospital took more than one hour for 60.2% of participants. The ENOPEX survey demonstrated that 96.7% of patients were "satisfied" or "very satisfied" with Telepharmacy procedures. As many as 97.5% considered Telepharmacy as a complementary service to regular follow-up; 55.9% preferred face-to-face hospital pharmacy care if they have an appointment at the hospital; and 75.6% showed preference for receiving their medicines at home.

The main objective of this study is to report the results of the ENOPEX study through an analysis of the opinions and experiences of users of outpatient Telepharmacy services from a geographic perspective, and identify differences among autonomous communities.

Methods

We analyzed the results of the national survey ENOPEX[16] by autonomous community. The survey involved users of outpatient Telepharmacy services during the lockdown due to the COVID-19 pandemic. The data collected included point of delivery, pharmacotherapy follow-up, opinion on Telepharmacy, future development of Telepharmacy, confidentiality, satisfaction, and coordination with patient care teams. Participants were asked to answer the ENOPEX (see Appendix 1) questionnaire designed by a panel of HP experts in Telepharmacy.

Sample

The population of the study included adult (> 18 years) users of outpatient HP services in Spain, who voluntarily participated in the interview between March 15 and May 15, 2020. Prior informed consent was obtained either in written or telephonically.

Sample size was calculated based on a representative sample of 119,972 Telepharmacy users (data provided by the participating centers through a questionnaire about the situation of Telepharmacy services in Spain carried out by the SEFH some months before[15]). Sampling error was 99%, with a beta error of 20%. Twenty five percent of questionnaires were not returned.

Prior to the statistical analysis, sample size was calculated for a power of 80% (Cohen's coefficient). All statistical analyses were performed using the R software, assuming that 75% of subjects would be in favor of Telepharmacy services.

Calculations revealed that a sample of 16,588 users was required.

Data collection

Each participating center collected data based on the number of users to be recruited per hospital. Information was included on the online questionnaire available at (www.sefh.es). Study data were collected and pro-

vided using the TEDCap web application available on the SEFH server. Each center was assigned a unique code. Anonymization was performed through the allocation of an alphanumeric code for the identification of each recruited patient.

Questionnaires were completed anonymously in face-to-face visits, telephonically or online. Access to online questionnaires was given through a QR code. Express informed consent to participate in the study was requested on the first page of the questionnaire.

Statistical analysis

Statistical analysis included an initial collection of data, descriptive analysis of demographic characteristics, and an analysis of data related to questionnaire items, both globally and by autonomous community. Quantitative variables were expressed as means and standard deviations or as median values and quartiles in case of asymmetrical distribution. Qualitative variables were expressed as percentages. Comparison of quantitative variables across communities was performed using the non-parametric Kruskal-Wallis test. Associations between independent qualitative variables were analyzed on the basis of contingency tables and residuals using Chi-square test or Monte Carlo methods and Fisher's exact test.

To assess the effect of autonomous community, four multilevel regressions were performed. This way, we analyzed user's acceptance of Telepharmacy as complementary to face-to-face hospital pharmacy care. Users' willingness to pay for Telepharmacy services was also assessed. The four multilevel regressions were used as generalized mixed models adjusted for the maximum likelihood coefficient, Laplace approximation. Dependent variables were used following binomial distribution in the models for complementary service, satisfaction, and willingness to pay, and a linear regression model for the score given by users (1-10 points). Fixed effects are models identified as significant on bivariate analysis. Autonomous communities were introduced in random effects. All analyses were performed using the R software package version 4.0.3.

Ethical considerations

ENOPEX was conducted in compliance with the international ethical standards for scientific research applicable to this type of study. The Spanish Agency for Medicines and Medical Devices of the Spanish Ministry of Health classified this study as a non post-authorization observational study in June 2020. The study protocol was approved by the Institutional Review Board of Hospital Valme in Seville, on June 30, 2020 with code 1524-N-20.

Patients were identified with a code recorded on the Case Report Form, which guaranteed the confidentiality of data and preserved the identity of study participants. Once the inclusion phase was completed, data were anonymized and entered into specific biostatistical analysis programmes using the ID code initially assigned to each participant.

Results

A total of 9,442 interviews were performed, of which 8,079 were considered valid (see Appendix 2 and Figure 1).

Eighty-one public and private hospitals of all levels of healthcare located in 16 of the 17 health systems in Spain took part in the study (Appendix 3).

Data from Asturias (5 patients), La Rioja (10 patients), Ceuta, and Melilla were excluded from analysis due to the small sample of patients.

Five autonomous communities represented 72% of patients; 25.3% of patients lived in the Community of Madrid, 15.9% in Galicia, 14.6% in Andalusia, 9.5% in Catalonia and 7.8% lived in the Autonomous Community of Valencia. Overall data by autonomous community are shown in Appendix 2.

Demographic data revealed that Extremadura and Aragón included more patients older than 41 years (88.9% and 87.5% respectively); Navarra and Catalonia showed a higher percentage of women (65.1% and 59.8% respectively).

There were a higher percentage of patients who had been on follow-up for more than 5 years in Murcia (66.1%) and Navarra (63.5%).

The autonomous communities with the highest number of patients living more than 10 km from the hospital were Andalusia (70.8%) and the Basque Country (64.2%).

The patients who had the longest journey to the HP lived in Andalusia and Aragón.

Finally, the highest percentage of employed patients was observed in Castile la Mancha (44.3%) and the Balearic islands (44.2%).

The methods of delivery differed across communities, ranging from home delivery only, as in the case of Navarra (100%), Extremadura (99.2%) or Galicia (99.1%) to other modalities involving informed delivery at a community pharmacy, as in Cantabria (95.8%). Some communities opted for mixed models, such as in the case of Andalusia, which offered delivery at home (67.3%), a community pharmacy (23.6%) or at the closest primary care center (9.1%) (Table 1). Confidentiality issues were reported by 5.8% of patients in Cantabria, whereas no reports were recorded in Andalusia, Basque Country, Galicia or Murcia (Table 1). Confidentiality issues were more frequent when the point of delivery was the community pharmacy (5.4%) vs home delivery (1.6%).

Pharmacotherapeutic follow-up

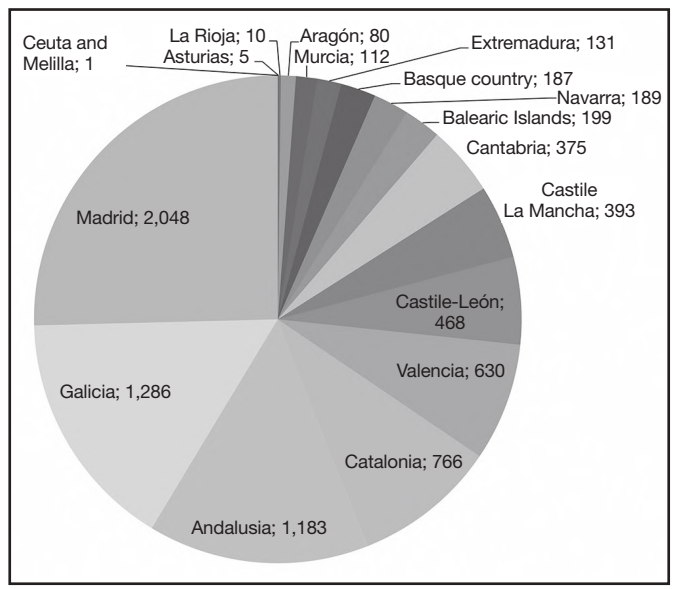
In total, 71.6% of patients learned about the service of informed dispensation and delivery through direct information provided by the hospital pharmacist (from 88.1% of patients in Extremadura to 53.3% in Valencia). In 86.3 % of cases, a remote clinical follow-up consultation was held prior to the delivery of medicines (from 97.5% of patients in Aragón to 74.9% in the Basque Country).

As many as 6,915 patients (85.6%) stated that Telepharmacy helped them keep informed about their medications. By autonomous community (Table 1), we found that 58.2% and 72.2% of patients in Navarra and the Basque Country were satisfied with the Telepharmacy service, respectively, versus 96.3% and 92 % in Extremadura and Murcia, respectively.

As to whether they had been given the opportunity to make questions and/or solve doubts or resolve issues in relation to their medicines arising from the state of emergency , 91.3% of patients in Aragon answered "I agree" or "I totally agree" vs 42.8% of patients in the Basque Country. With regard to doubts or issues related to their medicines unrelated to the state of emergency , 85% of patients in Aragon answered "I agree" or "I totally agree" vs 55% of patients in Navarra.

In terms of general satisfaction, the communities with the lowest level of satisfaction (coefficient < 0) were Valencia (–0.14), Castile-León (–0.08) and Castile La Mancha (–0.10).

Figure 1. *Number of respondents of the ENOPEX survey by autonomous communities.*



Informed drug delivery

A percentage of 85.8% of patients received their medicines at home, vs 10.8% of patients who received their medicines at a community pharmacy, and 3.4% who received them at their primary care center.

The autonomous communities with the highest level of satisfaction with the method of delivery (Table 1) were Murcia and Extremadura 97.5% and 99.5%, respectively, with patients living in the Basque Country and Cantabria showing the lowest level of satisfaction, 89.9% and 91.6%, respectively.

Acceptance as complementary procedure

Telepharmacy was considered a complementary service to face-to-face hospital pharmacy (HP) care by 97.8% of patients. Acceptance ranged from 98.9% in the Basque Country to 95.4% in Catalonia or Castile La Mancha (Table 2). One of the factors with an independent effect on acceptance that Telepharmacy be considered a complementary service to face-to-face HP care included the time patients had been on follow-up by the HP. Thus, the longer the time on follow-up, the higher the acceptance that Telepharmacy is established as a complementary service. Other factors with independent effects were not having ever used a Telepharmacy service or having faced confidentiality issues. The time devoted to attend face-to-face visits negatively affects consideration of Telepharmacy as a complementary service. The autonomous communities most willing to use Telepharmacy as a complementary service included Catalonia and Castile-León, as compared to the other communities, OR = 5.85 and OR = 3.31, respectively (see Figure 2).

Reported experience with the Telepharmacy procedure

In relation to the opinion of patients about the Telepharmacy procedures, 96.9% of users were "satisfied" or "very satisfied", ranging from 99.3% in Extremadura to 67.9% in Castile-León.

Table 1. Experience with follow-up and dispensation/delivery by A.C

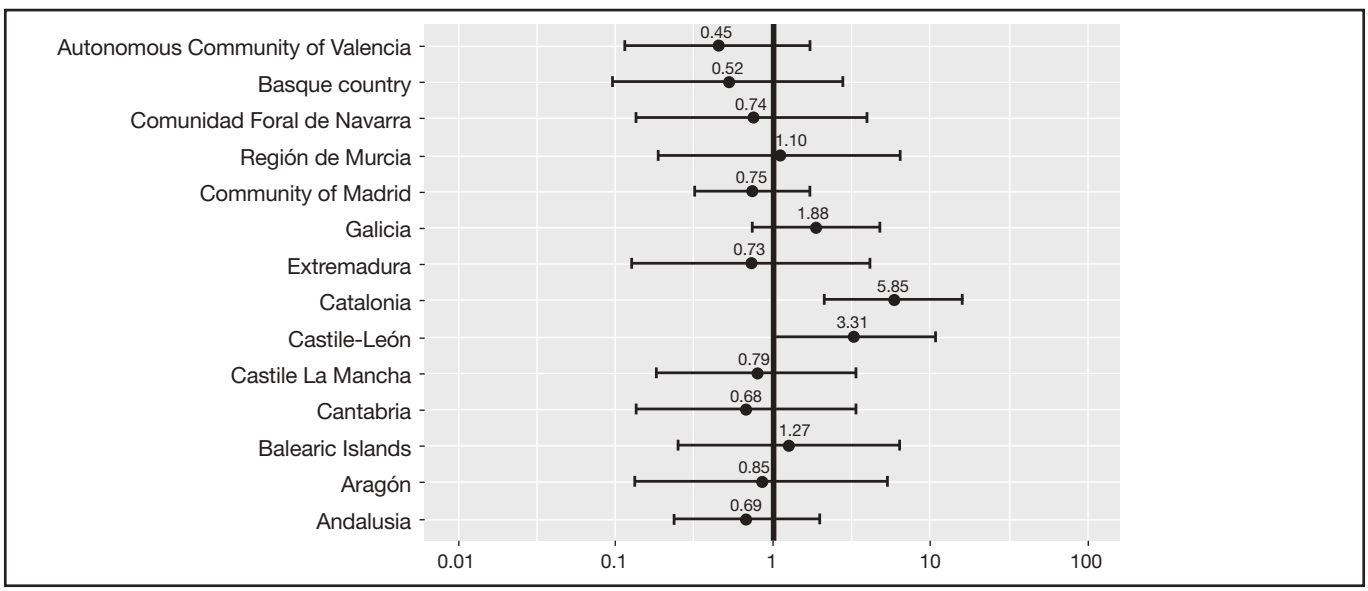
Autonomous community	N = 8,079 (%)	Telepharmacy was useful to keep informed I agree or I totally agree (%)	COVID-19-related questions solved I agree or totally agree (%)	Questions unrelated to COVID-19 solved I agree or I totally agree (%)	Home delivery *n* (%)	Delivery at primary care center *n* (%)	Delivery at community pharmacy *n* (%)	No confidentiality problems *n* (%)	Satisfied with the method of delivery I agree or I totally agree *n* (%)
Andalusia	1,183 (100)	1,006 (85.1)	674 (82.4)	960 (81.2)	796 (67.3)	108 (9.1)	279 (23.6)	1,183 (100.0)	1,147 (97)
Extremadura	131 (100)	126 (96.3)	88 (67.4)	80 (61.2)	131 (99.2)	0 (0.0)	1 (0.8)	131 (99.5)	130 (99.5)
Cantabria	375 (100)	285 (76.1)	277 (73.9)	239 (63.9)	8 (2.1)	6 (1.6)	360 (95.8)	353 (94.2)	343 (91.6)
Castile-León	468 (100)	390 (83.4)	400 (85.6)	369 (78.9)	438 (93.6)	10 (2.1)	20 (4.3)	460 (98.5)	450 (96.2)
Castile La Mancha	393 (100)	337 (85.9)	339 (86.3)	289 (73.6)	328 (83.5)	65 (16.5)	0 (0.0)	386 (98.4)	381 (97.2)
Valencia	630 (100)	531 (84.3)	555 (88.1)	506 (80.4)	630 (97.7)	3 (0.5)	12 (1.9)	633 (98.2)	623 (96.7)
Basque country	187 (100)	135 (72.2)	80 (42.8)	114 (61.0)	185 (98.9)	0 (0.0)	2 (1.1)	187 (100.0)	168 (89.9)
Balearic Islands	199 (100)	168 (84.5)	170 (85.5)	169 (85.0)	158 (79.4)	32 (16.1)	9 (4.5)	202 (98.4)	192 (96.8)
Madrid	2,048 (100)	1,812 (88.5)	1,789 (87.4)	1,701 (83.1)	1,939 (94.7)	23 (1.1)	86 (4.2)	1,933 (99.4)	1,994 (97.4)
Galicia	1,286 (100)	1,127 (87.7)	1,069 (83.2)	978 (76.1)	1,275 (99.1)	0 (0.0)	11 (0.9)	1,286 (100.0)	1,251 (97.3)
Murcia	112 (100)	103 (92.0)	100 (89.3)	91 (82.1)	110 (98.2)	2 (1.8)	0 (0.0)	112 (100.0)	109 (97.5)
Catalonia	766 (100)	621 (81.2)	645 (84.3)	624 (81.5)	658 (85.9)	22 (2.9)	86 (11.2)	746 (97.5)	736 (96.2)
Aragón	80 (100)	70 (87.6)	73 (91.3)	68 (85.0)	78 (97.5)	0 (0.0)	2 (2.5)	387 (98.5)	381 (97.2)
Navarra	189 (100)	109 (58.2)	93 (49.7)	103 (55.0)	189 (100.0)	0 (0.0)	0 (0.0)	186 (98.6)	183 (97.1)

Table 2. Opinions by A.C. about the most valued advantage, willingness to pay, en future method of delivery based on whether the patient has to visit the hospital or not.

A.C. N= 8 079 (%)	Considers Telepharmacy complementary to face-to-face pharmacy care (%)	Favorable or totally favorable opinion with the Telepharmacy procedure (%)	Telepharmacy has improved communication with Hospital Pharmacy professionals I agree or I totally agree (%)	I would recommend the TP programm I agree or I totally agree (%)	I would maintain TP after the state of alarm I agree or I totally agree (%)	I most value that TP avoids travels (%)	Willingness to pain I agree or I totally agree (%)	If I visit the hospital in the future, I would like to receive face-to-face phamacy care (%)	I I don't have to visit the hospital in the future, I would prefer receiving my medicines at home (%)
Andalusia 1,183 (14.6)	1,160 (98.19)	1,130 (95.69	883 (74.7)	1,156 (97.8)	1,129 (95.5)	932 (78.8)	557 (47.1)	649 (54.9)	709 (60.0)
Extremadura 131 (1.62)	129 (98.5)	130 (99.3)	123 (94.0)	131 (100.0)	125 (95.5)	121 (92.5)	66 (50.8)	115 (88.1)	126 (96.3)
Cantabria 375 (4.6)	371 (99.9)	343 (91.6)	259 (69.3)	363 (96.8)	354 (94.5)	263 (70.3)	163 (43.5)	213 (57.0)	187 (50.1)
Castile-León 468 (5.8)	458 (98.0)	317 (67.9)	329 (70.5)	354 (75.8)	421 (90.1)	326 (69.8)	159 (34.1)	297 (63.6)	326 (69.7)
Castile La Mancha 393 (4.86)	374 (95.4)	366 (93.2)	271 (69.2)	312 (79.4)	327 (83.4)	278 (70.8)	169 (43.2)	204 (52.1)	314 (80.1)
Valencia 630 (7.8)	621 (98.6)	598 (95.4)	481 (76.5)	611 (97.1)	589 (93.5)	503 (79.9)	291 (46.2)	279 (44.3)	537 (85.3)
Basque Country 187 (2.3)	184 (98.9)	180 (96.7)	132 (71.1)	182 (97.4)	170 (91.4)	149 (80.2)	80 (43.3)	111 (59.4)	143 (77.0)
Balearic Islands 199 (2.46)	192 (96.6)	179 (90.3)	145 (73.2)	185 (93.2)	169 (85.0)	138 (69.4)	67 (33.8)	97 (49.0)	135 (68.0)
Madrid 2,048 (25.3)	2,002 (97.8)	1,941 (94.8)	1,658 (81.0)	1,986 (97.0)	1,857 (90.7)	1,470 (71.8)	862 (42.1)	1,146 (56)	1,660 (81.1)
Galicia 1,286 (15.9)	1,248 (97.1)	1,237 (96.2)	882 (68.6)	1,221 (95.0)	1,158 (90.1)	938 (73.0)	466 (36.3)	712 (55.4)	1,071 (83.3)
Murcia 112 (1.38)	108 (97.3)	105 (94.6)	90 (80.4)	107 (95.5)	97 (86.6)	79 (71.4)	59 (52.7)	54 (49.1)	81 (73.2)
Catalonia 766 (9.48)	95.4	724 (94.6)	590 (77.1)	743 (97.1)	707 (92.3)	533 (69.7)	391 (51.1)	425 (55.6)	564 (73.7)
Aragón 80 (0.9)	79 (98.8)	79 (98.8)	76 (95.1)	77 (96.3)	79 (98.8)	63 (78.8)	47 (58.8)	22 (27.5)	62 (77.5)
Navarra 189 (2.3)	185 (98.4)	174 (92.1)	130 (68.8)	186 (98.5)	175 (92.6)	167 (88.4)	113 (60.3)	141 (75.1)	141 (75.1)

TP: Telepharmacy.

Figure 2. *Multilevel regression to assess the effect of autonomous community on acceptance of Telepharmacy as a complementary service.*



Communication with the hospital pharmacist had improved with Telepharmacy, ranging from 94% of patients in Extremadura and 68.6% in Galicia.

In the multilevel regression model of opinion about Telepharmacy, having received medicines at home had positive independent effects. In contrast, not having had any contact with the hospital pharmacist before, being unemployed, and having had confidentiality problems had independent negative effects. In general, the community with the best opinions about Telepharmacy was Andalusia, contrasting with Castile-Leon.

For 81.5% of patients, the most valued advantage of Telepharmacy was not having to travel to the hospital, especially in Cantabria (92.5%) and the Basque Country (80.2%)

In total, 17.3% of patients found the disadvantage that Telepharmacy hindered face-to-face contact with a hospital pharmacist.

All patients in Extremadura would recommend the Telepharmacy program vs 75.8% of patients in Castile-León.

A percentage as high as 95.5% of patients in Andalusia and Extremadura vs 83.4% in Castile La Mancha would agree to maintaining the Telepharmacy service after the state of emergency.

Willingness to pay

The factors with an independent positive effect on willingness to pay for Telepharmacy included living at a greater distance from the hospital and having received medicines at home or at a community pharmacy. In contrast, being 41-65 years old, having been more than 10 years on follow-up, being unemployed or a student, and having faced confidentiality issues had independent negative effects on willingness to pay for the service. The communities with the lowest willingness to pay were Castile-León OR = 0.7, the Balearic islands (OR = 0.76) and Galicia (OR = 0.65) vs Navarra (OR = 1.44), Aragón (OR = 1.25) and Catalonia (OR = 1.21), where patients exhibited a higher willingness to pay for the service.

All patients who had to visit the hospital preferred face-to-face dispensation, except for patients from Valencia (45.3%) and Aragon (56.3%), where the preferred option was informed delivery at home or at a close point of delivery.

When patients did not have to visit the hospital, the preferred option in all communities was home delivery, ranging from 50.1% in Cantabria to 96.3% in Extremadura.

Discussion

Since the outbreak of the COVID-19 pandemic, multiple Telepharmacy programs have been launched worldwide, as reported by Unni *et al.*[17]. In their review, Unnit described Telepharmacy initiatives launched over the world, which primarily involved remote consultation, home delivery of medicines, and patient education programs[10,18-23]. These initiatives provided valuable experiences and guidance for a proper, safe, effective, and efficient implementation of remote pharmacy care.

The Food and Drug Administration and the European Medicines Agency[24,25] require that outcomes and patients' experiences are evaluated. They advocate for a patient-centered model of shared decision-making to transition from models based on cost-effectiveness to value-based models[26]. In compliance with this mandate, this study describes the SEFH's ENOPEX study to evaluate the experiences of patients in Spain by autonomous community, in relation to pharmacotherapeutic follow-up, mode of dispensation, opinions about Telepharmacy, and validity of the questionnaire, as described by Margusino-Framiñán *et al.*[16].

A thorough analysis by autonomous community reveals that the experience with Telepharmacy in terms of pharmacotherapeutic follow-up during the state of emergency was highly satisfactory for patients from all autonomous communities. Satisfaction was lower in relation to confidentiality, although confidentiality problems were not frequent. Ensuring the confidentiality of data during dispensing and home delivery of medicines is an important aspect of the SEFH Telepharmacy strategy and other international programs[14,27]. For instance, packets must be opaque, and the privacy of their contents must be guaranteed. Other recent initiatives also identify confidentiality as a point for improvement for the future development of Telepharmacy[19,20]. Hence, safety problems have been detected in some video conferencing platforms, which do not comply with HIPAA regulations in the USA (Health Insurance Portability and Accountability Act)[28].

Patients were generally satisfied with Telepharmacy, although they considered it complementary to face-to-face hospital pharmacy care. The satisfactory experiences of patients with Telepharmacy offers the opportunity to improve their commitment and empowerment, which ultimately improves treatment adherence and clinical outcomes[29,30].

In most autonomous communities, the model of remote informed delivery primarily involved home delivery of medicines, except for Cantabria, where medicines were mainly delivered at community pharmacies. This is relevant to the future standardization of Telepharmacy. This study reveals that patients prefer approximation and informed delivery of medicines when they do not have to visit the hospital, including patients in Cantabria. Telepharmacy reduces travels to hospital, prevents interference of treatment with daily life activity, involves cost savings, reduces the accumulation of medicines at home, is more convenient for the patient, and reduces dependence on caregivers[14].

The survey documented that claims for confidentiality problems were 3.3 higher in the patients who collected their medicines at a community pharmacy vs those who received them at home. This may also explain patients' preference for receiving medicines at home if they do not have to visit to the hospital.

In any case, patients should be offered several delivery options to discuss the best option in each case. This will be key to ensuring treatment adherence[31]. A recent small survey on 50 patients who collected their medicines at a community pharmacy during the COVID-19 in Spain[32] revealed a high general satisfaction with the experience, with a mean score of 9.84 over 10. The broad collection times, convenience, and rapid service were some of the advantages reported by patients. Therefore, further research is required to identify the best methods of delivery in Telepharmacy.

Further evidence is necessary to measure the influence of Telepharmacy on clinical outcomes, and the cost-effectiveness of this service for patients and health systems. In this line, the randomized study conducted by Hefti *et al.*[33] shows that the increase in the rate of hospitalizations during the COVID-19 pandemic was lower in patients who received Telepharmacy care between 2019 and 2020, as compared to a group without access to Telepharmacy (Telepharmacy group +12.9 % vs face-to-face group +40.2 %; $p < 0.05$), which resulted in savings of 1.57 million dollars.

Although it is out of the scope of this study, there are numerous reasons that explain that patients who received remote pharmacotherapy follow-up exhibited lower hospitalization rates. Pharmacotherapy care provided by pharmacists reduces adverse drug reactions, improves patient education, and enhances treatment adherence, thereby reducing admissions[34-38].

The ENOPEX study provides guidance for future studies on Telepharmacy in relation to a correct pharmacotherapeutic follow-up.

One of the challenges to the provision of Telepharmacy services after the end of the pandemic is that legal guarantees at national and regional level are maintained. So far, laws supported the informed delivery of medicines[9] at home or at the closest primary care center or community pharmacy, under the supervision of a hospital pharmacist.

The results of the ENOPEX survey are a starting point for each community to identify relevant variables to the classification of patients. These results will also help determine patient's preferences, which is essential to identify the patients who will benefit the most from Telepharmacy in the future, and the patients who need face-to-face pharmaceutical care. At national level, Margusino *et al.*[16] detected five variables with independent effects on consideration of Telepharmacy as complementary to face-to-face pharmaceutical care, namely: time on follow-up, travel time to hospital, point of delivery, option of previous teleconsultation, and confidentiality during delivery.

Another relevant aspect is patients' willingness to pay for Telepharmacy services. In this sense, patients in Navarra, Catalonia and Aragón were the most willing to pay for this service. For the sake of equity, this should not represent a barrier to remote delivery of medicines, although it reveals the relevance that patients give to Telepharmacy[39,40].

The different studies and documents in relation to Telepharmacy conducted by the SEFH during the COVID-19 pandemic[10,14-16] demonstrate that hospital pharmacies have the capacity to provide outpatient Telepharmacy services, as proven by the successful implementation of these services during the COVID-19 pandemic. However, there is still room for improvement in the procedures. The SEFH is preparing seven methodological support documents, as follows: *Guidelines on Telepharmacy for professions, Guidelines on Telepharmacy for patients, Effective and safe provision of Telepharmacy services, Validation of technological tools for Telepharmacy, prioritization of patients in Telepharmacy, guidelines for Telepharmacy consultation, and Indicators in Telepharmacy*[41].

A limitation of the ENOPEX survey is that a preliminary test was not performed to determine whether patients could understand, process, and answer the items of the questionnaire. In addition, participation in the study was not based on demographic or clinical criteria, but on willingness to take part, which may have resulted in a lack of geographical representativity. Nevertheless, a large sample was achieved, with patients from 16 of the 17 autonomous communities in Spain.

Although we did not reach the estimated sample size (16,588 interviews), 8,079 valid questionnaires were finally received, the sample is representative, and sample size does not affect the quality of the study.

The survey was conducted in the context of a pandemic and state of emergency, which may have influenced patients' opinions.

The results of the ENOPEX survey on outpatient Telepharmacy services during the state of emergency demonstrate that patients from all autonomous communities were very satisfied with these services during the pandemic. Thus, most patients were in favor of maintaining these services to prevent travels to hospital and preferred receiving their medicines at home when they do not have an appointment at the hospital.

This study shows that patients consider outpatient Telepharmacy services as complementary to face-to-face pharmaceutical care. These services facilitate pharmacotherapeutic follow-up, patient education, coordination with the patient care team, and remote informed dispensing and delivery of medicines.

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No funding.

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To all co-investigators of the ENOPREX survey (Appendix 3).

Conflict of interests

No conflict of interests.

Appendix 1. Questionnaire ENOPEX

Page 1

ENOPEX QUESTIONNAIRE©

SURVEY OF THE OPINION AND EXPERIENCE OF OUTPATIENTS SERVED BY TELEPHARMACY SERVICES RUN BY HOSPITAL PHARMACY DEPARTMENTS IN SPAIN DURING THE COVID-19 PANDEMIC

Dear patient.

This survey is part of a study promoted by the Spanish Society of Hospital Pharmacists, a scientific non-profit-making organization. It is intended first and foremost to get to know your opinion and understand your experience regarding Telepharmacy services with a view to improving such services in the future.

As the entity responsible for the processing of your data, SEFH undertakes to comply with the requirements of the applicable data protection regulations. The data collected as part of the study will be assigned a code so that the identity of respondents remains anonymous at all times.

The information you provide will be treated in a confidential and anonymous way. Under no circumstances will your answers be presented together with your name or any data that may be traced back to you. You will initially have to answer a few questions with respect to your socioeconomic circumstances.

Please be advised that new regulations on the protection of personal data, specifically the new General Data Protection Regulation (Regulation EU 2016/679 of the European Parliament and of the Council), came into force on 25 May 2018. Should you wish to exercise your rights under the said Regulation please get in touch with the Spanish Society of Hospital Pharmacy's data protection officer by writing an email to sefh@sefh.es.

Your participation is wholly voluntary. To be able to start the process, you are requested to answer the questions below. Only patients answering both questions in the affirmative can take part in the survey.

I have been treated via Telepharmacy while the state of emergency was in force:

◯ Verdadero ◯ Falso

I agree to participate in the survey:

◯ Verdadero ◯ Falso

Appendix 1 ***(cont.).*** Questionnaire ENOPEX

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ENOPEX QUESTIONNAIRE©

SURVEY OF THE OPINION AND EXPERIENCE OF OUTPATIENTS SERVED BY TELEPHARMACY SERVICES RUN BY HOSPITAL PHARMACY DEPARTMENTS IN SPAIN DURING THE COVID-19 PANDEMIC

Please select the appropriate answers from the options below. Thank you!

DEMOGRAPHIC DATA

Autonomous community	◯ Andalusia ◯ Aragón ◯ Principado de Asturias ◯ Balearic Islands ◯ Canarias ◯ Cantabria ◯ Castile La Mancha ◯ Castile-León ◯ Catalonia ◯ Extremadura ◯ Galicia ◯ La Rioja ◯ Community of Madrid ◯ Región de Murcia ◯ Comunidad Foral de Navarra ◯ Basque Country ◯ Comunidad Valenciana ◯ Ceuta and Melilla
Center to which it belongs	◯ Hospital Juan Ramón Jimenez ◯ Agencia Sanitaria Costa del Sol ◯ Hospital de Poniente ◯ Hospital Universitario Virgen Macarena ◯ Hospital de Valme ◯ Hospital Punta de Europa ◯ Hospital San Juan de La Cruz ◯ Hospital Universitario Puerta del Mar
Center to which it belongs	◯ Hospital San Juan de Dios de Zaragoza ◯ Hospital San Jorge ◯ Centro Neuropsiquiátrico N. S. del Carmen ◯ Hospital de Barbastro ◯ Hospital Universitario Miguel Servet ◯ Hospital Clínico Universitario Lozano Blesa de Zaragoza
Center to which it belongs	◯ Fundación Hospital de Jove
Center to which it belongs	◯ Hospital Mateu Orfila ◯ Hospital Universitario Son Llátzer ◯ Hospital de Manacor ◯ Hospital Comarcal D'inca ◯ Hospital Universitario Son Espases
Center to which it belongs	◯ Complejo Hospitalario Universitario de Canarias

Appendix 1 ***(cont.).*** Questionnaire ENOPEX

ENOPEX QUESTIONNAIRE©

Center to which it belongs	◯ Hospital Universitario Marqués de Valdecilla
Center to which it belongs	◯ Hospital General La Mancha Centro ◯ Hospital Universitario de Guadalajara ◯ Hospital Virgen de La Salud ◯ Hospital General Universitario Ciudad Real ◯ Hospital Virgen de La Luz ◯ Hospital Santa Barbara
Center to which it belongs	◯ Complejo Asistencial Soria ◯ Santos Reyes ◯ Hospital de León ◯ Hospital Clínico Universitario de Valladolid
Center to which it belongs	◯ Hospital de La Santa Creu I Sant Pau ◯ Ico-Hospitalet ◯ Hospital Comarcal Blanes ◯ Hospital Comarcal Calella ◯ Fundació Puigvert ◯ Hospital Universitario Sagrat Cor ◯ Fundació Hospital Sant Joan de Deu Martorell ◯ Hospital General de Granollers ◯ Fundació Hospital Esperit Sant ◯ Parc Tauli Sabadell ◯ Hospital Residencia Sant Camil ◯ Fundación Sanitaria de Mollet ◯ Hospital Infantil Vall D'Hebron ◯ Ico Badalona ◯ Durán y Reynals (Ico Hospitalet) ◯ Institut Català D'oncologia de Girona ◯ Hospital Comarcal de Blanes ◯ Hospital Dos de Maig ◯ Hospital St. Jaume Calella ◯ Hospital General de Catalunya ◯ Hospital Universitari Mutua Terrassa ◯ Hospital Universitari de Girona Dr. Josep Trueta ◯ Hospital Universitari Vall D'Hebron (Traumatologia) ◯ Hospital Universitari Vall D'Hebron. Area General ◯ Hospital Sta. Caterina
Center to which it belongs	◯ Complejo Hospitalario Badajoz ◯ Hospital Virgen del Puerto ◯ Complejo Hospitalario Universitario de Cáceres ◯ Hospital de Mérida
Center to which it belongs	◯ Complejo Hospitalario Universitario A Coruña ◯ Virxe Da Xunqueira ◯ Arquitecto Marcide-Prof Novoa Santos ◯ Complexo Hospitalario Universitario de Ourense
Center to which it belongs	◯ Hospital San Pedro

Appendix 1 ***(cont.).*** Questionnaire ENOPEX

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ENOPEX QUESTIONNAIRE©

Center to which it belongs	◯ Hospital Universitario de Getafe ◯ Hospital Universitario de Fuenlabrada ◯ Hospital Clínico San Carlos ◯ Hospital Universitario Infanta Sofía ◯ Hospital El Escorial ◯ Hospital Ramon y Cajal ◯ Hospital Universitario del Sureste ◯ Hospital U. Puerta de Hierro Majadahonda ◯ Hospital Universitario de La Princesa ◯ Hospital Infanta Leonor ◯ Hospital Universitario de Torrejón ◯ Hospital Universitario 12 de Octubre ◯ Hospital del Henares ◯ Hospital Universitario Hm Sanchinarro ◯ Hospital Universitario Príncipe de Asturias ◯ Hospital Universitario La Paz ◯ Hospital Universitario Severo Ochoa ◯ Hospital General Universitario Gregorio Marañón ◯ Hospital Universitario Fundación Alcorcón
Center to which it belongs	◯ Hospital Clínico Universitario Virgen de La Arrixaca ◯ Hospital Universitario Los Arcos del Mar Menor ◯ Hospital Morales Meseguer ◯ Hospital Reina Sofia de Murcia ◯ Hospital Comarcal del Noroeste
Center to which it belongs	◯ Complejo Hospitalario de Navarra ◯ Clínica Universidad de Navarra
Center to which it belongs	◯ Hospital de Urduliz- Alfredo Espinosa ◯ Hospital Universitario Donostia
Center to which it belongs	◯ Hospital Universitario Dr. Peset ◯ Arnau de Vilanova-Lliria ◯ Hospital Universitari I Politècnic La Fe ◯ Hospital General Universitario Castellón ◯ Hospital General de Ontinyent ◯ Hospital General Universitario de Alicante ◯ Hospital General Universitario de Elx
What is your age group? ◯ 18-40 ◯ 41-65 ◯ > 65	
What is your sex? ◯ Female ◯ Male	
How long have you been followed-up as a hospital pharmacy outpatient? ◯ < 1 year ◯ 1-5 years ◯ 6-10 years ◯ > 10 years	

Appendix 1 ***(cont.).*** Questionnaire ENOPEX

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ENOPEX QUESTIONNAIRE©

How far do you live from your hospital?

◯ < 6.2 miles ◯ 6.3-31 miles ◯ > 31 miles

How long does it take you to get to the hospital and return home every time you visit the hospital pharmacy? (total time from the moment you leave home to the moment you return)

◯ < 1 hour ◯ 1-5 hours ◯ > 5 hours

Employment status

◯ Employed ◯ Unemployed ◯ Pensioner ◯ Student ◯ Other

Hospital department that prescribed your hospital-based medication

◯ Allergology	◯ Cardiology	◯ Dermatology	◯ GI
◯ Endocrinology & Nutrition	◯ ENT	◯ Infectious diseases	◯ Hematology
◯ Internal medicine	◯ Mental Health	◯ Nephrology	◯ Neurology
◯ Pneumology	◯ Obstetrics & Gynecology	◯ Oncology	◯ Ophthalmology
◯ Palliative care unit	◯ Pediatrics	◯ Rheumatology	◯ Surgery
◯ Trauma Surgery	◯ Urology	◯ Others	

YOUR EXPERIENCE WITH THE PHARMACOTHERAPEUTIC FOLLOW-UP

1. **How did you first hear about the Telepharmacy program? Select as many options as may be applicable:**

☐ Through the hospital pharmacist
☐ Through other healthcare providers (physicians, nurses)
☐ Through other patients or patient associations
☐ Through the media (newspapers, TV, radio, social media)

2. **Were you contacted by a hospital pharmacist by phone, a teleconsultation app and/or e-mail before your medication was sent to you?**

◯ Yes ◯ No

Pharmacotherapeutic follow-up

	I totally agree	I agree	I am not sure	I disagree	I totally disagree
3. **Has Telepharmacy provided you with the information you required about your treatment during the state of emergency period?**	◯	◯	◯	◯	◯
4. **Were you able to ask questions and clarify doubts or resolve issues related to your medication arising from the special situation resulting from the state of emergency?**	◯	◯	◯	◯	◯
5. **Were you able to ask questions and clarify doubts or resolve issues about to your medication that were not related to the state of emergency?**	◯	◯	◯	◯	◯

Appendix 1 ***(cont.).*** Questionnaire ENOPEX

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ENOPEX QUESTIONNAIRE©

YOUR EXPERIENCE WITH THE PLACE OF DELIVERY

6. How did you get hold of your medication during the state of emergency period?

◯ It was delivered to my home ◯ I picked it up from my health center ◯ I picked it up from a community pharmacy

Rate from 1 to 10 the following aspects of the delivery/dispensation process during the state of emergency period

7. Punctuality of deliveries/dispensations

1 5 10

(Place a mark on the scale above)

8. The medications delivered were the right ones

1 5 10

(Place a mark on the scale above)

9. The amounts received corresponded to the length of my treatment

1 5 10

(Place a mark on the scale above)

10. The medication was at the right temperature when I received it

1 5 10

(Place a mark on the scale above)

11. The medication's expiration date was far enough into the future to cover the duration of my treatment

1 5 10

(Place a mark on the scale above)

12. Confidentiality of delivery

1 5 10

(Place a mark on the scale above)

13. Were there any confidentiality issues regarding the Telepharmacy process?

◯ No issues ◯ A few issues ◯ Many issues

14. Are you on the whole satisfied with the delivery method that was used to make your medication available to you during the state of emergency period?

◯ Totally satisfied ◯ Fairly satisfied ◯ Neither satisfied nor dissatisfied ◯ Rather dissatisfied ◯ Totally dissatisfied

Your opinion

15. Do you think that Telepharmacy is complementary to in-hospital pharmaceutical services?

◯ Yes ◯ No

16. What is your opinion about Telepharmacy services?

◯ Totally unfavorable ◯ Unfavorable ◯ Neither for nor against ◯ Favorable ◯ Totally in favor

Appendix 1 ***(cont.).*** Questionnaire ENOPEX

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ENOPEX QUESTIONNAIRE©

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Your opinion

17. Telepharmacy has positively influenced your communication with the hospital pharmacists who usually process your prescriptions.

◯ I totally disagree ◯ I disagree ◯ I am not suret ◯ I agree ◯ I totally agree

18. What is the most important advantage of a Telepharmacy program? (Please choose only one option)

◯ Allowed me to comply with the restrictions imposed during the state of emergency period
◯ I didn't have to travel to the hospital
◯ Possibility to balance my family and professional life
◯ Greater confidentiality
◯ Others

19. What is the biggest disadvantage of a Telepharmacy program? (Please choose only one option)

◯ Losing face-to-face contact with my hospital pharmacist
◯ The quality of information conveyed online
◯ The drug delivery procedure
◯ Loss of confidentiality or privacy
◯ Others

Your opinion

	I totally agree	I agree	I am not sure	I disagree	I totally disagree
20. Would you recommend the Telepharmacy program to other patients?	◯	◯	◯	◯	◯
21. Would you be in favor of hospital pharmacies retaining Telepharmacy program once the state of emergency is lifted as an alternative to onsite drug dispensation and delivery	◯	◯	◯	◯	◯
22. Should Telepharmacy be retained in the future, would you agree to keep participating in teleconsultations and to have to pay for any drugs delivered to you?	◯	◯	◯	◯	◯

Place of delivery

	Onsite	At home	At the healthcare center	At your local pharmacy
23. If Telepharmacy was implemented in the future and you had to come to your hospital for a medical visit or a functional exam, how would you like to receive your medication?	◯	◯	◯	◯
24. If Telepharmacy was implemented in the future and you DID NOT have to come to your hospital for a medical visit or a functional exam, how would you like to receive your medication?	◯	◯	◯	◯

Appendix 2. Baseline data of patients by autonomous community

Autonomous Community *N* = 8 079 (%)	Teleconsultation prior to delivery *n* (%)	> 40 years *n* (%)	Female *n* (%)	> 5 years on treatment *n* (%)	> 10 km *n* (%)	> 1 hour *n* < (%)	Employed *n* < (%)
Andalusia	1,183 (100)	998 (84.4)	569 (46.0)	569 (48.1)	838 (70.8)	1,022 (86.4)	397 (33.6)
Extremadura	131 (100)	116 (88.9)	60 (45.9)	76 (57.8)	70 (53.8)	58 (44.4)	35 (26.7)
Cantabria	375 (100)	308 (82.2)	201 (53.5)	130 (34.7)	213 (56.7)	162 (43.3)	152 (40.4)
Castile-León	468 (100)	375 (80.2)	248 (52.9)	241 (51.5)	169 (36.1)	192 (41.0)	204 (43.5)
Castile La Mancha	393 (100)	303 (77.0)	217 (55.3)	144 (36.6)	128 (32.6)	309 (78.5)	174 (44.3)
Valencia	630 (100)	495 (78.5)	353 (56.0)	287 (45.5)	403 (64.0)	442 (70.1)	240 (38.1)
Basque Country	187 (100)	153 (81.8)	111 (59.4)	75 (40.1)	120 (64.2)	96 (51.3)	69 (36.9)
Balearic Islands	199 (100)	154 (77.3)	112 (56.5)	92 (46.4)	126 (63.1)	108 (54.4)	88 (44.2)
Madrid	2,048 (100)	1,626 (79.4)	1,106 (54.0)	864 (42.2)	770 (37.6)	983 (48.0)	893 (43.6)
Galicia	1,286 (100)	1,029 (80.0)	642 (49.9)	710 (55.2)	738 (57.4)	912 (70.9)	520 (40.4)
Murcia	112 (100)	90 (80.4)	66 (58.9)	74 (66.1)	70 (62.5)	72 (64.3)	27 (24.1)
Catalonia	766 (100)	597 (77.9)	458 (59.8)	470 (61.3)	437 (57.0)	470 (61.3)	303 (39.5)
Aragón	80 (100)	70 (87.5)	35 (43.8)	28 (35.0)	51 (63.7)	67 (83.7)	25 (31.3)
Navarra	189 (100)	159 (84.1)	123 (65.1)	120 (63.5)	114 (60.3)	134 (70.9)	47 (24.9)

Appendix 3. List of ENOPEX study investigators

Nº	AUTONOMOUS C.	Hospital	Name	Type of collaboration
1	Andalusia	Agencia Sanitaria Costa del Sol	Begoña Tortajada Goitia	Co-investigator
2	Andalusia	Hospital de Poniente	Joaquín Urda Romacho	Principal Investigator
3	Andalusia	Hospital de Valme	Ramon A. Morillo Verdugo	Co-investigator
4	Andalusia	Hospital Juan Ramón Jimenez	M. de las Aguas Robustillo Cortés	Co-investigator
5	Andalusia	Hospital Punta de Europa	Mª Paz Quesada Sanz	Principal Investigator
6	Andalusia	Hospital Universitario Puerta del Mar	M. Hosé Huertas Fernández	Principal Investigator
7	Andalusia	Hospital Universitario Puerta del Mar	Rosa M. Ramos Guerrero	Co-investigator
8	Andalusia	Hospital Universitario Virgen Macarena	Miguel Angel Calleja Hernández	Co-investigator
9	Andalusia	Hospital Virgen del Rocío	Trinidad Desongles Corrales	Co-investigator
10	Andalusia	Hospital San Juan de la Cruz	M. Teresa Ruiz-Rico Ruiz-Morón-NO SOCIA	Co-investigator
11	Aragón	Centro Neuropsiquiátrico N. S. del Carmen	Cristina Cirujeda	Principal Investigator
12	Aragón	Hospital Clínico Universitario Lozano Blesa de Zaragoza	Mercedes Gimeno Gracia	Principal Investigator
13	Aragón	Hospital Clínico Universitario Lozano Blesa de Zaragoza	Raquel Fresquet Molina	Co-investigator
14	Aragón	Hospital San Juan de Dios de Zaragoza	Alejandro J. Sastre Heres	Principal Investigator
15	Balearic Islands	Hospital de Manacor	M. Antonia Maestre Fullana	Co-investigator
16	Balearic Islands	Hospital Mateu Orfila	Gabriel Mercadal	Co-investigator
17	Balearic Islands	Hospital Universitario Son Espases	Ana Gómez Lobón	Co-investigator
18	Balearic Islands	Hospital Universitario Son Llàtzer	Joaquin Ignacio Serrano López de las Hazas	Principal Investigator
19	Cantabria	Hospital Universitario Marqués de Valdecilla	David Gómez Gómez	Principal Investigator
20	Castile-León	Complejo Asistencial Soria	Maria Elisa Fernández García	Principal Investigator
21	Castile-León	Hospital Clínico Universitario de Valladolid	Encarnación Abad Lecha	Principal Investigator

Appendix 3 ***(cont.).*** List of ENOPEX study investigators

Nº	AUTONOMOUS C.	Hospital	Name	Type of collaboration
22	Castile-León	Hospital de León	Ortega Valin, Luis	Principal Investigator
23	Castile-León	Santos Reyes	Virginia Benito Ibáñez	Principal Investigator
24	Castilla León	COMPLEJO ASISTENCIAL SORIA	María Elisa Fernandez García	Co-investigator
25	Castile La Mancha	Hospital de Guadalajara	Alicia Lázaro López	Co-investigator
26	Castile La Mancha	Hospital de Guadalajara	Clara Deán Barahona	Co-investigator
27	Castile La Mancha	Hospital de Guadalajara	Elvira Martínez Ruiz	Co-investigator
28	Castile La Mancha	Hospital de Guadalajara	Gema Isabel Casarrubios Lázaro	Co-investigator
29	Castile La Mancha	Hospital de Guadalajara	Inés Mendoza Acosta	Co-investigator
30	Castile La Mancha	Hospital de Guadalajara	Isabel María Carrión Madroñal	Co-investigator
31	Castile La Mancha	Hospital de Guadalajara	María Blanco Crespo	Co-investigator
32	Castile La Mancha	Hospital de Guadalajara	María Lavandeira Pérez	Co-investigator
33	Castile La Mancha	Hospital de Guadalajara	Patricia Tardáguila Molina	Co-investigator
34	Castile La Mancha	Hospital General La Mancha Centro	Beatriz Proy Vega	Principal Investigator
35	Castile La Mancha	Hospital Universitario de Guadalajara	Ana M. Horta Hernández	Co-investigator
36	Castile La Mancha	Hospital Virgen de La Luz	Amparo Flor García	Co-investigator
37	Castile La Mancha	Hospital Virgen de La Salud	Araceli Fernández-Colada Sánhez	Principal Investigator
38	Catalonia	Durán y Reynals (Ico Hospitalet)	Eduardo Fort Casamartina	Co-investigator
39	Catalonia	Fundació Hospital Esperit Sant	Marcos López Novelle	Co-investigator
40	Catalonia	Fundació Hospital Esperit Sant	Miriam Maroto Hernando	Principal Investigator
41	Catalonia	Fundació Hospital Sant Joan de Deu Martorell	Ylenia Campos Baeta	Co-investigator
42	Catalonia	FUNDACIÓN SANITARIA DE MOLLET	Maria Priegue Gonzalez	Co-investigator
43	Catalonia	Fundación Sanitaria de Mollet	María Priegue González	Principal Investigator
44	Catalonia	Hospital Comarcal Blanes	Eva M. Martínez Bernabé	Co-investigator
45	Catalonia	Hospital General de Catalunya	Gemma Morla Clavero	Co-investigator
46	Catalonia	Hospital General de Granollers	Carlos Segui Solanes	Co-investigator
47	Catalonia	Hospital Infantil Vall d'Hebron	Aurora Fernández Polo	Co-investigator
48	Catalonia	HOSPITAL ST JAUME CALELLA	Nuria Sabate Frias	Co-investigator
49	Catalonia	Hospital Sta. Caterina	Magdalena Perpinya Gombau	Co-investigator
50	Catalonia	Hospital Sta. Caterina	Misael Rodriguez Goicoechea	Principal Investigator
51	Catalonia	Hospital Universitari de Girona Dr. Josep Trueta	Laura Viñas Sagué	Principal Investigator
52	Catalonia	Hospital Universitari Mutua Terrassa	Julia Pardo Pastor	Co-investigator
53	Catalonia	Hospital Universitari Vall d'Hebron (Traumatología)	Juan Carlos Juarez Gimenez	Co-investigator
54	Catalonia	Hospital Universitari Vall d'Hebron. Area General	Ignacio Cardona Pascual	Co-investigator
55	Catalonia	Hospital Universitario Sagrat Cor	Leticia Galofré Mestre	Principal Investigator
56	Catalonia	Ico Badalona	Cristina Ibáñez Collado	Principal Investigator
57	Catalonia	Institut Catalá d'oncologia de Girona	Nuri Quer Margall	Principal Investigator
58	Catalonia	Parc Tauli Sabadell	Belen López García	Co-investigator
59	Extremadura	Complejo Hospitalario Badajoz	Raquel Medina	Co-investigator
60	Galicia	Arquitecto Marcide-Prof Novoa Santos	Antonia Casas Martínez	Co-investigator
61	Galicia	Complejo Hospitalario Universitario A Coruña	Luis Margusino Framiñán	Co-investigator
62	Galicia	Complexo Hospitalario Universitario de Ourense	Belén Padrón Rodríguez	Co-investigator
63	Galicia	Hospital Clínico Universitario de Santiago de Compostela	M. Sol Rodríguez Cobos	Co-investigator
64	Galicia	Virxe Da Xunqueira	José Luis Rodríguez Sánchez	Co-investigator
65	La Rioja	Hospital San Pedro	Jara Gallardo Anciano	Principal Investigator
66	La Rioja	HOSPITAL SAN PEDRO	M. Carmen Obaldia Alaña	Co-investigator
67	Madrid	H. Infanta Leonor	Irene Cañamares Orbis	Co-investigator

Appendix 3 ***(cont.).*** List of ENOPEX study investigators

Nº	AUTONOMOUS C.	Hospital	Name	Type of collaboration
68	Madrid	Hospital Clínico San Carlos	Ana García Sacristán	Co-investigator
69	Madrid	Hospital del Henares	M. Angeles Campos Fernández de Sevilla	Co-investigator
70	Madrid	Hospital del Tajo	Luis Pedraza	Co-investigator
71	Madrid	HOSPITAL EL ESCORIAL	Carolina Aguilar Guisado	Co-investigator
72	Madrid	HOSPITAL EL ESCORIAL	M. Isabel Barcía Martín	Co-investigator
73	Madrid	Hospital El Escorial	Susana Sánchez Suárez	Investigador Principal
74	Madrid	HOSPITAL GENERAL UNIVERSITARIO GREGORIO MARAÑÓN	Carmen Guadalupe Rodríguez Gonzalez	Co-investigator
75	Madrid	Hospital General Universitario Gregorio Marañón	Cecilia M. Fernández-Llamazares	Principal Investigator
76	Madrid	Hospital General Universitario Gregorio Marañón	Roberto Collado Borrell	Principal Investigator
77	Madrid	Hospital Ramon Y Cajal	M. de los Angeles Parro Martín	Co-investigator
78	Madrid	Hospital U. Puerta de Hierro Majadahonda	Amelia Sánchez Guerrero	Co-investigator
79	Madrid	Hospital Universitario 12 de Octubre	Marta González Sevilla	Co-investigator
80	Madrid	Hospital Universitario de Fuenlabrada	Ana Ontañón Nasarre	Co-investigator
81	Madrid	Hospital Universitario de Fuenlabrada	Belen Hernández Muniesa	Co-investigator
82	Madrid	Hospital Universitario de Fuenlabrada	Carolina Mariño Martínez	Co-investigator
83	Madrid	Hospital Universitario de Fuenlabrada	Cristina Bravo Lázaro	Principal Investigator
84	Madrid	Hospital Universitario de Fuenlabrada	Mario García Gil	Co-investigator
85	Madrid	Hospital Universitario de Fuenlabrada	Nuria Guerrero Muñoz	Co-investigator
86	Madrid	Hospital Universitario de Getafe	Alberto Onteniente González	Co-investigator
87	Madrid	Hospital Universitario de Getafe	Cristina Capilla Montes	Co-investigator
88	Madrid	Hospital Universitario de Getafe	Eva Negro Vega	Principal Investigator
89	Madrid	Hospital Universitario de La Princesa	Alberto Morell Baladron	Investigador Colaborador
90	Madrid	Hospital Universitario de Torrejón	Marta Blasco Guerrero	Principal Investigator
91	Madrid	Hospital Universitario Fundación Alcorcón	Patricia Sanmartin Fenollera	Co-investigator
92	Madrid	Hospital Universitario Hm Sanchinarro	Lara Martín Rizo	Investigador Principal
93	Madrid	Hospital Universitario Infanta Sofía	Cristina García Yubero	Co-investigator
94	Madrid	Hospital Universitario La Paz	Francisco Moreno Ramos	Co-investigator
95	Madrid	Hospital Universitario Príncipe de Asturias	Marta Herrero Fernández	Co-investigator
96	Murcia	Hospital Clínico Universitario Virgen de La Arrixaca	Almudena Mancebo González	Co-investigator
97	Murcia	Hospital Clínico Universitario Virgen de La Arrixaca	Laura Menendez Naranjo	Co-investigator
98	Murcia	Hospital Comarcal del Noroeste	Isabel Susana Robles García	Co-investigator
99	Murcia	Hospital Reina Sofia de Murcia	María García Coronel	Co-investigator
100	Murcia	Hospital Universitario Los Arcos del Mar Menor	María Onteniente Candela	Co-investigator
101	Navarra	Clínica Universidad de Navarra	María Serrano Alonso	Co-investigator
102	Navarra	Complejo Hospitalario de Navarra	M. Teresa Sarobe Caricas	Co-investigator
103	Basque Country	Hospital de Urduliz- Alfredo Espinosa	M. Olatz Ibarra Barrueta	Co-investigator
104	Basque Country	Hospital Universitario Donostia	M. Asunción Aranguren	Co-investigator
105	Principado de Asturias	FUNDACIÓN HOSPITAL DE JOVE	Alba León Barbosa	Co-investigator
106	Valencia	Arnau de Vilanova-Lliria	M. Dolores Edo Solsona	Co-investigator
107	Valencia	Hospital General de Ontinyent	Mª Jose Martinez Pascual	Co-investigator
108	Valencia	Hospital General Universitario Castellón	Esther Vicente Escrig	Principal Investigator
109	Valencia	Hospital General Universitario de Alicante	Rosa Ruiz Fuster de Apodaca	Co-investigator
110	Valencia	Hospital General Universitario de Elx	Ana García Monsalve	Co-investigator
111	Valencia	Hospital Universitari I Politécnic La Fe	Emilio Monte Boquet	Principal Investigator
112	Valencia	Hospital Universitario Dr. Peset	Marta Hermenegildo Caudevilla	Co-investigator

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