

# Teleconsultation in the Portuguese National Health Service During the COVID-19 Pandemic: A Survey of Physicians' Views and Future Implications



## Consulta Não Presencial no Serviço Nacional de Saúde Português Durante a Pandemia de COVID-19: Estudo da Opinião dos Médicos e Implicações para o Futuro

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### ABSTRACT

**Introduction:** The COVID-19 pandemic led to the reorganization of healthcare services and teleconsultation emerged as a solution to facilitate patient appointments. The aim of this study was to characterize, from a physician perspective, the teleconsultations carried out in the Portuguese National Health Service (SNS) during the first phase of the pandemic and to identify factors that influence the experience of the teleconsultation.

**Material and Methods:** A cross-sectional analytical study was conducted based on an online survey, between July-September 2020, aimed at SNS doctors. Data on demographics, practice, attitudes and perceptions associated with the teleconsultation was collected. The adjusted prevalence ratio (aPR) was calculated to identify demographic factors and determinants of teleconsultation associated with satisfaction, use of video calls and greater motivation to carry out teleconsultations in the future.

**Results:** 2225 valid responses were obtained. Teleconsultation was carried out by 93.8% of participants in this period, 99.0% used the telephone as a form of communication and only 8.0% used a video call. A high degree of satisfaction with the teleconsultation was significantly associated with perceiving the teleconsultation as providing care with equivalent quality to a face-to-face consultation (aPR = 1.472) and being motivated to do teleconsultation after the pandemic (aPR = 4.081). Reporting clinical (aPR = 0.763) or technical difficulties (aPR = 0.666) was negatively associated with satisfaction. A percentage of 70.4% of doctors would like to continue doing follow-up teleconsultations and 53.3% consider that video call technologies should always or often be used during teleconsultations.

**Conclusion:** Teleconsultation seems to have potential to become a common practice in the future. However, it is important to address clinical, technical, organizational, and legal questions and, above all, to ensure that it is a safe and valuable practice for patients.

**Keywords:** COVID-19; National Health Service; Portugal; Remote Consultation; Telemedicine

### RESUMO

**Introdução:** A pandemia de COVID-19 impôs uma reorganização dos serviços de saúde e a teleconsulta surgiu como solução para manter o acompanhamento dos utentes. Este estudo caracterizou, pela perspetiva dos médicos, a consulta não presencial (CNP) realizada no Serviço Nacional de Saúde (SNS) durante a primeira fase da pandemia e identificou fatores que influenciam a experiência da consulta.

**Material e Métodos:** Estudo transversal analítico com base num questionário *online* dirigido aos médicos do SNS entre julho e setembro de 2020. Recolheram-se dados demográficos e informação sobre a prática, atitudes e perceções relativas à CNP. Foram calculadas razões de prevalência através de regressões Poisson, ajustadas para identificar fatores associados a maior satisfação, utilização de videochamada e maior motivação para realizar teleconsultas no futuro.

**Resultados:** Obtiveram-se 2225 respostas válidas. A CNP foi realizada por 93,8% dos inquiridos neste período, dos quais 99,0% utilizou o telefone como forma de comunicação e apenas 8,0% a videochamada. Registámos elevada satisfação com as CNP realizadas, com significativa associação à ideia de que a CNP providencia cuidados de saúde de qualidade equivalentes à consulta presencial [*adjusted prevalence ratio* (aPR) = 1,472], e adesão à realização de CNP após a pandemia (aPR = 4,081). A existência de dificuldades clínicas (aPR = 0,763) ou técnicas (aPR = 0,666) esteve associada a menor satisfação. Entre os médicos respondentes, 70,4% gostariam de continuar a realizar CNP subsequentes e 53,3% consideraram que deve ser sempre ou muitas vezes utilizado suporte de vídeo na CNP.

**Conclusão:** A teleconsulta parece ter potencial para se tornar uma prática comum no futuro. No entanto importa solucionar limitações de natureza clínica, técnica, organizacional e legal e, assegurar que é uma prática segura, benéfica e valorizada pelo utente.

**Palavras-chave:** Consulta Remota; COVID-19; Portugal; Serviço Nacional de Saúde; Telemedicina

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## INTRODUCTION

Telemedicine was defined by the World Health Organization in 1997 as “the provision of healthcare by healthcare professionals using information and communication technologies, where distance is a critical factor”.<sup>1</sup> Teleconsultation, one of the components of telemedicine, can be characterised as a real-time or deferred interaction between physicians and their patients or between physicians.<sup>2</sup> It is a reality that has been growing for three decades in Portugal and worldwide, both in primary care and in the hospital.<sup>2-7</sup> Teleconsultation presents potential benefits for patients, namely increased accessibility to healthcare services, especially for those living outside urban centres,<sup>4,8</sup> convenience for patients, reduced travel costs and time saving, which could be relevant for professionally active patients or informal caregivers.<sup>8-11</sup> There are also benefits for healthcare systems and coping with disasters and public health emergencies.<sup>12,13</sup> However, concerns have traditionally been described regarding its potential clinical risks and acceptance by physicians and patients, in addition to technical, logistical and regulatory challenges.<sup>14</sup>

A rapid reorganisation of healthcare services has been imposed by COVID pandemic, due to the need to reallocate healthcare resources to fight the pandemic and to minimise the risk of infection transmission among healthcare professionals and the patients. Telemedicine and particularly teleconsultation emerged as the solution to maintain doctor-patient monitoring and communication in the context of a pandemic. Therefore, there was an exponential growth in the use of teleconsultation worldwide, contrasting with the previously scarce use.<sup>15-19</sup>

‘Medical consultation without the presence of the patient’ and ‘teleconsultation’ are considered different concepts in Portugal, even though they are often used interchangeably. ‘Medical consultation without the presence of the patient’ was defined by the *Portaria* no. 207/2017 as a medical consultation that may (...) be associated with different forms of communication, namely through traditional mail, telephone, email, or others, without the presence of the patients. On the other hand, “teleconsultation” involves the “use of interactive, audio-visual and data communication, including mandatory clinical recording”.<sup>20</sup> Non-face-to-face medical appointments (CNP) (*consulta não presencial*) were recommended during the pandemic by departments, hospital administrations and the Directorate-General for Health, while face-to-face consultations were reserved for whenever it was not clinically adequate or technically possible.

This study aims at characterising the CNP activity within the Portuguese National Health Service (*Serviço Nacional de Saúde* – SNS) during the first phase of the COVID pandemic based on the perspective of physicians, as well as assessing their current attitudes and experiences, as well

as their expectations regarding the use of CNP after the pandemic. It was also aimed at the identification of factors with an impact on the experience in CNP defining clinical and organisational strategies and interventions for the implementation of CNP.

## MATERIAL AND METHODS

This was an observational, cross-sectional, and analytical study based on a 23-item online Google Forms questionnaire, aimed at characterising the CNP activity within the Portuguese SNS during the first phase of COVID pandemic, based on the physicians’ perspective. All physicians registered with the Portuguese Medical Association were sent by email an invitation to respond to the survey. The questionnaire was available online between 2 July and 11 September 2020. Only respondents working in public institutions (including the Health Service of the Autonomous Region of Madeira and the Regional Health Service of the Azores) at the date of response were considered for the analysis. Any differences between the concepts of ‘teleconsultation’ and ‘non-face-to-face consultation’ when supported by any telecommunication technological device were not considered in this study.

### Questionnaire

Demographic data of respondents, including gender, age, healthcare region where they work, workplace (hospital; primary health care - family health unit (USF), personalised health care unit (UCSP), other), doctor grades, speciality, were included in the questionnaire. The questionnaire can be consulted in Appendix 1 (Appendix 1: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/16724/6579>). Data on the respondent’s experience in CNP were also obtained, including any previous use of CPN, number of consultations, format (first or follow-up consultation), infrastructures and technologies used, clinical data recording, duration, technical and clinical issues, and motivation for the use of CNP in the future. Finally, questions regarding perception on CNP activity were included, including satisfaction, quality of care and use of video support, using a five-point Likert scale. The questionnaire was designed based on the previous literature review, discussion within a dedicated working group and semi-structured interviews with physicians. In a next step, the questionnaire items were changed, and new items were added based on the qualitative data obtained. The questionnaire was tested through a pilot study including 10 participants and was revised to ensure internal consistency and relevance of the questions.

## Statistical Analysis

A descriptive analysis of the participant characteristics and responses was carried out. Categorical variables were expressed as frequencies, ratios, or percentages as appropriate. Three significant outcomes were selected based on the questionnaire: "video call" responses were selected and categorised for analysis according to whether video calls were/were not used, regarding the outcome "Use of video call during CNPs", in question 12 (Appendix 1: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/16724/6579>); responses were rated on a 5-point Likert scale (very dissatisfied - dissatisfied - neither dissatisfied nor satisfied - satisfied - very satisfied) for the outcome "High level of satisfaction with CNPs", in question 18 (Appendix 1: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/16724/6579>) and a score of 4-5 on the Likert scale was categorised as "high satisfaction", while yes/no responses were used and were categorised for analysis into yes/no for the outcome "Willing to keep on using CNPs after the pandemic", in question 21 (Appendix 1: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/16724/6579>).

A univariate analysis was carried out for the three significant outcomes, and the prevalence of the outcome per stratum was obtained, in addition to the prevalence ratio (PR) for a 95% confidence interval (CI) and the *p*-value associated to the Wald test of the regression model parameters. The adjusted prevalence ratio was obtained in a multivariate analysis by the Poisson regression method with robust variance, using the variables initially included in the univariate analysis for each outcome. The Poisson model is widely used for the estimation of prevalence ratios for binary outcomes and has been used instead of logistic regression because odds ratios may overestimate prevalence ratios (or relative risks) in logistic regression when binary outcomes are more frequent (greater than 10%).<sup>21</sup> Analyses were performed using STATA 14 and 95% confidence intervals (CI) and *p*-values < 0.05 were considered statistically significant.

## Ethical considerations

The questionnaire was reviewed and approved by the legal department of the *Ordem dos Médicos* and complies with the General Data Protection Regulation. Written informed consent was obtained from all participants prior to the completion of the questionnaire.

## RESULTS

From the initially considered universe of 30,767 physicians working in the public sector, 2,452 respondents were selected, while 2,225 were considered for analysis. The responses related to physicians who were not working in the

public sector during the pandemic were excluded from the study.<sup>22-24</sup>

## Demographic characteristics

The characteristics of the participants are shown in Table 1: 67.6% female (n = 1,505), including mostly physicians aged 35 or younger (40.0%, n = 890); the lowest response rate was obtained from those aged 66 or older (2.7%, n = 60).

Most responses were obtained from physicians working in the Northern Regional Health Administration (37.8%, n = 841) and in the Regional Health Administration of Lisbon and The Tagus Valley (37.2%, n = 827).

The highest response rates were obtained from family medicine (35%, n = 785), internal medicine (8%, n = 172) and paediatrics (5%, n = 117) physicians (Appendix 2: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/16724/6580>), including consultants - 76.7% (n = 1,704), registrars - 21.5% (n = 479) and generalist medical practitioners (including postgraduate trainees)

Table 1 – Demographic characteristics of the respondents

	n (%)
<b>Gender</b>	
Female	1,505 (67.6%)
Male	711 (32.0%)
Opt-out	9 (0.4%)
<b>Age group</b>	
≤ 35	890 (40.0%)
36 - 45	560 (25.2%)
46 - 55	279 (12.5%)
56 - 65	436 (19.6%)
≥ 66	60 (2.7%)
<b>Healthcare Region</b>	
Northern	841 (37.8%)
Central	361 (16.2%)
Lisbon and the Tagus Valley	827 (37.2%)
Alentejo	43 (1.9%)
Algarve	74 (3.3%)
Azores	39 (1.8%)
Madeira	40 (1.8%)
<b>Doctor grades</b>	
Consultant	1,704 (76.6%)
Registrar	479 (21.5%)
Generalist medical practitioner	42 (1.9%)
<b>Institution typology</b>	
Hospitals	1,385 (62.2%)
Primary care units	811 (36.5%)
Other institutions	29 (1.3%)

- 1.9% (n = 42).

### Characteristics of the CNP activity

We found that 85.2% (n = 1,895) of the respondents had not carried out any CNP activity before the onset of the pandemic, while some CNP activity was used by 93.8% (n = 2,087) of the respondents during the first phase of the pandemic. We found that 29.4% (n = 654) of the respondents had held over 200 consultations and 9.6% (n = 214) had held less than 20 CNP consultations at the time of response. The characteristics of the CNP activity are shown in Table 2.

Over half of the respondents had held first and follow-up consultations in the CNP format (53.0%, n = 1,106), 44.5% (n = 928) had only held follow-up consultations and 2.5% (n = 53) only first consultations. Most respondents (58.0%, n = 1,210) spent on average 10 to 20 minutes per consultation and an individual medical office was mostly used (85.6%); only 3.3% used a specific office. Data analysis showed that 80.4% (n = 1,678) of the respondents always kept records of the appointment in the patient's medical file and, whenever this was not obtained, the reasons included (i) lack of access to the patient's medical file (46.7%, n = 191), technical issues (40.3%, n = 165), physician unavailability (39.9%, n = 163). About 2.7% (n = 11) of the respondents described having made recordings on another platform, namely "Trace COVID" and 4.7% (n = 19) were unaware of this requirement.

Different forms of communication were used by respondents. A phone call was mostly used (99.0%), while email was also used for uploading and downloading documents (67.1% and 62.3%, respectively), as well as the mail (41.3% and 12.5%). Other forms of communication were also described: documents sent by SMS, in-person reception, uploading and downloading through a video call platform. Only 8.0% (n = 167) of the respondents had carried out CNP with video support using different formal and informal platforms: WhatsApp (48.5%, n = 81), Microsoft Teams (24.6%, n = 41), Zoom (22.2%, n = 37), Skype (21.0%, n = 35), Google Meet (6.0%, n = 10), RSE Live (3.0%, n = 5), Medi Graf (1.8%, n = 3).

### Respondents' attitudes and perceptions

Some issues were described by respondents, including (78.6%) technical issues related to infrastructures, technologies, and communication, and 90.7% related to clinical issues associated with the medical assessment of patients. More than one answer per question was possible, as shown in Table 3.

Among respondents, 49.5% were globally satisfied or very satisfied with CNPs and 15.6% were dissatisfied or very dissatisfied. When asked whether CNP provides simi-

lar quality of care, when compared to face-to-face consultations, 14.1% (n = 313) of the respondents have agreed on a comparable quality in all or most situations, 35.7% (n = 795) have described a similar quality in some situations, 34.0% (n = 756) have described a similar quality in rare situations while 16.2% (n = 361) have described that no similar quality was obtained in any situation.

### Use of CNPs after the pandemic

A percentage of 70.4% (n = 1,567) of the respondents would like to keep on holding follow-up non-face-to-face consultations, while only 15.2% (n = 338) would like to only hold first consultations, after the pandemic. About half (53.3%, n = 1,185) of the respondents have considered that video support should always or frequently be used in CNPs.

Different measures were suggested by respondents, aimed at an easier implementation of CNP, as regards the healthcare institutions, including the implementation and rehabilitation of adequate settings and the provision of adequate equipment, the development of a specific platform or the adaptation of any existing software, the implementation of support teams dedicated to CNP, the promotion of training sessions on regulations, techniques and technologies for CNP for physicians and the presence of specific CNP consultation periods in scheduling. Several measures aimed at patients or caregivers were also suggested: awareness campaigns, development of a formal informed consent of patients for the option of CNP *versus* face-to-face consultations, availability of means and communication technologies so that non-face-to-face consultations could be held. The implementation of specific legislation, patient's selection criteria and the rights and duties of patients are also relevant measures.

### Influencing factors of CNPs

Influencing factors of CNPs were analysed, namely those associated with high satisfaction and with the interest and motivation in holding non-face-to-face consultations in the future.

As shown in Table 4, the factors associated with high satisfaction regarding CNPs included (i) wishing to keep on holding CNPs after the pandemic (aPR = 4.081; 95% CI 3.313 - 5.026) and (ii) considering CNPs as providing healthcare of equivalent quality when compared to face-to-face consultations (aPR = 1.472; 95% CI 1.369 - 1.583). Lower satisfaction with this consultation modality was related to clinical (aPR = 0.763 CI 95%. 0.702 - 0.829) and technical (aPR = 0.666; CI 95% 0.615 - 0.721) issues. Age, doctor grade, healthcare region and type of institution did not have any significant influence on satisfaction.

The highest use of video calls was found in hospitals and, after adjustment, working in family healthcare units

Table 2 – Characteristics of CNPs held during the first phase of the COVID pandemic

	% (n)
<b>Were CNPs already included in your clinical practice before the Covid pandemic? (A CNP fazia parte da prática clínica antes da pandemia COVID-19?)</b>	
Yes	14.8% (330)
No	85.2% (1895)
<b>Were CNPs included in your clinical practice during the 1st phase of the COVID pandemic? (A CNP fez parte da prática clínica durante a 1ª fase da pandemia COVID-19?)</b>	
Yes	93.8% (2087)
No	6.2% (138)
<b>Number of CNP consultations held from the onset of the pandemic up to the survey response (Número de CNP realizadas desde início da pandemia até à resposta ao questionário)</b>	
< 20 non-face-to-face consultations	9.6% (214)
20 - 50	19.3% (429)
50 - 100	19.3% (429)
100 - 200	16.2% (361)
> 200	29.4% (654)
Did not hold any CNPs during this period	6.2% (138)
<b>Type of medical appointment</b>	
First consultations	2.5% (53)
Follow-up consultations	44.5% (928)
Both	53.0% (1106)
<b>Average time spent per CNP</b>	
< 10 min	23.5% (491)
10 - 20 min	58.0% (1210)
20 - 30 min	15.5% (323)
> 30 min	3.0% (63)
<b>Locations where CNPs were held (Espaço físico onde foram realizadas a CNP*)</b>	
Medical office	85.6% (1786)
GSpecific CNP office	3.3% (69)
Shared space at the institution (medical staff shared space, for instance)	23.6% (492)
Out of the institution (at home, for instance)	34.8% (727)
<b>Ways of communication in CNPs*</b>	
Telephone call	99.0% (2065)
Videocall	8.0% (167)
Upload of documents to patients by email (prescriptions, for instance)	67.1% (1400)
Upload of documents by SMS (prescriptions, for instance)	2.0% (41)
Upload through videocall platforms	1.2% (24)
Forwarding by mail	41.3% (861)
Download of documents by email	62.3% (1301)
Download through videocall platforms	1.4% (30)
Reception by mail	12.5% (260)
Face-to-face reception of documents	1.8% (37)
Others	0.2% (4)
<b>Device used to make telephone calls</b>	
Only telephone/mobile of the institution	41.0% (912)
Only own phone/mobile	15.0% (334)
Both	44.0% (979)

\*: more than a single response was possible

Table 3 – Attitudes and perceptions on CNPs

	% (n)
<b>Technical issues*</b>	
Patients or caregivers' adaptation to technology	46.8% (977)
Inadequate technology	34.8% (726)
Unavailable technology	22.2% (464)
Unable to establish an adequate communication with the patients or caregivers	31.3% (653)
Unable to download documents	22.6% (471)
Unable to upload documents	20.4% (425)
No technical issues	21.4% (446)
<b>Clinical issues*</b>	
Unable to perform a physical examination	83.4% (1740)
Issues in transmitting clinical information to patients or caregivers	43.1% (899)
Issues in understanding the clinical information given by patients or caregivers	34.8% (726)
Unable to obtain clinical tests	22.1% (461)
No clinical issues	9.3% (195)
<b>Satisfaction with CNPs</b>	
Very dissatisfied	3.9% (81)
Dissatisfied	11.7% (245)
Neutral	34.9% (728)
Satisfied	39.8% (831)
Very satisfied	9.7% (212)
<b>Would like to keep on holding CNP first consultations after the COVID pandemic</b>	
Would like to keep on holding non-face-to-face first consultations	15.2% (338)
Would not like to keep on holding non-face-to-face first consultations after the pandemic	84.8% (1887)
<b>Would like to keep on holding CNP follow-up consultations after the COVID pandemic</b>	
Would like to keep on holding non-face-to-face follow-up consultations	70.4% (1597)
Would not like to keep on holding non-face-to-face follow-up consultations after the pandemic	29.6% (658)
<b>Benefits of the use of video support</b>	
Never	4.6% (103)
Rarely	13.4% (299)
Sometimes	28.7% (638)
Frequently	34.6% (770)
Always	18.7% (415)

\*: more than one response was possible

(*unidades de saúde familiar* - USF) and personalised health care units (*unidades de saúde familiar personalizadas* - UCSP) was associated with lower use of video support (USF: aPR = 0.506; 95% CI 0.327 - 0.783; UCSP: aPR = 0.382; 95% CI 0.168 - 0.872). Other factors associated with the use of video calls included (i) having held CNPs before the pandemic (aPR = 2.166; 95% CI 1.543 - 3.039), (ii) considering CNPs as providing healthcare quality equivalent to face-to-face consultations (aPR = 1.869; 95% CI 1.285 - 2.716) and (iii) age group 36-45 (aPR = 1.894; 95% CI 1.075 - 3.337), 46-55 (aPR = 2.601; 95% CI 1.429 - 4.735) and age 66 and older (aPR = 4.372; 95% CI 2.074 - 9.215) (< 35 as reference category), as shown in Table 5. The

presence of clinical issues was negatively associated with the use of video calls (aPR = 0.54; 95% CI 0.35 - 0.831). There were no differences regarding gender, doctor grade and healthcare region.

As shown in Table 6, the factors significantly associated with wanting to keep on holding CNPs after the pandemic included (i) the high level of satisfaction with CNPs (aPR = 1.692; 95% CI 1.594 - 1.796), (ii) working in the Alentejo healthcare region (aPR 1.259; 95% CI 1.075 - 1.475), (iii) considering CNPs as providing equivalent quality when compared to face-to-face consultations (aPR = 1.166; 95% CI 1.122 - 1.211), and (iv) having used video support (aPR = 1.097; 95% CI 1.019 - 1.18). Doctor grades, the type of

Table 4 – Factors associated with high level of satisfaction (“very satisfied” and “satisfied”) with CNPs

Variables	Total	Cases	Prevalence %	crudePR	95% CI	p-value	aPR	95% CI	p-value
<b>Gender</b>									
Female	1,505	750	49.83	Ref					
Male	711	282	39.66	0.80	[0.72 - 0.88]	< 0.001	0.861	[0.788 - 0.941]	<b>0.001</b>
<b>Age group (Ref: &lt; 35)</b>									
< 35	890	382	42.92	Ref					
36 - 45	560	282	50.36	1.17	[1.05 - 1.31]	0.006	1.118	[0.999 - 1.250]	0.051
46 - 55	279	133	47.67	1.11	[0.96 - 1.28]	0.163	1.017	[0.883 - 1.171]	0.813
56 - 65	436	212	48.62	1.13	[1.00 - 1.28]	0.050	1.047	[0.922 - 1.187]	0.480
≥ 66	60	24	40.00	0.93	[0.68 - 1.28]	0.658	0.831	[0.628 - 1.100]	0.196
<b>Healthcare region (Ref: Northern)</b>									
Northern	841	369	43.88	Ref					
Lisbon and The Tagus Valley	827	414	50.06	1.14	[1.03 - 1.26]	0.011	1.037	[0.948 - 1.135]	0.426
Alentejo	43	20	46.51	1.06	[0.76 - 1.47]	0.734	0.899	[0.674 - 1.197]	0.465
Algarve	74	31	41.89	0.95	[0.72 - 1.26]	0.741	0.959	[0.763 - 1.207]	0.724
Central	361	158	43.77	1.00	[0.87 - 1.15]	0.972	1.003	[0.891 - 1.130]	0.959
Madeira	39	18	46.15	1.05	[0.74 - 1.49]	0.779	1.003	[0.757 - 1.328]	0.985
Azores	40	23	57.5	1.31	[0.99 - 1.73]	0.090	1.265	[0.960 - 1.666]	0.095
<b>Typology of the institution (Ref: Hospital)</b>									
Hospital	1,266	582	45.97	Ref					
UCSP	158	75	47.47	1.03	[0.87 - 1.23]	0.722	0.998	[0.847 - 1.176]	0.978
USF	618	304	49.19	1.07	[0.97 - 1.18]	0.189	1.067	[0.976 - 1.167]	0.152
Other	183	72	39.34	0.86	[0.71 - 1.03]	0.092	0.900	[0.768 - 1.055]	0.194
<b>Doctor Grades (Ref: Consultant)</b>									
Consultant	1,704	805	47.24	Ref					
Generalist Medical Practitioner	21	9	42.86	0.91	[0.55 - 1.49]	0.689	1.010	[0.67 - 1.523]	0.961
Registrar	479	212	44.26	0.94	[0.84 - 1.05]	0.248	1.047	[0.928 - 1.181]	0.453
Junior house off	21	7	33.33	0.71	[0.38 - 1.29]	0.204	1.017	[0.626 - 1.651]	0.945
<b>Determinants of CNP</b>									
Having held CNPs before the pandemic	330	180	54.55	1.21	[1.09 - 1.35]	0.001	1.102	[0.998 - 1.215]	0.054
Having described technical issues	1,807	729	40.34	0.56	[0.51 - 0.60]	< 0.001	0.666	[0.615 - 0.721]	<b>&lt; 0.001</b>
Having described clinical issues	2,046	871	42.57	0.47	[0.44 - 0.51]	< 0.001	0.763	[0.702 - 0.829]	<b>&lt; 0.001</b>
Would like to keep on holding follow-up CNPs after the pandemic	1,567	952	60.75	4.94	[4.02 - 6.08]	< 0.001	4.081	[3.313 - 5.026]	<b>&lt; 0.001</b>
Having considered CNPs with similar quality as face-to-face consultations	313	272	86.90	2.18	[2.04 - 2.34]	< 0.001	1.472	[1.369 - 1.583]	<b>&lt; 0.001</b>
Having held CNPs with video support	145	99	68.28	1.52	[1.35 - 1.72]	< 0.001	1.170	[1.044 - 1.310]	<b>0.007</b>

aPR: adjusted prevalence ratio; crude PR: crude prevalence ratio; CNP: non face-to-face consultations; UCSP: unidade de cuidados de saúde especializados; USF: unidade de saúde familiar

Table 5 – Factors associated with the use of videocalls for CNPs

Variables	Total	Cases	Prevalence %	crudePR	95% CI	p-value	aPR	95% CI	p-value
<b>Gender</b>									
Female	1,505	84	5.58	Ref					
Male	711	60	8.44	1.51	[1.10 - 2.08]	0.011	1.334	[0.966 - 1.843]	0.08
<b>Age group (Ref: &lt; 35)</b>									
< 35	890	27	3.03	Ref					
36 - 45	560	44	7.86	2.59	[1.62 - 4.13]	< 0.001	1.894	[1.075 - 3.337]	<b>0.027</b>
46 - 55	279	32	11.47	3.78	[2.31 - 6.20]	< 0.001	2.601	[1.429 - 4.735]	<b>0.002</b>
56 - 65	436	31	7.11	2.34	[1.42 - 3.88]	0.001	1.651	[0.904 - 3.015]	0.103
≥ 66	60	11	18.33	6.04	[3.15 - 11.58]	< 0.001	4.372	[2.074 - 9.215]	<b>&lt; 0.001</b>
<b>Healthcare region (Ref: Northern)</b>									
Northern	841	49	5.83	Ref					
Lisbon and The Tagus Valley	827	59	7.13	1.22	[0.85 - 1.77]	0.278	1.301	[0.897 - 1.888]	0.165
Alentejo	43	5	11.63	2.00	[0.84 - 4.75]	0.121	1.732	[0.759 - 3.951]	0.192
Algarve	74	2	2.70	0.46	[0.12 - 1.87]	0.261	0.457	[0.115 - 1.811]	0.265
Central	361	20	5.54	0.95	[0.57 - 1.58]	0.845	0.930	[0.564 - 1.535]	0.778
Madeira	39	5	12.82	2.20	[0.93 - 5.21]	0.075	2.001	[0.944 - 4.239]	0.07
Azores	40	5	12.50	2.15	[0.90 - 5.09]	0.086	1.875	[0.779 - 4.509]	0.16
<b>Typology of the institution (Ref: Hospital)</b>									
Hospital	1,266	97	7.66	Ref					
UCSP	158	6	3.80	0.50	[0.22 - 1.11]	0.077	0.382	[0.168 - 0.872]	<b>0.022</b>
USF	618	25	4.05	0.53	[0.34 - 0.81]	0.003	0.506	[0.327 - 0.783]	<b>0.002</b>
Other	183	17	9.29	1.21	[0.74 - 1.98]	0.445	1.114	[0.683 - 1.815]	0.666
<b>Doctor grades (Ref: Consultant)</b>									
Consultant	1,704	130	7.63	Ref					
Generalist Medical Practitioner	21	1	4.76	0.62	[0.09 - 4.26]	0.622	1.061	[0.15 - 7.358]	0.952
Registrar	479	14	2.92	0.38	[0.22 - 0.66]	< 0.001	0.715	[0.363 - 1.410]	0.334
Junior house officer	21	0	0	0	[0 - 0]	0.188	0	[0 - 0]	<b>&lt; 0.001</b>
<b>Determinant of CNPs</b>									
Having held CNPs before the pandemic	330	37	11.21	1.97	[1.38 - 2.80]	< 0.001	2.166	[1.543 - 3.039]	<b>&lt; 0.001</b>
Having described technical issues	1,807	104	5.76	0.59	[0.42 - 0.83]	0.003	1.047	[0.719 - 1.525]	0.81
Having described clinical issues	2046	115	5.62	0.34	[0.23 - 0.49]	< 0.001	0.54	[0.350 - 0.831]	<b>0.005</b>
Having considered CNPs with similar quality as face-to-face consultations	313	36	11.50	2.02	[1.41 - 2.89]	< 0.001	1.869	[1.285 - 2.716]	<b>0.001</b>

aPR: adjusted prevalence ratio; crude PR: crude prevalence ratio; CNP: non face-to-face consultations; UCSP: unidade de cuidados de saúde personalizados; USF: unidade de saúde familiar



Table 6 – Factors associated with the intention of wanting to keep on holding CNPs after the pandemic

Variables	Total	Cases	Prevalence %	crudePR	95% CI	p-value	aPR	95% CI	p-value
<b>Gender</b>									
Female	1,505	1,110	73.82	Ref					
Male	711	453	63.71	0.86	[0.81 - 0.92]	< 0.001	0.918	[0.868 - 0.971]	<b>0.003</b>
<b>Age group (Ref: &lt; 35)</b>									
< 35	890	637	71.57	Ref					
36 - 45	560	398	71.07	0.99	[0.93 - 1.06]	0.837	0.938	[0.876 - 1.004]	0.065
46 - 55	279	199	71.33	1.00	[0.92 - 1.09]	0.936	0.965	[0.886 - 1.051]	0.409
56 - 65	436	295	67.66	0.95	[0.88 - 1.02]	0.143	0.918	[0.849 - 0.994]	<b>0.034</b>
≥ 66	60	38	63.33	0.88	[0.73 - 1.08]	0.173	0.894	[0.743 - 1.076]	0.234
<b>Healthcare region (Ref: Northern)</b>									
Northern	841	568	67.54	Ref					
Lisbon and The Tagus Valley	827	618	74.73	1.11	[1.04 - 1.18]	0.001	1.052	[0.994 - 1.113]	0.080
Alentejo	43	36	83.72	1.24	[1.08 - 1.43]	0.026	1.259	[1.075 - 1.475]	<b>0.004</b>
Algarve	74	50	67.57	1.00	[0.85 - 1.18]	0.996	1.032	[0.892 - 1.194]	0.673
Central	361	245	67.87	1.00	[0.92 - 1.09]	0.911	1.012	[0.939 - 1.091]	0.752
Madeira	39	25	64.10	0.95	[0.75 - 1.21]	0.655	0.942	[0.762 - 1.165]	0.583
Azores	40	25	62.2	0.93	[0.72 - 1.18]	0.507	0.898	[0.706 - 1.141]	0.379
<b>Typology of the institution (Ref: Hospital)</b>									
Hospital	1,266	874	69.04	Ref					
UCSP	158	110	69.62	1.01	[0.90 - 1.13]	0.881	0.966	[0.867 - 1.075]	0.525
USF	618	462	74.76	1.08	[1.02 - 1.15]	0.01	1.056	[0.999 - 1.115]	0.053
Other	183	121	66.12	0.96	[0.86 - 1.07]	0.427	0.990	[0.895 - 1.096]	0.853
<b>Doctor grades (Ref: Consultant)</b>									
Consultant	1,704	1,199	70.36	Ref					
Generalist Medical Practitioner	21	16	76.19	1.08	[0.85 - 1.38]	0.561	1.129	[0.898 - 1.418]	0.299
Registrar	479	340	70.98	1.01	[0.95 - 1.08]	0.794	0.963	[0.897 - 1.034]	0.293
Junior house officer	21	12	57.14	0.81	[0.56 - 1.18]	0.188	0.846	[0.614 - 1.166]	0.308
<b>Determinants of CNPs</b>									
Having held CNPs before the pandemic	330	250	75.76	1.09	[1.02 - 1.17]	0.021	1.021	[0.958 - 1.088]	0.529
Having described technical issues	1,807	1,240	68.62	0.88	[0.83 - 0.93]	< 0.001	1.029	[0.973 - 1.089]	0.313
Having described clinical issues	2,046	1,403	68.57	0.75	[0.71 - 0.79]	< 0.001	0.972	[0.920 - 1.027]	0.310
Having considered CNPs with similar quality as face-to-face consultations	313	306	97.76	1.48	[1.43 - 1.54]	< 0.001	1.166	[1.122 - 1.211]	<b>&lt; 0.001</b>
Having described high level of satisfaction with CNPs	1,033	952	92.16	1.79	[1.69 - 1.89]	< 0.001	1.692	[1.594 - 1.796]	<b>&lt; 0.001</b>
Having used video support for CNPs	145	124	85.52	1.23	[1.15 - 1.33]	< 0.001	1.097	[1.019 - 1.180]	<b>0.013</b>

aPR: adjusted prevalence ratio; crude PR: crude prevalence ratio; CNP: non face-to-face consultation; UCSP: unidade de cuidados de saúde personalizados; USF: unidade de saúde familiar

institution and issues found during CNP had no significant influence on the motivation to keep on holding CNP.

## DISCUSSION

This was the first study characterising the activity and opinion of Portuguese physicians regarding CNP activity in public institutions during the first phase of the COVID pandemic. About 7.2% of the respondents working in the public sector responded to the questionnaire. Within the study period, CNPs were used by most doctors in public institutions (93.8% of respondents), from different specialties and from all age groups, ensuring generalised and continuous healthcare to users nationwide.

Face-to-face interactions are traditionally included in medical consultations. However, with the development and widespread use of communication technologies, both telephone and video calls have become useful tools in assisting medical practice. Telephone calls were still the most familiar, widespread, and easy-to-use mean of communication.<sup>14</sup> In fact, telephone calls were used by most respondents (99.0% of the respondents in the present study). Video support was only used by a few respondents (8.0%), even though this should be used in all, most or some CNPs, according to 82.0% of the respondents.

Recently, although video-supported consultation has been globally adopted, the comparison between telephone and video consultation is still limited.<sup>25</sup> In a systematic review, Rush *et al.* have found that the use of video support may have advantages in physician-related outcomes, increasing diagnostic accuracy and decision making and reducing therapy selection errors, when compared to telephone consultations.<sup>25</sup> Video calls, by allowing the visual assessment of patients and greater physician involvement, may explain these advantages.<sup>14,26,27</sup>

Randomised studies have also shown that video-supported teleconsultations are associated with high levels of satisfaction among healthcare professionals and patients.<sup>28</sup> In our study, physicians who used video support were significantly more satisfied with the consultations and were more motivated to continue to hold CNPs, compared to physicians who did not use this.

Informal platforms designed for video calls (WhatsApp, Zoom, Skype) were mostly used in video-supported consultations, while specific consultation platforms were only occasionally used. The use of Skype in the context of teleconsultation is now widely recognised.<sup>28-30</sup> A review of 27 studies showed Skype as an effective technology, with only one study reporting a negative experience.<sup>29</sup> Policymakers have favoured Skype, particularly in the United Kingdom, as a safe, free, and easy-to-use platform, providing information support for users.<sup>28</sup>

The use of these video call applications in addition to

teleconsultation platforms was legally permitted during the pandemic in the United Kingdom and the United States of America.<sup>31</sup> In Portugal, there are currently formal and secure platforms for teleconsultations to be used between healthcare professionals and patients in the public sector, the most recent being RSE Live, developed by the *Serviços Partilhados do Ministério da Saúde* (a department of the Ministry of Health).<sup>32</sup> The study has reached the conclusion that the use of this platform was residual ( $n = 5$ ).

Different issues were described with the adoption of teleconsultations, especially if carried out with little planning, as in the current pandemic situation. Among the technical issues reported in the study, difficulties in adapting the patients of caregivers to communication technologies and inadequacy or lack of the required equipment are worth mentioning. While financial and training investment in technologies and infrastructures could overcome the latter, the difficulty in adapting users is more difficult to overcome.<sup>33</sup> As regards clinical issues, the lack of physical examination and the difficulty in transmitting or understanding clinical information from patients or caregivers are worth mentioning. Video support may mitigate some of these issues. In fact, the use of video support was significantly associated with less clinical issues. On the other hand, some issues are related to the provision of healthcare at a distance; therefore, an adequate patient selection is crucial, so that the quality of healthcare is not compromised.

The inclusion criteria for teleconsultation should be adapted according to the speciality/subspeciality and defined in partnership with the specialty colleges and medical scientific societies. Based on literature, it is anticipated that teleconsultations will become particularly useful in follow-up of controlled chronic pathology;<sup>34-36</sup> clinical counselling, therapeutic review, screening, prescription renewal and medical reports.<sup>37</sup> On the other hand, teleconsultations may be inappropriate for patients with acute or exacerbated chronic diseases, when physical examination or diagnostic tests are crucial, or whenever the patients are unable to use communication technologies due to the lack of these, maladaptation, sensory or cognitive deficits or language barriers.<sup>33,38</sup>

The different issues that were found do not represent any significant determining factors of CNPs. Half of the respondents were satisfied or very satisfied with CNPs and 70.4% wanted to keep on holding CNPs after the pandemic. Other studies have also found high levels of satisfaction with teleconsultations.<sup>39</sup> In line with Kissi *et al.*, the perception of the easy-to-use characteristics of teleconsultations, assessed by the identification of fewer clinical and technical issues, and recognising the quality of care provided by teleconsultations could contribute significantly to satisfaction.<sup>40</sup> The tendency for higher satisfaction with CNPs in the 36-45

age group may be interpreted by the fact that these physicians have already achieved a high level of confidence and clinical and technical skills, and only need to focus on transposing these skills to teleconsultations.<sup>41</sup> The relevance given by physicians and patients to the doctor-patient relationship enabled by a previous face-to-face consultation has also been demonstrated,<sup>14,30</sup> and a preference for CNPs is expected to exist only in the context of follow-up consultations.

### Implications for clinical practice and policies for teleconsultation implementation

The facilitators and barriers to teleconsultations that were identified in the study are complex and correspond to different domains, in line with those described by Ross *et al.* in a systematic review on the implementation of telemedicine systems.<sup>42</sup>

In the organisational domain, the need for adequate resources and infrastructures, promotion of the use of teleconsultations, mobilisation of a team of professionals dedicated to its implementation aimed at solving technical and operational issues, reformulation of work processes and systems and the integration of new systems with the existing ones are worth mentioning.

In the area of the attitudes and opinions regarding the benefits and limitations of teleconsultations, the idea that the new systems could benefit the patients is opposed by fears of deterioration of the doctor-patient relationship or the quality of care provided.<sup>42</sup> Issues regarding user privacy and safety also emerge as uncertain.<sup>16,25</sup> These could be overcome through greater involvement of physicians in the whole process of implementing teleconsultations, training, the creation of simple and convenient user interfaces, the promotion of teleconsultation platforms ensuring greater privacy and confidentiality, and the provision of clear and evidence-based information on the advantages and indications for teleconsultation.

In the external context, the adequacy of available resources to the patient's needs, and the presence of legislation and government policies and financial incentives are decisive factors for the implementation of teleconsultations.

### Limitations and future research

Due to the cross-sectional nature of the study and the use of non-probability sampling, these results reflect the experiences and opinions of a non-randomised group of physicians working in the public sector within a specific time and may not be generalisable to the present or future, or even to the specificities of other healthcare systems. Sample selection biases may have occurred, in the sense that physicians who chose to respond may have done so because they had better or worse experiences with CNPs,

which may have had an influence on the estimates. Nevertheless, the significant number of responses, namely from general practitioners, allows some confidence in the results. Although the use of the Likert scale is universal, easy to apply and analyse for collecting opinions and perceptions in questionnaires, we admit the presence of some subjectivity in the interpretation of statements, central tendency bias and acquiescence bias. These support any further confirmatory studies and longitudinal studies to reach a better understanding on whether teleconsultations could be a durable alternative form of healthcare delivery. Further studies will also be required to assess effectiveness, cost-effectiveness, ethics, and safety of teleconsultations in the management of different pathologies in different areas of medicine in Portugal. The assessment of the use of teleconsultations by other healthcare professionals is very relevant, in addition to studies for the assessment of satisfaction, motivation, and clinical outcomes of patients.

In the Portuguese context, 'teleconsultation', 'telephone consultation' and 'non-face-to-face consultation' are often used interchangeably by physicians, patients, and the population to describe any remote healthcare intervention, regardless of whether it is supported by video or only by telephone. Although they are different concepts, no distinctions were considered in this study.

The knowledge acquired in the study supports healthcare institutions and governing bodies in the promotion and development of systems and infrastructures allowing telemedicine adequate for patients and cost-effective. This is a strategy to build resilience to pandemic threats, to diversify and maximise healthcare delivery modalities, adapted to the different types of patients and their needs.

Teleconsultations, like all other medical activities, only make sense if user-centred and are associated with clear benefits for the patients. The possibility of choosing face-to-face consultations should always be ensured by both the patients and physicians.

### CONCLUSION

The implementation and spread of non-face-to-face consultations were increased in Portugal with the COVID-19 pandemic. The results of this study suggest that teleconsultations seem to have the potential to become a common practice in the future of medicine in Portugal, especially aimed at follow-up consultations, while the benefits of the implementation of means allowing video calls were described by physicians. Clinical, technical, organisational, legal and ethical issues still need to be overcome.

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## AUTHOR CONTRIBUTION

CON, MVM: Co-first authors. Study design and writing of the manuscript, data analysis and interpretation, critical review.

VRP: Data analysis and interpretation, critical review.

HON, EC: Study design, critical review.

PA: Critical review of data analysis and of the manuscript.

## HUMAN AND ANIMAL PROTECTION

The authors declare that this project complied with the regulations that were established by the Ethics and Clinical

Research Committee, according to the 2013 update of the Helsinki Declaration of the World Medical Association.

## DATA CONFIDENTIALITY

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

## CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in writing this manuscript.

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