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ARTIGO ORIGINAL

COVID-19's Impact and Telehealth Practice in Chronic Pain Management Services: A Nationwide Study

Impacto da COVID-19 e Prática de Telessaúde nas Unidades de Dor Crónica: Um Estudo de Âmbito Nacional

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ABSTRACT

Introduction: COVID-19 brought restrictions across chronic pain management services (CPMS), whose consequences should be objectified. Telehealth is being recommended in CPMS, however, the extent of its practice is unknown. We aimed to assess COVID-19's impact and telehealth practice in Portuguese CPMS.

Material and Methods: A cross-sectional survey was conducted in May 2020. CPMS's description, telehealth practice, COVID-19's impact in CPMS's activity and opinions about telehealth practice were questioned to all Portuguese CPMS's directors. We used descriptive statistics and Chi-squared test was performed. A *p*-value<0.05 was considered significant for all tests.

Results: The response rate was 59%. Although there are regional and unit's typology differences, COVID-19 brought an increase and a sophistication in telehealth practice, that is expected to be maintained in the future. COVID-19 led to major reductions of in-person consultations and procedures, increased patient-CPMS communication, and a non-negligible proportion of CPMS with an alarming wait time for first chronic pain consultations. Prediction of patient's refusal/fear to attend CPMS, positive opinions about telehealth practice, previous telehealth practice and wait time for first consultation in chronic non cancer pain < 12 week, are associated with future telehealth practice.

Discussion and Conclusion: Opinions about telehealth practice in CPMS were essentially positive and support future telehealth practice. This is the first nationwide study that objectifies the impact of COVID-19 and assesses telehealth practice in CPMS's activity. This study may help health professionals and authorities improving telehealth practice and CPMS's activity.

RESUMO

Introdução: A COVID-19 condicionou restrições à atividade nas Unidades de Dor Crónica (UDC). A Telessaúde tem sido recomendada e aumentou neste contexto, no entanto, a extensão da sua prática é desconhecida. O objetivo deste trabalho foi avaliar o impacto da COVID-19 e a prática de Telessaúde nas UDC portuguesas.

Material e Métodos: Foi realizado um estudo transversal conduzido através da aplicação de um questionário aos diretores das UDC. As características das UDC, o impacto da COVID-19, o uso indevido de opióides, e a prática de Telessaúde foram registadas. Recorreu-se a estatística descritiva e aplicação de *Chi-squared test*. Um valor de *p*<0,05 foi considerado estatisticamente significativo.

Resultados: A taxa de resposta foi 59%. Apesar de existirem diferenças regionais e por tipologia de UDC, a COVID-19 trouxe um aumento e sofisticação da prática de Telessaúde. A COVID-19 causou marcadas reduções nas consultas presenciais e realização de procedimentos, e verificou-se uma proporção importante de UDC com tempos de espera alarmantes para primeira consulta. A previsão de recusa/medo dos pacientes em comparecer nas UDC, o uso prévio de Telessaúde, opinião positiva sobre a sua prática, e tempo de espera para primeira consulta de dor crónica não oncológica < 12 semanas, estão associadas à prática de Telessaúde.

Discussão e Conclusão: As opiniões relativas à prática de Telessaúde foram essencialmente positivas e apoiam a sua implementação no futuro. Este é o primeiro estudo de âmbito nacional que objetiva o elevado impacto da COVID-19 e a crescente prática de Telessaúde nas UDC e poderá permitir a implementação de melhorias nas UDC.

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INTRODUCTION

The 2020 global pandemic caused by the novel coronavirus SARS-CoV-2 (COVID-19),[1] brought severe effects across healthcare systems and societies.[2,3] Healthcare systems across the world have been faced with the challenge of infection control and resources reallocation towards the greatest acute needs,[2,4] which comprehend decisions such as postponing or cancelling elective surgery procedures and patient visits. In Portugal, the first case of COVID-19 was notified on March 2, 2020 and Emergency State (ES) was declared in the Portuguese territory from March 19, 2020 to May 2, 2020. ES comprehended major restrictions in public circulation, commercial activities, and public services. Accordingly, a COVID-19 National Contingency Plan to restrain activities was published on early March.[5] Access to vital, but non-urgent, healthcare services have been restricted, and the College of Competence in Pain Medicine of the Portuguese Medical Association has made several recommendations for chronic pain management services (CPMS),[6] that were in line with international recommendations.[4,7,8]

Chronic pain (CP) prevention and management have suffered a disruption by the COVID-19 pandemic.[4] The experience of living within this pandemic has disrupted daily life across all sectors, including those living with CP,[9] and their care has been significantly impacted.[8] Some may identify opportunities (e.g. increased time with family, normalisation of flexible working, reduced demand for travel), while others may face significant threats to health and wellbeing, namely CP patients.[10] Moreover, based on past experience, these pandemic scenarios may collectively lead to an increase in CP in the immediate and possibly long-term future.[9]

Telehealth is the use of information and communication technologies (ICT) to support health from afar through the provision of care, the organisation of the services and the training of health professionals and citizens.[11,12] Telehealth can contribute to achieve universal health coverage by improving access for patients to quality, cost-effective, health services wherever they may be. It is particularly valuable for those in remote areas, vulnerable groups and ageing populations.[11-14] Additionally, telehealth platforms are ideal for managing the challenges that healthcare systems are facing in response to global pandemic, namely, to reduce in-person clinic visits and allow the patients to receive care without the risk of exposure (especially for older adults and those with chronic conditions), and to minimize healthcare workers exposure, ensuring that in-person medical care is reserved for patients who need it.[15,16] This pandemic has brought telehealth to a position of prominence in patient care,[3] and its practice is being recommended and used in CPMS to allow consultations, intermittent remote outcome monitoring, and healthcare professionals or patients education.[4,9,17-21]

The impact of COVID-19 and related recommendations in CPMS and their patients were not objectified. Additionally, although Portugal has a National Strategic Telehealth Plan,[22] its practice in CPMS is unknown. Therefore, the aim of the present study was to assess COVID-19's impact and telehealth practice in Portuguese CPMS.

MATERIAL AND METHODS

A cross-sectional survey about telehealth practice and COVID-19's impact in Portuguese CPMS was conducted in May 2020. The authors built a novel questionnaire with 22 items to address to all Portuguese CPMS's directors. The questionnaire was subdivided into a set of items about CPMS's description, telehealth practice, COVID-19's impact in CPMS's activity and opinions about telehealth practice in CPMS. CPMS's description was made according: CPMS's classification, CPMS's region, type of hospital where CPMS is inserted (public, private or public-private), presence of electronic health records (EHR), practice of home-based care and available modes of patient-CPMS communication. Telehealth and its subtypes practice in CPMS, namely, audio-only teleconsultation (AOT), video teleconsultation (VT), telemonitoring, tele-training, and telerehabilitation, were evaluated before, during and after the ES. We have included definitions of each term in the questionnaire, to avoid misconceptions. Telehealth was defined as the use of ICT to support health from afar through the provision of care, the organization of the services and the training of health professionals and citizens. We emphasized that this concept was not restricted to medical activity and included all health professionals. Teleconsultation was defined as consultation in which the health professional, at a distance and using ICT, assesses the clinical situation of a person and plans the provision of health care. It was underlined that it did not include patient-CPMS communications. Electronic medical prescription (EMP), which allows prescribers to write prescriptions that can be retrieved by a pharmacy electronically, is compulsory within the Portuguese national health service and is included in teleconsultation practice. Telemonitoring consists of the use of communication technologies to remotely monitor the biometric parameters of citizens, such as blood pressure, heart rate, capillary blood glucose, weight, oximetry, and temperature, which are transmitted to the caregiver. Its main objective is to improve the delivery of health care to citizens, and consequently improve their quality of life. Tele-training was defined as the training of health professionals, or patients and family members, who are physically distant from the trainer, on health issues. Telerehabilitation was defined as an innovative and alternative method that allows remote access to the rehabilitation team. Additionally, the duration of Portuguese ES period was remembered in the questionnaire (from March 19, 2020 to May 2, 2020). COVID-19's impact

in CPMS's activity was assessed with questions about: estimated in-person consultations and procedures held at CPMS, estimated wait times for first consultation in chronic cancer and non-cancer pain, perception of increased patient-CPMS communication during ES, presence of psychological support telephone line available to patients, estimated opioid misuse risk (OMR), prediction about patient's refusal/fear to come to CPMS and planned activities about the International Association for the Study of Pain (IASP) 2020 Global and European Year for Pain Prevention. Lastly, opinions about telehealth practice in CPMS were assessed: influence on OMR, increase in quality of patient's health care, increase in accessibility to health care, applicability/literacy issues and its detrimental use in CP.

The questionnaire was anonymous, and we have used a free platform (Google Forms®) for its application. To obtain feedback from all Portuguese CPMS's directors, we have tried to obtain their e-mail addresses from several sources (national databases of CPMS, social networks, and personal contacts). Three repeated invitation e-mails with an introductory explanation about the study aims were sent out between May 18, 2020 and June 19, 2020 to 64 Portuguese CPMS's directors.

Descriptive statistics of CPMS's description, telehealth practice, COVID-19's impact in CPMS's activity and opinions about telehealth practice in CPMS were grouped and expressed as frequencies with percentages (%). For analysis purposes we have grouped VT, telemonitoring, tele-training, and telerehabilitation in one categorical variable defined as advanced telehealth practice. Chi-squared test was performed to test associations between categorical variables. A *p*-value of 0.05 was considered significant for all tests. All statistical analyses were performed using Statistical Package for the Social Sciences (version 25.0 for Windows; SPSS, Chicago, IL, USA).

RESULTS

Thirty-eight CPMS's directors answered the questionnaire, representing 59% of the directors contacted. The main characteristics of these CPMS are described in Table 1.

Twenty CPMS (52.6%) had telehealth practice before ES and 7 (18.4%) had advanced telehealth practice. Regarding their subtype of telehealth practice: 18 CPMS (47.4%) had AOT, 1 (2.6%) had VT, 3 (7.9%) had telemonitoring and 3 (7.9%) had tele-training (Supplementary Table 1).

Before ES, there were no differences in the proportion of telehealth practice, EHR, and home-based care according to the type of hospital (public *vs* private). Concerning the region of the country where CPMS are located and its classification, there were no differences in telehealth practice, EHR, and home-based care, except for telehealth practice in Pain Therapeutic Units and CPMS from the centre region of Portugal (Supplementary Table 2). Pain Therapeutic Units (p=0.048) and CPMS from the centre region (p=0.006) had less telehealth practice. These findings were independent (44.0% of CPMS from Centre Region were Pain Therapeutic Units *vs* 24.1% of CPMS from outside Centre Region were Pain Therapeutic Units, p=0.222). There were no associations regarding advanced telehealth practice (Supplementary Table 2).

Table 1. CPMS's characteristics (N=38)

	N(%)
Classification	
Multidisciplinary Pain Centre	3 (7.9)
Multidisciplinary Pain Unit	13 (34.3)
Pain Therapeutic Unit	11 (28.9)
Chronic Pain Consultation	11 (28.9)
Region	
North	15 (39.5)
Centre	9 (23.7)
South	12 (31.6)
Autonomous regions	2 (5.2)
Type of Hospital	
Public	27 (71.1)
Private	10 (26.3)
Public-Private partnership	1 (2.6)
Modes of patient-CPMS communication available	
Telephone	26 (68.5)
E-mail	4 (10.5)
Social media or application	1 (2.6)
None	7 (18.4)
Electronic health records	35 (92.1)
Home-based care	8 (21.1)
Telehealth practice before ES	20 (52.6)
Advanced telehealth practice* before ES	7 (18.4)

LEGEND:
CPMS: chronic pain management services; ES: emergency state; N: number.
* Excludes audio-only teleconsultation

During ES, 31 CPMS (81.6%) practiced telehealth, according to the following pattern (Supplementary Table 1): AOT in 27 (71.1%), VT in 5 (13.2%), telemonitoring in 6 (15.8%) and tele-training in 2 (5.3%). Advanced telehealth practice was present in 31.6% of CPMS. The professionals more involved with telehealth practice were doctors (in 77.4% of CPMS with telehealth practice), nurses (in 71.0% of CPMS with telehealth practice) and psychologists (32.3% of CPMS with telehealth practice).

We did not find any association between telehealth practice during the ES and the following variables (Supplementary Table 3): CPMS's region, type of hospital, CPMS's classification, estimate of moderate to very high OMR, opinion that telehealth may decrease OMR, perception of increased patient-CPMS communication during ES, telehealth practice before ES, and advanced telehealth practice before ES. At the same time, Pain Therapeutic Units (p=0.006)

and centre region CPMS (p=0.019) had lower advanced telehealth practice. On the other hand, Multidisciplinary Pain Units (p=0.033), CPMS with telehealth practice before ES (p=0.001), and CPMS with advanced telehealth practice before ES (p<0.001) had higher advanced telehealth practice during ES (Supplementary Table 3).

Table 2 resumes the estimated COVID-19's impact in CPMS's activity, namely, in-person consultations and procedures held in CPMS during ES, telehealth practice proportion during ES, estimated patient's OMR, perception of increased patient-CPMS communication, psychological support telephone line available to CP patients, predicted patient's refusal/fear to come to CPMS, estimated wait time for first consultation in chronic cancer pain and non-cancer pain, and involvement in 2020 Global and European Year for Pain Prevention.

There were no differences in wait times for first consultation in chronic cancer pain according to the type of hospital and CPMS's classification. The south region of Portugal presented a wait time higher than 2 weeks in a lower proportion compared with the other regions (16.7% *vs* 57.7%, p=0.020). Regarding wait times for first consultation in chronic non cancer pain, there were no differences according to the type of hospital and CPMS's regions. Multidisciplinary Pain Centres presented a wait time higher than 12 weeks in a higher proportion compared with other CPMS's classification (66.7% *vs* 17.1%, p=0.043). Alternatively, Chronic Pain Consultations presented a wait time higher than 12 weeks in a lower proportion compared with other CPMS's classification (0.0% *vs* 29.6%, p=0.045).

Twenty-nine CPMS's directors (76.3%) answered that will maintain or implement telehealth in future activity (Supplementary Table 1), namely, AOT in 20 (52.6% of the total CPMS), VT in 12 (31.6% of the total CPMS), telemonitoring in 5 (13.2% of the total CPMS) and tele-training in 5 (13.2% of the total CPMS).

Their opinions about telehealth implementation in CPMS's activity are presented in Table 3.

The association of future telehealth practice intention with several factors was tested and it is resumed in Table 4. Higher future telehealth practice was associated with the following variables: "prediction of patient's refusal/fear to come to CPMS's", "opinion that telehealth adds quality to patient's health", "opinion that telehealth improves access to health care", and "opinion that telehealth can be adapted to patients with CP" have. Additionally, CPMS where telehealth practice and advanced telehealth practice have been applied earlier have higher future telehealth practice intention. On the other hand, CPMS whose directors have the "opinion that telehealth can be harmful" have lower future telehealth practice intention. CPMS with wait time for first consultation in chronic non cancer pain higher than 12 weeks presented lower intention to practice advanced telehealth in the future.

Table 2. Estimated COVID-19's impact in CPMS's activity (N=38)

	N(%)
In-person consultations during ES	
100% to 75% of predicted	7 (18.4)
75% to 50% of predicted	2 (5.3)
50% to 25% of predicted	2 (5.3)
< 25% of predicted	25 (65.7)
Unknown	2 (5.3)
Procedures performed during ES	
100% to 75% of predicted	5 (13.2)
75% to 50% of predicted	1 (2.6)
50% to 25% of predicted	4 (10.5)
< 25% of predicted	26 (68.4)
Unknown	2 (5.3)
Telehealth practice during ES (% relative to total activity)	
100% to 75%	15 (39.5)
< 75% to 50%	4 (10.5)
< 50 % to 25%	5 (13.2)
< 25% to > 0%	5 (13.2)
0%	7 (18.3)
Unknown	2 (5.3)
Estimated patient's opioid misuse risk during ES	
Very High	1 (2.6)
High	5 (13.2)
Moderate	11 (28.9)
Low	9 (23.7)
Very Low	7 (18.4)
Unknown	5 (13.2)
Perception of increased patient-CPMS communication	18 (47.4)
Psychological support telephone line available to CP patients	19 (50.0)
Predicted patient's refusal/fear to come to CPMS	27 (71.1)
Estimated wait times for first consultation in chronic cancer pain	
0 – 2 weeks	21 (55.2)
3 – 5 weeks	9 (23.7)
6 – 8 weeks	5 (13.2)
> 8 weeks	0 (0.0)
Unknown	3 (7.9)
Estimated wait time for first consultation in chronic non-cancer pain	
0 – 2 weeks	9 (23.7)
3 – 5 weeks	9 (23.7)
6 – 8 weeks	8 (21.1)
9 – 12 weeks	4 (10.5)
> 12 weeks	6 (15.8)
Unknown	2 (5.2)
Involvement in 2020 Global and European Year for Pain Prevention	15 (39.5)

LEGEND:
CP: chronic pain; CPMS: chronic pain management services; ES: emergency state; N: number

Patients followed in 7 CPMS (18.4%) do not have any available mode of patient-CPMS communication and that was not associated with CPMS's classification, CPMS's region, type of hospital, telehealth practice before ES, telehealth practice during ES and the future telehealth practice intention (Supplementary Table 4). Nevertheless, a psychological

Table 3. Opinions about Telehealth practice in CPMS (N=38)

	N(%)
Telehealth adds quality to patient's health care?	
Yes	27 (71.0)
No	6 (15.8)
Unknown	5 (13.2)
Telehealth improves access to health care?	
Yes	27 (71.0)
No	8 (21.1)
Unknown	3 (7.9)
Telehealth can be applied to most patients (literacy issues)?	
Yes	18 (47.4)
No	16 (42.1)
Unknown	4 (10.5)
Telehealth can be adapted to the specificities of CP patients?	
Yes	25 (65.8)
No	9 (23.7)
Unknown	4 (10.5)
Telehealth can be harmful?	
Yes	7 (18.4)
No	27 (71.1)
Unknown	4 (10.5)
Influence of telehealth in opioid misuse risk	
No influence/irrelevant	11 (28.9)
It may decrease the risk	14 (36.9)
It may increase the risk	4 (10.5)
Unpredictable influence	5 (13.2)
Unknown	4 (10.5)
Intention to use telehealth for the promotion of 2020 GYPP	
Yes	16 (42.1)
No	22 (57.9)

LEGEND:
CP: chronic pain; CPMS: chronic pain management services; ES: emergency state; GYPP: Global Year for Pain Prevention; N: number

support telephone line available to patients during ES was provided more often to patients from CPMS without any mode available of patient-CPMS communication than to patients from CPMS with patient-CPMS communication available (85.7% *vs* 41.9%, $p = 0.045$)

DISCUSSION

Regarding CPMS's characteristics, almost all Portuguese CPMS have EHR, which have clinical, organizational, and societal outcomes benefits.[23] Only a small minority of Portuguese CPMS provide home-based care. Many CPMS's patients are old-aged, with reduced mobility, and several studies have noted the positive effects of home-based care interventions on improving pain-related outcomes in patients.[24,25] Despite the limitedness of resources, it would be important to increase home-based care interventions. Modern types of communication are expanding, such as e-mail, social media, or applications (apps), however only a minority of Portuguese CPMS provide it. Apps for pain management may be beneficial for patients, particularly in an out-clinic setting. Studies have shown that pain apps are workable and well-liked by patients and health care professionals.[26,27] A non-negligible number of CPMS do not provide any mode of patient-CPMS communication, which probably reduces healthcare proximity and accessibility. Therefore, this should be addressed in the future.

There are several papers about telehealth's practice in CPMS, namely organizational issues, cost-benefits analysis, and patient's evaluation.[13,18,20,21,28-35] However, to our knowledge, this is the first nationwide study that assesses telehealth practice in CPMS. Telehealth had significant effects on multiple outcome measures recommended in the IMMPACT guidelines.[36] Given widespread availability and low cost to patients, clinicians treating patients with CP should consider using electronic and mobile interventions as part of a multidisciplinary pain treatment strategy,[36] and COVID-19 has highlighted it.[37] Before ES, approximately half of the CPMS had telehealth practice (mainly with AOT) and few had advanced telehealth practice, probably due to its harder implementation and differential telecommunications technologies access.[11,18]

According to our results, COVID-19 brought an increase in telehealth practice, that is expected to be maintained in the future. During ES, in-person consultations and procedures were substantially decreased in CPMS, which can be explained by the adhesion to national recommendations.[5] At the same time, there was a 1.6-fold increase in teleconsultation, more specifically, 1.5-fold in AOT, and a 5-fold increase in VT. Teleconsultation enables professionals of different levels of care to be brought closer together, optimises the management of resources, improves the access of citizens to health care, reduces the number of visits by users and caregivers and promotes the empowerment of citizens in the management of their health.[22] AOT has the advantages to be applied in patients who cannot participate in a VT for technological or financial issues and it has easier applicability, which may have contributed for its greater practice. However, in the future, AOT practice is expected to return to approximately the same proportion before ES and VT practice is expected to increase 12-fold. Our findings may reflect the expected benefits of VT over AOT,[38] namely, relationship and communication gains.[38] On the other hand, technical problems can exist more often and reduce quality.

EMP is an essential component in teleconsultation practice and, recently, over 90% of prescriptions were transmitted to community pharmacies electronically in several European countries, including Portugal.[39]

Telemonitoring and tele-training were practiced in a small minority of CPMS. However, in the future, an increase in their practices is expected. Telemonitoring aims to detect early signs and symptoms of decompensation, particularly in

Table 4. Future telehealth practice and associated factors (N=38)

	Future telehealth practice, *N (%)*			Future advanced telehealth practice, *N (%)*		
	Yes	No	*p**	Yes	No	*p**
CPMS's region						
North region	13 (.8)	2 (22.2)	0.208	8 (44.4)	7 (35.0)	0.522
Centre region	6 (20.7)	3 (33.3)	0.357	3 (16.7)	6 (30.0)	0.282
South region	9 (31.0)	3 (33.3)	0.599	6 (33.3)	6 (30.0)	0.825
Public Hospital	21 (72.4)	6 (66.7)	0.522	12 (66.7)	15 (75.0)	0.572
CPMS's classification						
Multidisciplinary Pain Centre	2 (6.9)	1 (11.1)	0.567	1 (5.6)	2 (10.0)	0.541
Multidisciplinary Pain Unit	9 (31.0)	4 (44.4)	0.360	7 (38.9)	6 (30.0)	0.564
Pain Therapeutic Unit	8 (27.6)	3 (33.3)	0.522	3 (16.7)	8 (40.0)	0.110
Chronic Pain Consultation	10 (34.5)	1 (11.1)	0.179	7 (38.9)	4 (20.0)	0.178
Wait time for first consultation in chronic cancer pain > 2 weeks	13 (44.8)	4 (44.4)	0.643	7 (38.9)	10 (50.0)	0.492
Wait time for first consultation in chronic non cancer pain > 12 weeks	5 (17.2)	3 (33.3)	0.275	1 (5.6)	7 (35.0)	**0.031**
Estimated moderate to very high risk of opioid misuse	14 (48.3)	3 (33.3)	0.346	10 (55.6)	7 (35.0)	0.203
Opinion that telehealth may decrease opioid misuse risk	13 (44.8)	1 (11.1)	0.071	6 (33.3)	8 (40.0)	0.671
Perception of increased patient-CPMS communication	13 (44.8)	5 (55.6)	0.427	10 (55.6)	8 (40.0)	0.338
Telehealth practice before ES	19 (65.5)	1 (11.1)	**0.006**	14 (77.8)	6 (30.0)	**0.004**
Advanced telehealth practice before ES	7 (24.1)	0 (0.0)	0.124	6 (33.3)	1 (5.0)	**0.032**
Telehealth practice during ES	26 (89.7)	5 (55.6)	**0.041**	16 (88.9)	15 (75.0)	0.249
Advanced telehealth practice during ES	12 (41.4)	0 (0.0)	**0.019**	10 (55.6)	2 (10.0)	**0.003**
Opinion that telehealth adds quality to patient's health care	24 (82.8)	3 (33.3)	**0.009**	15 (83.3)	12 (60.0)	0.110
Opinion that telehealth improves access to health care	24 (82.8)	3 (33.3)	**0.009**	14 (77.8)	13 (65.0)	0.307
Opinion that telehealth can be applied to most patients (literacy issues)?	16 (55.2)	2 (22.2)	0.088	10 (55.6)	8 (40.0)	0.338
Opinion that telehealth can be adapted to the specificities of patients with CP?	25 (86.2)	0 (0.0)	**< 0.001**	17 (94.4)	8 (40.0)	**< 0.001**
Opinion that telehealth can be harmful?	3 (10.3)	4 (44.4)	**0.041**	2 (11.1)	5 (25.0)	0.249
Prediction about patient's refusal/fear to come to CPMS	23 (79.3)	4 (44.4)	**0.049**	14 (77.8)	13 (65.0)	0.307

LEGEND:
CP: chronic pain; CPMS: chronic pain management services; ES: emergency state; N: number; * Obtained with Chi-squared test

chronic diseases, providing an opportunity for intervention before the citizen needs hospitalisation.[40] In 2018, 8 Portuguese hospitals hire Telemonitoring Programs in the areas of heart failure, acute myocardial infarction, and chronic obstructive pulmonary disease.[22] There should be an effort to expand it to CP field. The use of videoconference technologies for tele-training among health professionals has been described in the literature since 1996.[41-46] Healthcare providers need to be aware that many of the behavioural components of telehealth self-management are not only potentially helpful for managing pain but also for emotional distress related to the COVID-19.[4] Therefore, tele-training application in the field of CP may also be an opportunity, namely during special circumstances.[18] A substantial proportion of CPMS plan to promote 2020 Global and European Year for Pain Prevention using telehealth. Tele-training has been successful in improving education about CP prevention for both patients and health professionals.[47] Other types of telehealth, namely telerehabilitation, were not mentioned, which reflects its absence in Portuguese CPMS. Telerehabilitation is effective and comparable to conventional methods of healthcare delivery for the improvement of physical function and pain in a variety of musculoskeletal conditions.[48] Therefore, it should be encouraged.

We have found asymmetries in telehealth practice, regarding CPMS's classifications and regions, whose reasons should be addressed in future studies. COVID-19 caused patient's refusal/fear to come to CPMS in high proportions, which was linked to future telehealth implementation, meeting patients' specific needs during this pandemic. Additionally, previous telehealth practice in CPMS promotes telehealth and advanced telehealth in the future.

In contrast, perception of increased patient-CPMS communication during ES was unrelated with telehealth practice. Patients followed at CPMS without telehealth practice had health care proximity and accessibility compromised in ES, when major restrictions were applied during approximately two months. Physical distancing measures and restriction of travel may cause social isolation, which is associated with higher levels of depression and anxiety, poorer health behaviours, worse immune function, and pain.[10] Higher levels of pain severity and depressive symptoms are associated with increased OMR.[49-51] However, less than half of CPMS's directors estimated moderate to very high OMR during this period. Telehealth role in chronic opioid therapy has already been established in multiple studies.[52-55] Previous studies have demonstrated that teleconsultation was non-inferior

to in-person consultation for patients undergoing opioids, evidenced by no differences in additional substance use or average time to abstinence.[56,57] Recent consensus guidelines emphasize the use of telehealth to facilitate interactions in patients on opioid therapy during COVID-19.[7,8] Nevertheless, only one third of CPMS's directors believe that telehealth can reduce OMR. Teleconsultation do not foster the same patient–physician relationships which can present limitations in this setting. However, it is recommended that efforts must still be made to employ telehealth when feasible to balance the risks of exposure during in-person encounters with the benefits of appropriate assessment and monitoring during chronic opioid therapy.[58] Patients at high risk for opioid withdrawal should be scheduled for an in-person visit if possible.[7] Estimate of moderate to very high OMR or opinion that telehealth may decrease OMR were not linked with telehealth practice.

Patients with CP deteriorate while waiting for treatment,[59] and problems with wait times for appropriate service were identified in many nations before COVID-19.[60] Our study presents an important proportion of CPMS with an alarming wait time for first chronic cancer pain and non-cancer pain consultations, which may be a consequence of COVID-19 and its restrictions. These wait times do not follow IASP recommendations[61] and exceed timelines deemed acceptable by patients, causing anxiety and reducing function.[62] The patient perspective must be considered in initiatives attempting to improve access to care for this population with specific needs and goals. Innovative solutions, such as teleconsultation and shared care models, hold promise.[62] However, paradoxically, future implementation of advanced telehealth practice will be lower in CPMS with longer estimated wait times for first consultation in chronic non cancer pain. Our findings reflect CPMS's inability or disbelief to apply alternative solutions, such as VT, in response to increased patient-CPMS communication, OMR and longer estimated wait times for first consultation in chronic non cancer pain. Alternatively, they could be a consequence of telehealth absence.

Relatively to opinions about telehealth practice in CPMS, they were essentially positive and support future telehealth implementation.

Our study has several strengths. First, this is the first nationwide study that assesses telehealth practice in CPMS. Second, it objectifies the impact of COVID-19 in CPMS's activity. Third, it resumes the opinions of Portuguese CPMS's directors about telehealth practice. Moreover, our study estimates future telehealth practice and its associated factors. On the other hand, there are some limitations. First, given the 59% response rate, a question remains about the sample representativeness. In order to reduce non-response bias, we have followed recommendations.[63] Contact all CPMS's directors through several sources, provide an introductory explanation, send an anonymous and brief questionnaire, and give acceptable reply's wait time (one month). Furthermore, we believe that our sample is representative of the Portuguese's CPMS, because we have multiples responses from all types of CPMS's classifications, CPMS's regions, and types of hospital. Second, telehealth may involve new concepts for some, which can lead to misconceptions and response errors. We have included definitions in each telehealth term to avoid errors.

CONCLUSION

COVID-19 has brought many constraints which reflected in poorer CP patient's accessibility to CPMS. Telehealth is a valid option to overtake it, even after the pandemic, as recently highlighted.[64] Our study informs health professionals and authorities about COVID-19's impact and the status of telehealth in Portuguese CPMS. Therefore, the authors believe that this study will serve as a reference to support improvements in telehealth practice and CPMS's activity.

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Supplementary Material 1. Types of Telehealth practice (N=38)

Type of service	Before ES, *N (%)*	During ES, *N (%)*	After ES, *N (%)*
Telehealth practice	20 (52.6)	31 (81.6)	29 (76.3)
Advanced telehealth practice *	7 (18.4)	12 (31.6)	18 (47.4)
Subtypes of Telehealth practice			
Teleconsultation	18 (47.4)	29 (76.3)	26 (68.4)
Audio-only teleconsultation with EMP	18 (47.4)	27 (71.1)	20 (52.6)
Video teleconsultation with EMP	1 (2.6)	5 (13.2)	12 (31.6)
Tele-monitoring	3 (7.9)	6 (15.8)	5 (13.2)
Tele-training	3 (7.9)	2 (5.3)	5 (13.2)
Tele-rehabilitation	0 (0.0)	0 (0.0)	0 (0.0)

LEGEND:
EMP: electronic medical prescription; ES: emergency state; N: number; * excludes audio-only teleconsultation.

Supplementary Material 2. Telehealth practice before emergency state (N=38)

	Telehealth practice before ES, *N (%)*			Advanced telehealth practice before ES, *N (%)*		
	Yes	No	*p**	Yes	No	*p**
CMPS's region						
North region	10 (50.0)	5 (27.8)	0.162	4 (57.1)	11 (35.5)	0.261
Centre region	1 (5.0)	8 (44.4)	**0.006**	0 (0.0)	9 (29.0)	0.124
South region	8 (40.0)	4 (22.2)	0.205	2 (28.6)	10 (32.3)	0.615
Public Hospital	15 (75.0)	12 (66.7)	0.572	6 (85.7)	21 (67.7)	0.328
CPMS's classification						
Multidisciplinary Pain Centre	2 (10.0)	1 (5.6)	0.541	1 (14.3)	2 (6.5)	0.467
Multidisciplinary Pain Unit	8 (40.0)	5 (27.8)	0.428	4 (57.1)	9 (29.0)	0.164
Pain Therapeutic Unit	3 (15.0)	8 (44.4)	**0.048**	0 (0.0)	11 (35.5)	0.070
Chronic Pain Consultation	7 (35.0)	4 (22.2)	0.307	2 (28.6)	9 (29.0)	0.68

LEGEND:
CPMS: chronic pain management services; N: number; * Obtained with Chi-squared test

Supplementary Material 3. Telehealth practice during emergency state and associated factors (N=38)

	Telehealth practice during ES, *N (%)*			Advanced telehealth practice during ES, *N (%)*		
	Yes	No	*p**	Yes	No	*p**
CMPS's region						
North region	11 (35.5)	4 (57.1)	0.261	6 (50.0)	9 (34.6)	0.367
Centre region	7 (22.6)	2 (28.6)	0.538	0 (0.0)	9 (34.6)	**0.019**
South region	11 (35.5)	1 (14.3)	0.271	5 (41.7)	7 (26.9)	0.293
Public Hospital	22 (71.0)	5 (71.4)	0.680	10 (83.3)	17 (65.4)	0.231
CPMS's classification						
Multidisciplinary Pain Centre	3 (9.7)	0 (0.0)	0.533	2 (16.7)	1 (3.8)	0.229
Multidisciplinary Pain Unit	9 (29.0)	4 (57.1)	0.164	7 (58.3)	6 (23.1)	**0.033**
Pain Therapeutic Unit	10 (32.3)	1 (14.3)	0.328	0 (0.0)	11 (42.3)	**0.006**
Chronic Pain Consultation	9 (29.0)	2 (28.6)	0.680	3 (25.0)	8 (30.8)	0.516
Telehealth practice before ES	18 (58.1)	2 (28.6)	0.161	11 (91.7)	9 (34.6)	**0.001**
Advanced telehealth practice before ES	7 (22.6)	0 (0.0)	0.208	7 (58.3)	0 (0.0)	**< 0.001**
Estimate of moderate to very high risk of opioid misuse	13 (41.9)	4 (57.1)	0.376	4 (33.3)	13 (50.0)	0.273
Opinion that telehealth may decrease opioid misuse risk	11 (35.5)	3 (42.9)	0.517	2 (16.7)	12 (46.2)	0.080
Perception of increased patient-CPMS communication	15 (48.4)	3 (42.9)	0.563	6 (50.0)	12 (46.2)	0.825

LEGEND:
CP: chronic pain; CPMS: chronic pain management services; ES: emergency state; N: number. * Obtained with Chi-squared test.

Supplementary Material 4. Patient-CPMS communication availability and related factors (N =38)

	Patient-CPMS communication availability, *N (%)*		
	Yes	No	*p**
CMPS's region			
North region	10 (32.3)	5 (71.4)	0.070
Centre region	8 (25.8)	1 (14.3)	0.462
South region	11 (35.5)	1 (14.3)	0.271
Public Hospital	21 (67.7)	6 (85.7)	0.328
CPMS's classification			
Multidisciplinary Pain Centre	3 (9.7)	0 (0.0)	0.533
Multidisciplinary Pain Unit	11 (35.5)	2 (28.6)	0.549
Pain Therapeutic Unit	8 (25.8)	3 (42.9)	0.320
Chronic Pain Consultation	9 (29.0)	2 (28.6)	0.680
Telehealth practice before ES	18 (58.1)	2 (28.6)	0.161
Advanced telehealth practice before ES	6 (19.4)	1 (14.3)	0.617
Telehealth practice during ES	26 (83.9)	5 (71.4)	0.383
Advanced telehealth practice during ES	10 (32.3)	2 (28.6)	0.615
Psychological support line available to patients during SE	13 (41.9)	6 (85.7)	**0.045**
Future telehealth practice intention	24 (77.4)	5 (71.4)	0.538
Future advanced telehealth practice intention	14 (45.2)	4 (57.1)	0.437

LEGEND:
CP: chronic pain; CPMS: chronic pain management services; ES: emergency state; N: number; * Obtained with Chi-squared test