

BMJ Open Association between perception of COVID-19 risk, confidence in health services and avoidance of emergency department visits: results from a community-based survey in Portugal

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ABSTRACT

Objectives To examine the association between the perception of COVID-19 risk, confidence in health services and avoidance of emergency department (ED) visits in Portugal during the COVID-19 pandemic.

Design Community-based, cross-sectional survey.

Setting Volunteer sample that completed the online survey between April 2020 and May 2021.

Participants 987 participants who perceived needing ED care. Of those, 242 reported avoiding ED visits.

Outcome measures Logistic regression models for ED avoidance were conducted to estimate the effect of risk perception and confidence in health services, adjusted for sociodemographics, health status and time.

Results The adjusted odds for ED avoidance were higher for participants lacking confidence in health service response to non-COVID-19 conditions (adjusted OR: 6.39; 95% CI 3.19 to 12.82) and COVID-19 (1.81; 1.19 to 2.77) and lower for those perceiving a low risk of being infected at a health provider (0.16; 0.07 to 0.38).

Conclusion In our sample, confidence in health services and risk perception of infection at a health provider were associated with the decision to avoid the ED. These results suggest that policymakers and care providers need to mitigate the negative consequences of delayed healthcare; be aware of the implications of distrust and fear from those in need of healthcare and provide equally distributed safe alternatives to ED care.

INTRODUCTION

The first case of COVID-19 in Portugal was detected on 2 March 2020 and by the end of May 2021, there had been 849.538 cases and 17.025 deaths.^{1,2} The first lockdown was implemented on 19 March 2020 and lasted until the beginning of May.^{3,4} The second lockdown was in place from November 2020 until mid-March, due to the increase in the number of cases.^{5–7} Particularly during periods of higher incidence, there have been constraints in the healthcare delivery in public hospitals, with scheduled treatments and exams postponed

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Community-based survey, including several dimensions related to health services use, enabled studying the association between perception of COVID-19 risk, confidence in health services and emergency department (ED) avoidance, adjusting for relevant determinants of health services use (sociodemographics, health status and time) and the pandemic period.
- ⇒ Participants were recruited during more than 1 year—April 2020 to May 2021, allowing comparison of ED use in different epidemiological periods of the pandemic.
- ⇒ Detailed information about ED avoidance and its reasons is limited.
- ⇒ Open survey recruitment means that the study sample is unlikely to be representative.

and human resources reallocated to treat patients with COVID-19.^{8,9} Also, since the beginning of the pandemic, separate circuits and areas for patients with suspected or confirmed COVID-19 were created in health providers as well as COVID-19-free institutions (namely, specialised cancer hospitals),¹⁰ together with appeals to patients not to delay necessary urgent care.¹¹

Data for March 2020 showed an abrupt reduction in emergency department (ED) utilisation. During that month, the number of overall ED visits decreased 48% in Portugal.¹² A reduction was also observed for severe patients, since ED visits triaged red or orange with Manchester Triage System reduced at least 33%.¹² Globally, similar studies on the use of ED reported decline rates around 39%–47.2%.^{13–15} Monitoring ED utilisation is particularly relevant in a pandemic context. First, EDs are key to respond to acute health needs,¹⁶ while depending on the patients'

decision to seek care or not. Second, delaying or avoiding a necessary ED visit risks irreversible negative consequences for patients' health.¹⁷ Finally, EDs have an open-door policy (there is no need for previous referral) and are a frequent point of health system entry, with evidence of a considerably higher utilisation of emergency care in Portugal, compared with other Organisation for Economic Co-operation and Development (OECD) countries (71 vs 31 visits per 100 population).¹⁶

Determinants of health services use have been organised into predisposing factors, enabling/impeding factors and need for care, both at the individual and contextual level, based on the widely acknowledged model developed by Andersen.^{18 19} Previous studies have considered age and sex (as predisposing factors), income (as enabling factor) and mental or physical evaluated health status or self-reported perceived health (as need factors) as determinants.¹⁹

Previous works on ED avoidance during the pandemic have focused mainly on the observed reduction of utilisation based on secondary data. This approach is relevant to monitor the population's utilisation trends; however, the factors influencing the decision to visit or avoid ED during the pandemic period are still less known. This study aims to examine the association between the perception of COVID-19 risk, confidence in health services and avoidance of ED visits in Portugal during the pandemic, using a community-based survey (COVID-19 Barometer: Social Opinion). Since the decision to use health services is multifactorial,¹⁸ we will consider in our study the role of individual and contextual factors that may have influenced the decision to visit ED.

METHODS

Data source and participants

We used data from the community-based survey COVID-19 Barometer: Social Opinion. The questionnaire was administered online through the Microsoft Forms software programme (Microsoft Corp). We sent invitations to participate to existing contact networks and mailing lists, posted and promoted on social networks and promoted to vulnerable groups through partnerships with patient associations, public health doctors and other healthcare professional groups. A snowball sampling technique was used, asking participants to forward the link to the questionnaire.²⁰ By the end of June 2021, there were over 195 000 answers to the survey. To adjust rapidly to the pandemic's evolution, the questionnaire was flexible and questions have varied since its creation.²⁰ The questions about ED need and use were introduced on 11 April 2020 and removed on 14 May 2021, corresponding to our study period.

For this study, we extracted from the survey the data on sociodemographic characteristics; health status self-assessment; frequency of negative emotions; risk perception; level of confidence in the health service response;

date of participation and need for ED and subsequent use or avoidance.

We included only participants who reported having needed ED care and excluded those who did not live in Portugal. It was an open cohort, where participants could answer the questionnaire online once or more. For participants with several responses indicating need for ED care, we considered only the last response, except when avoiding ED was reported only in some of the answers (in that case, the last answer reporting ED avoidance was considered).

Study variables

To measure the perception of COVID-19 risk and confidence in health services, we used five variables. The survey questioned participants on their perception of their own risk of COVID-19 infection, severe COVID-19 or complications and being infected with COVID-19 at a health provider. We considered each of those three variables and categorised them as high, moderate and low/no risk. As for confidence in health services, we included two variables, one on the level of confidence in the response of health services to patients with COVID-19 and another on the response to other patients (non-COVID-19). Although these two variables were ordinal, we dichotomised them into high (very confident and confident) and low (not very confident and not confident) due to the low frequency of responses in the extreme categories.

To define our outcome of interest—ED avoidance/non-avoidance, we considered ED avoidance when the participant answered having felt the need for ED care but decided to avoid the visit (corresponding to 'I needed emergency care but decided not to go'). Non-avoidance was considered when the participant reported having felt the need for ED care and visited ED (corresponding to 'I needed emergency care and went to the ED').

Sociodemographic variables included age (16–25, 26–45, 46–65, >65 years), sex (female and male) and income (<650€, 651–1000€, 1001–1500€, 1501–2000€, 2001–2500€, >2501€). Overall health status perception was self-assessed by participants and categorised in the study as very good/good, reasonable and very bad/bad. The frequency of negative emotions is based on how frequently each participant felt agitated, anxious or sad due to distancing and was categorised as everyday, almost everyday, some days and never. The time variable was based on the date of participation in the survey and was categorised as first lockdown (21 March 2020 to 1 May 2020), between lockdowns (2 May 2020 to 6 November 2020), second lockdown (7 November 2020 to 26 March 2021), and after second lockdown (27 March 2021 to 14 May 2021).

Statistical analysis

Variables were described using absolute and relative frequencies, including missing values. Logistic regression was fitted with a binary dependent variable (non-avoidance and ED avoidance). ORs and corresponding 95% CIs were

estimated for all variables. We computed ORs for each of the variables on the perception of COVID-19 risk and confidence in health services, adjusting for other relevant factors. The latter include age and sex as predisposing factors for health services use, income as enabling that use and health status perception and frequency of negative emotions as measures of health need. We also adjusted for the period of the questionnaire since the decision to seek ED care may be influenced by the phase of the pandemic.

All statistical analyses were performed using R V.4.0.2.²¹

Patient and public involvement

Patients or the public were not involved in the design of our research. The questions included in the COVID-19 Barometer: Social Opinion survey were dynamic, to respond to the main concerns of society in each phase of the COVID-19 pandemic. Its results were disseminated to participants through press releases accessible online and the media, additionally to being presented in experts meetings to monitor the evolution of the pandemic, promoted by national authorities and transmitted online.

RESULTS

Characteristics of studied sample

The study included 987 volunteer participants who perceived having needed ED care at least once (table 1). Of those, 75.4% were women, 42.7% were 26–45-year old and 44.2% were 46-year old or more. About half of respondents had a monthly household income up to €1500 (n=458); the largest group had a monthly household income above €2501 (19.0%). Most evaluated their health status as very good/good (49.4%) or reasonable (43.8%). About half of participants reported negative emotions on some days due to the distancing measures (54.3%). The remaining participants reported having those emotions everyday (12.6%), almost everyday (17.4%) or never (15.0%). There were 237 participants responding during the first lockdown (24.0%), 436 (44.2%) between lockdowns, 166 (16.8%) during the second lockdown and 148 (15.0%) afterwards.

Association between ED avoidance and sociodemographic, health status, negative feelings and time

Overall, 24.5% of respondents (n=242) from our volunteer sample who perceived needing an ED visit have avoided seeking that care. The percentage of ED avoidance was 43.3% when the reported health status was very bad/bad and 30.3% for reasonable health status. During the second lockdown, the percentage of ED avoidance (17.5%) was lower than during the first (32.9%). Participants reporting a worse health status had an increased odds of ED avoidance, both in the case of very bad/bad (adjusted OR: 2.60; 95% CI 1.31 to 5.16) and reasonable (adjusted OR: 2.17; 95% CI 1.51 to 3.10), compared with the very good/good health status group. The odds of a respondent avoiding ED in the second lockdown were 61% less likely than in the first lockdown. The remaining respondent characteristics (eg,

demographic, income, negative emotions) were not significantly associated with ED avoidance. Crude ORs are shown in online supplemental material.

Association between ED avoidance and COVID-19 risk and confidence in health services

The distribution of respondents by COVID-19 risk perception indicates that most reported a moderate or low/no risk perception of being infected (44.2% and 33.3%, respectively; table 2). As for the risk perception for severe complications in case of COVID-19 infection, 20.8% of respondents perceived their own risk as high (n=205), 25.1% as moderate and 24.7% as low/no risk. Only 73 participants answered they perceived a high risk of being infected with COVID-19 at a health provider (7.40%), the majority reported a moderate (n=198; 20.1%) or low or non-existent risk (n=178; 18.0%). Around 60% of participants were confident in the response of health services to COVID-19 (n=591). However, the confidence reduced to 18.9% concerning conditions other than COVID-19.

The percentage of ED avoidance was higher for those with low confidence in the ability of health services to respond to other conditions than COVID-19 (28.4%), while only 8.6% of those with high confidence avoided visiting ED. For confidence in response to patients with COVID-19, there was a similar pattern (low confidence: 33.5%; high confidence: 20.6%). In the group of respondents who perceived a low or inexistent risk of being infected with COVID-19 at a health provider, only 7.9% avoided visiting ED (moderate risk: 25.3%; high risk: 35.6%). The odds of avoiding ED were higher in participants who lacked confidence in the response to COVID-19 (adjusted OR: 1.81; 95% CI 1.19 to 2.77; figure 1) and particularly in the response to non-COVID-19 conditions (adjusted OR: 6.39; 95% CI 3.19 to 12.82). Those who perceived a low or non-existent risk of being infected with COVID-19 at a health provider had significantly lower odds of avoiding ED (adjusted OR: 0.16; 95% CI 0.07 to 0.38). The risk perception of COVID-19 infection and its complications were significant only in bivariate analysis (crude ORs in online supplemental material).

DISCUSSION

Using a volunteer sample from a community-based survey, our data indicated that nearly one in four participants (24.5%) considering they needed ED care had avoided it. Health services use is a function of predisposing and enabling/impeding factors, as well as need for care, with a role for both individual and contextual determinants.¹⁸ Our study showed that, after adjusting for relevant determinants, the confidence in health services played an important role in influencing ED use in a pandemic context. Participants with low confidence in the health service response to patients other than those with COVID-19 had six times increased odds of avoiding ED. Also, those perceiving a low risk of being infected with COVID-19 in a health provider showed decreased odds of avoiding ED, thus enhancing that

Table 1 Characterisation of participants, ED avoidance and adjusted ORs, for adjustment variables (demographic, income, health status, negative emotions and period)

	Participants		ED avoidance		Adjusted OR	
	n	% total	n	%	Value	95% CI
Total	987	100.0%	242	24.5%		
Sex						
Female	744	75.4%	190	25.5%	1.17	(0.78 to 1.75)
Male	241	24.4%	52	21.6%	Ref	Ref
Missing	2	0.2%	0	0.0%		
Age group (years)						
16–25	130	13.2%	44	33.8%	1.45	(0.87 to 2.43)
26–45	421	42.7%	98	23.3%	Ref	Ref
46–65	374	37.9%	79	21.1%	0.98	(0.67 to 1.43)
>65	62	6.3%	21	33.9%	1.69	(0.88 to 3.27)
Monthly family income						
<650€	110	11.1%	35	31.8%	1.30	(0.72 to 2.37)
651–1000€	167	16.9%	49	29.3%	1.43	(0.85 to 2.43)
1001–1500€	181	18.3%	37	20.4%	0.88	(0.51 to 1.50)
1501–2000€	135	13.7%	37	27.4%	1.42	(0.82 to 2.44)
2001–2500€	118	12.0%	19	16.1%	0.76	(0.40 to 1.42)
>2501€	188	19.0%	36	19.1%	Ref	Ref
Missing	88	8.9%	29	33.0%		
Health status perception						
Very good/good	488	49.4%	84	17.2%	Ref	Ref
Reasonable	432	43.8%	131	30.3%	2.17	(1.51 to 3.10)
Very bad/bad	60	6.1%	26	43.3%	2.60	(1.31 to 5.16)
Missing	7	0.7%	1	14.3%		
Frequency of negative emotions						
Every day	124	12.6%	42	33.9%	1.70	(0.87 to 3.32)
Almost every day	172	17.4%	49	28.5%	1.47	(0.79 to 2.76)
Some days	536	54.3%	124	23.1%	1.32	(0.77 to 2.25)
Never	148	15.0%	26	17.6%	Ref	Ref
Missing	7	0.7%	1	14.3%		
Period						
First lockdown	237	24.0%	78	32.9%	Ref	Ref
Between lockdowns	436	44.2%	97	22.2%	0.73	(0.48 to 1.11)
Second lockdown	166	16.8%	29	17.5%	0.39	(0.22 to 0.69)
After second lockdown	148	15.0%	38	25.7%	0.83	(0.49 to 1.40)

ORs were adjusted for demographic variables—age and sex, monthly household income, health status, negative emotions and questionnaire period.

ED, emergency department.

individuals who fear getting infected in a health institution may avoid or delay seeking healthcare. A previous study has found that the confidence in the continuity of health services during a state of emergency was positively associated with community resilience.²² Therefore, consequences of distrust in health services may even expand beyond the boundaries of health sector and require careful monitoring.

Relation between ED avoidance and COVID-19 risk

Interestingly, the perception of the risk of being infected with COVID-19 or the severity of its consequences was no longer significantly associated with ED avoidance when we introduced the adjustment variables. A previous work with data from this survey has shown that individuals who perceived their health and mental status (negative

Table 2 Characterisation of participants and ED avoidance by COVID-19 risk perception and confidence in health services

	Participants		ED avoidance	
	n	% total	n	%
Perception of the risk of COVID-19 infection				
High	163	16.5%	54	33.1%
Moderate	436	44.2%	98	22.5%
Low/no risk	329	33.3%	75	22.8%
Unknown	56	5.7%	15	26.8%
Missing	3	0.3%	0	0.0%
Perception of the risk of severe COVID-19 infection or its complications				
High	205	20.8%	77	37.6%
Moderate	248	25.1%	58	23.4%
Low/no risk	244	24.7%	49	20.1%
Unknown	72	7.3%	11	15.3%
Missing	218	22.1%	47	21.6%
Perception of the risk of being infected with COVID-19 at a health provider				
High	73	7.4%	26	35.6%
Moderate	198	20.1%	50	25.3%
Low/no risk	178	18.0%	14	7.9%
Unknown	15	1.5%	3	20.0%
Missing	523	53.0%	149	28.5%
Level of confidence in the ability of health services to respond to COVID-19				
High	591	59.9%	122	20.6%
Low	185	18.7%	62	33.5%
Missing	211	21.4%	58	27.5%
Level of confidence in the ability of health services to respond to other conditions (non-COVID-19)				
High	187	18.9%	16	8.6%
Low	271	27.5%	77	28.4%
Missing	529	53.6%	149	28.2%

ED, emergency department.

emotions) as poor also perceived a higher risk of getting COVID-19,²³ which may be causing the loss of significance in our study. Future studies may address what motivates the low confidence in health services or the perception of high risk of being infected when contacting a health provider.

Evolution of ED avoidance during the pandemic period

We also observed that the percentage of ED avoidance was significantly lower during the second lockdown (7 November 2020 to 26 March 2021) than during the first

(21 March 2020 to 1 May 2020). As the pandemic period extended, we may hypothesise that the demand for ED care has been resuming to the prepandemic values. However, the responses for the period after the second lockdown indicate an interruption of that trend. Even if it might be an effect of the lower number of responses, these results should be interpreted with caution and its evolution monitored.

Implications for access to healthcare

ED avoidance is of concern from a public health perspective since it may imply a decreased access to needed healthcare. Considering that persons reporting poorer health avoided ED more than those with better health, there is a considerable risk that ED avoidance can implicate delaying necessary care, which has been described previously.^{12 14 17} The expected consequences may affect both morbidity and mortality, through delayed diagnosis or late/no response to acute situations. Previous studies have shown increased mortality during the pandemic period not totally explained by the rise of COVID-19 deaths in Portugal and elsewhere.²⁴ For acute cardiovascular conditions, mortality increased after the pandemics, especially in the community.²⁵ Concerning morbidity, there is also evidence of delayed diagnosis and reduced attendance to treatments in patients with cancer and an increased mortality by acute cardiovascular conditions especially in the community.^{26 27} To reduce the spanning of the negative effects of the pandemic beyond its end, health systems may benefit from identifying subgroups of patients who delayed necessary care more frequently. These subgroups may be targeted by both policymakers and providers who allocate resources to transitory programmes to reach, provide care and follow-up on these potentially vulnerable groups. Previous studies have shown abrupt drops in ED demand¹² and our data suggest that fear and distrust may have played a role. In future pandemics or analogous crises/shocks, healthcare providers, namely, hospitals, should aim to reassure patients that they are safe to visit healthcare providers and healthcare should not be avoided.

Possibility of reduced inappropriate utilisation

From a different perspective, this reduction of ED visits may have also reduced ED visits that were considered avoidable and could be safely cared for elsewhere. Those reporting avoiding ED may have looked for a response to their needs from a primary care provider or received scheduled hospital care. Evidence indicates that the number of telemedicine appointments increased up to 52% in hospitals (medical); and 103% and 110% in primary care (medical and nursing) in April 2020.²⁸ However, it is not known whether these alternatives were equally searched/ found for all persons, irrespective of differences in health literacy, region or provider. Therefore, it is important to ensure that the new ways of organising and delivering care induced by the pandemic, such as telemedicine, are equally distributed across the population (eg, across

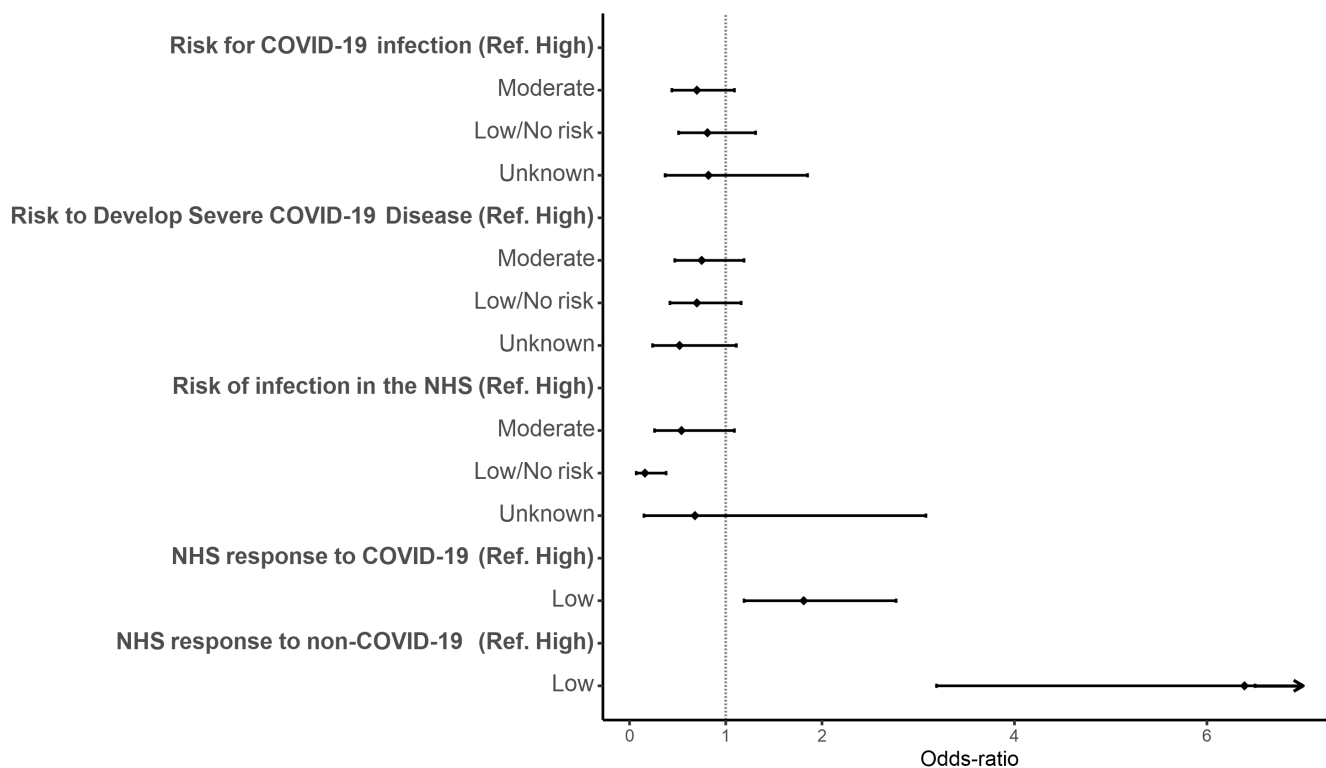


Figure 1 Adjusted ORs of ED avoidance by COVID-19 risk perception and confidence in health services. Forest plot of ED avoidance by COVID-19 risk perception and confidence in health services. Adjusted ORs (adjusted for demographic variables—age and gender, monthly household income, health status, negative emotions, and questionnaire period) and the respective 95% CIs are denoted by dots and lines, respectively. Forest plot CIs were cut-off at 6.5. ED, emergency department; NHS, National Health Service.

groups with different socioeconomic conditions and/or literacy levels) and contribute to avoid decompensation of chronic diseases²⁹ and reduce both ED crowding and inappropriate use in the future.

Study limitations

One of the limitations of our study is that our results cannot be extrapolated to the Portuguese population since the recruitment (snowball sampling technique) does not guarantee a representative sample. Our study suffers from non-response bias: COVID-19 Barometer: Social Opinion is an online survey with an all-volunteer sample, so some population groups are less likely to answer (eg, person with difficulties in internet use/access or COVID-19 negationism). More than half of our sample was aged 16–45 years old (55.9%), which was higher than in the general population (40.6% from 15 to 44 years old). Since younger population is expected to be healthier and present a lower frequency of chronic conditions, we hypothesise that this may have led to a lower frequency of fear of being infected. There may have also been an effect on ED avoidance, but in an unknown direction, since younger population may be healthier but, at the same time, our results indicated that participants reporting worse health status avoided ED more. The survey was designed and evolved to monitor the response of society to COVID-19 in several areas,²⁰ so

detailed information about ED demand and avoidance (eg, reasons for ED visit) is limited. We considered the self-assessment of overall health status perception as a proxy of the severity of the ED visit, but that might not always be the case. Due to the proportion of variables with missing data, we did not analyse the joint effect of risk perception and confidence in health services. Although our analyses were hypothesis-driven and focused on the magnitude of the effect size and its precision, our study is exploratory, and the results should be replicated in further studies. Nevertheless, each factor of interest was adjusted for relevant determinants of health services use and the pandemic period.

CONCLUSIONS

Our study used data from a community-based survey and concluded that, for the sample of 987 volunteer participants who perceived needing ED care, one in four avoided an ED visit, with the level of confidence in health services and the perception of the risk of being infected at a health provider associated with the decision to avoid care. These data suggest the need of a response from health services to ensure that the negative consequences of delayed healthcare are controlled and mitigated; that the health system and society as a whole are aware of the

potential negative consequences of distrust and fear from those in need of healthcare; and that equally distributed safe alternatives to ED care are known and accessible.

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Contributors SL (guarantor) and PS designed the study. PS, AG, ARP, MM, PL, ARG, CN and SD acquired the data. SL and PS analysed the data and all authors interpreted it. SL and PS drafted the manuscript. All authors critically reviewed the manuscript.

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Competing interests None declared.

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Patient consent for publication Not applicable.

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REFERENCES

- Portugal. Direção-Geral da Saúde. COVID-19: Relatório de Situação Epidemiológica no 1 de 03/03/2020 [online]. Lisboa: DGS, 2020. Available: <https://covid19.min-saude.pt/relatorio-de-situacao/> [Accessed 7 Sep 2021].
- Portugal. Direção-Geral da Saúde. COVID-19: Relatório de situação de 01-06-2021 [online]. Lisboa: DGS, 2021. Available: <https://covid19.min-saude.pt/relatorio-de-situacao/> [Accessed 7 Sep 2021].
- Decreto do Presidente da República n.o 55/2020. 1.a Série: 3.o Suplemento. (2020-03-18): 13-(2)-13-(4).
- Resolução do Conselho de Ministros n.o 33-A/2020. Diário da República n.o 85/2020. 1.a Série: 3.o Suplemento. (2020-04-30): 7-(10)-7-(21).
- Portugal. Direção-Geral da Saúde. COVID-19: Relatório de situação de 29-01-2021 [Internet]. Lisboa: DGS, 2021. Available: <https://covid19.min-saude.pt/relatorio-de-situacao/> [Accessed 7 Sep 2021].
- Decreto do Presidente da República n.o 6-B/2021. Diário da República n.o 8/2021. 1.a Série: 2.o Suplemento. (2021-01-13): 5-(2)-5-(5).
- Resolução do Conselho de Ministros n.o 19/2021. Diário da República n.o 50-A/2021. 1.a Série-B. (2021-03-13): 29-31.
- Despacho n.o 574-A/2021. Diário da República n.o 8/2021. 2.a Série: 1.o Suplemento. (2021-01-13): 468-(3)-468-(4).
- Despacho n.o 5314/2020. Diário da República n.o 89/2020. 2.a Série. (2020-05-07): 79-81.
- Portugal. Direção-Geral de Saúde. Norma no 004/2020 de 23/03/2020 atualizada a 19/04/2021: abordagem do doente com suspeita ou confirmação de COVID-19 [online]. Lisboa: DGS, 2021. Available: https://covid19.min-saude.pt/wp-content/uploads/2021/04/Norma_004_2020_act_19_04_2021.pdf [Accessed 7 Sep 2021].
- Portugal. Direção-Geral de Saúde. Governo garante que é seguro ir s urgências - COVID-19 [online]. Lisboa: DGS, 2020. Available: <https://covid19.min-saude.pt/governo-garante-que-e-seguro-ir-as-urgencias/> [Accessed 7 Sep 2021].
- Santana R, Sousa JS, Soares P, *et al*. The demand for hospital emergency services: trends during the first month of COVID-19 response. *Port J Public Health* 2020;38:30-6.
- Friedman AB, Barfield D, David G, *et al*. Delayed emergencies: the composition and magnitude of non-respiratory emergency department visits during the COVID-19 pandemic. *J Am Coll Emerg Physicians Open* 2021;2:1-8.
- Gutovitz S, Pangia J, Finer A, *et al*. Emergency department utilization and patient outcomes during the COVID-19 pandemic in America. *J Emerg Med* 2021;60:798-806.
- GÇ I, Cevik Y. Impact of COVID-19 pandemic on visits of an urban emergency department. *Am J Emerg Med* 2020;42:78-82.
- Berchet C. *Emergency care services: trends, drivers, and interventions to manage the demand*. Paris: OECD Health, 2015.
- Findling MG, Blendon RJ, Benson JM. Delayed care with harmful health consequences—reported experiences from national surveys during coronavirus disease 2019. *JAMA Health Forum* 2020;1:e201463.
- Andersen RM. National health surveys and the behavioral model of health services use. *Med Care* 2008;46:647-53.
- Babitsch B, Gohl D, von Lengerke T. Re-visiting Andersen’s behavioral model of health services use: a systematic review of studies from 1998-2011. *Psychosoc Med* 2012;9:Doc11.
- Pedro AR, Gama A, Soares P, *et al*. COVID-19 barometer: social opinion – what do the Portuguese think in this time of COVID-19? *Port J Public Health* 2020;38:42-50.
- Team RC. *R: a language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing, 2020.
- Cohen O, Shapira S, Aharonson-Daniel L, *et al*. Confidence in health-services availability during disasters and emergency situations—does it matter?—lessons learned from an israeli population survey. *Int J Environ Res Public Health* 2019;16:16193519. doi:10.3390/ijerph16193519
- Laires PA, Dias S, Gama A, *et al*. The association between chronic disease and serious COVID-19 outcomes and its influence on risk perception: survey study and database analysis. *JMIR Public Health Surveill* 2021;7:e22794.
- Islam N, Shkolnikov VM, Acosta RJ, *et al*. Excess deaths associated with covid-19 pandemic in 2020: age and sex disaggregated time series analysis in 29 high income countries. *BMJ* 2021;373:n1137.
- Wu J, Mamas MA, Mohamed MO, *et al*. Place and causes of acute cardiovascular mortality during the COVID-19 pandemic. *Heart* 2021;107:113-9.
- Morais S, Antunes L, Rodrigues J. The impact of the coronavirus disease 2019 pandemic on the diagnosis and treatment of cancer in Northern Portugal. *Eur J Cancer Prev* 2021:686.
- Gurney JK, Millar E, Dunn A, *et al*. The impact of the COVID-19 pandemic on cancer diagnosis and service access in new Zealand—a country pursuing COVID-19 elimination. *Lancet Reg Health West Pac* 2021;10:e100127
- Portugal. Entidade Reguladora da Saúde. Impacto da pandemia COVID-19 no Sistema de Saúde: período de março a junho de 2020 [online]. Porto: ERS, 2020. Available: <https://www.ers.pt/media/3487/im-impacto-covid-19.pdf>
- Hanlon P, Daines L, Campbell C, *et al*. Telehealth interventions to support self-management of long-term conditions: a systematic meta-review of diabetes, heart failure, asthma, chronic obstructive pulmonary disease, and cancer. *J Med Internet Res* 2017;19:e172.