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FACULDADE DE MEDICINA
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MESTRADO INTEGRADO EM MEDICINA

2021/2022

Miguel Esteves Pereira

Social Media use by Cardiovascular
Healthcare Professionals in Portugal

MAIO, 2022

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Mestrado Integrado em Medicina

Área: Ciências Médicas e da Saúde > Medicina Clínica

Tipologia: Dissertação

Trabalho efetuado sob a Orientação de:
Doutor Ricardo José Araújo Ladeiras Lopes

Trabalho organizado de acordo com as normas da revista:
Revista Portuguesa de Cardiologia (English Edition)

MAIO, 2022

FMUP

Eu, Miguel Esteves Pereira, abaixo assinado, nº mecanográfico 201605520, estudante do 6º ano do Ciclo de Estudos Integrado em Medicina, na Faculdade de Medicina da Universidade do Porto, declaro ter atuado com absoluta integridade na elaboração deste projeto de opção.

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Faculdade de Medicina da Universidade do Porto, 14/03/2022

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DESIGNAÇÃO DA ÁREA DO PROJECTO

Ciências Médicas e da Saúde > Medicina Clínica

TÍTULO DISSERTAÇÃO/MONOGRÁFIA (riscar o que não interessa)

Social Media use by Healthcare Professionals in Portugal

ORIENTADOR

Doutor Ricardo José Araújo Ladeiras Lopes

COORIENTADOR (se aplicável)

ASSINALE APENAS UMA DAS OPÇÕES:

É AUTORIZADA A REPRODUÇÃO INTEGRAL DESTA TRABALHO APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	<input type="checkbox"/>
É AUTORIZADA A REPRODUÇÃO PARCIAL DESTA TRABALHO (INDICAR, CASO TAL SEJA NECESSÁRIO, Nº MÁXIMO DE PÁGINAS, ILUSTRAÇÕES, GRÁFICOS, ETC.) APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE.	<input type="checkbox"/>
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Faculdade de Medicina da Universidade do Porto, 14/03/2021

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Miguel Esteves Pereira

DEDICATÓRIA

Em primeiro lugar, gostaria de agradecer, especialmente, ao Professor Doutor Ricardo Ladeiras Lopes por me ter guiado durante todo este percurso. Com efeito, se por um lado sempre exigiu a excelência e permitiu que tivesse total liberdade criativa; por outro, nunca me faltou com o seu apoio, contribuições e correções para que conseguíssemos alcançar o melhor trabalho possível. De facto, sinto que me levou a dar o melhor de mim, e, por isso, estou-lhe extremamente grato.

De seguida, gostaria de agradecer aos meus pais e aos meus irmãos: Manel e Rui. Bem sei que, por vezes, durante estes 6 anos houve momentos em que estive menos presente, mas quero que saibam que o vosso apoio, amor, boa disposição e alegria foram cruciais para que conseguisse chegar ao fim deste curso tão feliz e satisfeito como cheguei. Nesta tónica, estendo também os meus agradecimentos aos meus dois avôs e duas avós pelo exemplo de trabalho, generosidade, humildade e sentido humanístico que sempre em mim cultivaram pela bondade e genuinidade das vossas ações. Levá-los-ei para sempre comigo no coração... À restante família, quero que saibam que me sinto profundamente grato por vos ter do meu lado.

Não menos importante, gostaria também de agradecer aos meus amigos. Aos do secundário, aos do basquete, aos que fiz na faculdade, e aos de sempre. Vocês sabem quem são, e sem vocês completar isto não faria sentido. Aproveito este momento, também, para deixar uma palavra de apreço a todos os quasi-amigos e conhecidos, com os quais tive o prazer de partilhar estes 6 anos. Desde a AE ao YES, Basquete Masculino, Basquete Feminino e em tantos outros momentos, sem dúvida que ajudaram a tornar estes 6 anos tão especiais como foram.

Por último, deixei para o fim o que destes 6 anos mais belo levo. Mariana, estou eternamente grato por nos termos cruzado durante este percurso. Não podia deixar passar este momento para partilhar o quão completo e feliz estou por te poder ter ao meu lado. O teu nobre coração, a tua felicidade contagiante, a tua capacidade para me ajudar a ver sempre o copo meio cheio e a viver os momentos ao máximo, foi o que me fez acabar este percurso tão regozijado, de “coração cheio” e ansioso pelo futuro.

**A todos,
o meu obrigado...**

Brief description of the article's significance and/or interest:

Despite the crucial role that social media (SoMe) plays on contemporary cardiovascular medicine, there is not any solid data portraying the use of SoMe by cardiovascular healthcare professionals (CVHP) in Portugal. Hence, the main goal of this national cross-sectional survey was to accurately characterize SoMe use by Portuguese CVHP, describing which SoMe platforms are used the most, how much time do they spent on them, what are the reasons for their use and, also, what is the type of content that CVHP want to acquire and share while using SoMe.

Declaration of originality:

We declare that the manuscript is our own work and does not contain plagiarism as a whole or in parts. We also acknowledge that the manuscript has not been previously published, nor is it under review or consideration for book chapter or journal publication elsewhere. We also declare that all authors have read and approved the manuscript and that there are no conflicts of interest to declare.

This manuscript is being submitted as an Original Investigation.

Social Media use by Cardiovascular Healthcare Professionals in Portugal

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ABSTRACT

Introduction and Objectives:

Social Media (SoMe) has a flourishing role in cardiovascular (CV) medicine as a facilitator of academic communication not only during conferences and congresses, but also by scientific societies and journals. However, there is no solid data portraying the use of SoMe by CV healthcare professionals (CVHP) in Portugal.

Hence, the main goal of this national cross-sectional survey was to accurately characterize SoMe use by Portuguese CVHP.

Methods:

A 35-item questionnaire was specifically developed for this study, approved by the Digital Health Study Group of the Portuguese Society of Cardiology (SPC), and sent, by e-mail, to the mailing list of the SPC (including 1293 potential recipients).

Results and Conclusion:

There were 206 valid answers. Fifty-two percent of respondents were female and 58% were younger than 44 years of age with almost 2 out of 3 participants being medical doctors. Ninety-two percent of the survey participants reported that they are currently using SoMe and LinkedIn was the most common platform used with professional purpose. Sixty-four percent believed SoMe had had a positive impact in their clinical practice; 77% and 49% had used SoMe for acquiring and sharing information related to COVID-19, respectively.

In conclusion, the majority of Portuguese CVHP that participated in this survey are actively using SoMe, with a greater participation of those below 45 years of age; its clinical impact is positive, with a leading role in the dissemination of evidence during the COVID pandemic.

KEYWORDS: Digital Health, Social Media, Cardiovascular Medicine, Cardiovascular Research, e-Cardiology, Virtual Communities, Cardiovascular Healthcare Professionals, COVID-19, Cross-sectional Survey

INTRODUCTION

Cardiovascular (CV) medicine is in constant evolution, and the role of scientific knowledge dissemination in its past, present, and future is undeniable. Throughout centuries, this diffusion occurred mainly by two essential vectors: scientific journals and in-person congresses. ¹The continuous development of digital communication technologies, illustrated by the explosion of social media (SoMe), fractured this ancestral paradigm by allowing the establishment of virtual communities. ^{2,3} As a result, SoMe has a flourishing role in CV clinical practice.

To begin with, the discussion of scientific content presented in congresses, written in guidelines, or published in journals has never been this easy. In fact, this online discussion by means of SoMe is immediate, global, does not require any type of paid subscription, and is accessible to CV healthcare professionals (CVHP) anywhere and at any time. ^{4,5} Consequently, the academic debate is in constant eruption, quickly spreading to a larger number of participants in every corner of the globe, when compared to more traditional methods of communication. The discussion generated around the ORBITA, ISCHEMIA and FAME trials is a good example¹. It included thousands of online posts and allowed to question details concerning the protocol of these trials with a much more profound degree of minutiae that would be possible not only in the conferences where these trials were presented, but also resorting to more traditional methods of scientific literature. ^{1,6}

On the other hand, and from an academic point of view, there is a burgeoning tendency for the use of SoMe, specifically Twitter, as an auxiliary tool for the education of young cardiologists. ⁷ There has been a gradual expansion of the concept of “#FOAMed” (*free open-access medical education*) and “#FITSurvivalGuide” (*fellows-in-training survival guide*), which consists of sharing a group of educational tweets related to a particular CV topic, using the earlier-cited hashtags. ⁵ This conversation, which is open to and empowered by CVHP from all backgrounds and with different levels of medical education, allows for a real-time online symposium of hot CV topics.

The use of SoMe in CV clinical practice has also shown great significance regarding the academic communication not only during conferences and congresses, but also by scientific societies and journals^{8,9}. It has been suggested that the online promotion of CV conferences and congresses using an event-specific hashtag encourages the communication and content-sharing between its participants. ¹⁰ Besides that, and being the impact factor an imperfect metric ¹¹, the concept of Altmetric Attention Score (AAS), which is a metric automatically calculated by the attention that an article receives online, has been used as a tool to measure the impact and the performance of that same article in SoMe platforms, media, blogs and podcasts. ^{8,12} Furthermore, it has also been demonstrated that the mention of an article in SoMe leads to an increase in its number of downloads, in-page views ¹³, and possibly its citations.

OBJECTIVES

Despite the crucial role that SoMe plays on contemporary CV clinical practice, there is no solid data portraying the use of SoMe by CVHP in Portugal. Hence, the main goal of this national cross-sectional survey was to accurately characterize SoMe use by Portuguese CVHP, describing which SoMe platforms are used the most by CVHP, how much time do they spent on them, what are the reasons for their use and, also, what is the type of content that CVHP want to acquire and share while using SoMe. In addition, as a secondary objective, the impact of the COVID-19 pandemic in CVHP SoMe habits was also evaluated.

METHODS

A 35-item open questionnaire (available as a Supplementary file), divided in three parts, was specifically developed in Portuguese language for this national cross-sectional study, inspired by questionnaires with similar objectives from different medical specialties¹⁴⁻¹⁶, following the guidelines for designing questionnaires^{17,18} and Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines ¹⁹. The first part, concerning the overall use of SoMe by CVHP, had 18 items related to: the overall pattern of SoMe use; the preferred SoMe platforms; the main reasons for its use; the type of information intended to acquire and share; the clinical impact of SoMe use and the hesitations for not using SoMe. The second part encompassed 7 items which focused on SoMe use during the COVID-19 pandemic, such as: alterations in the pattern of SoMe use; its use for searching

and sharing information about COVID-19; and its use for contacting patients. The last part had questions about the demographic data of the questionnaire participants, namely: their profession, level of medical education, medical specialty, age, gender, workplace, and geographical location of the workplace.

The questionnaire was approved by the Digital Health Study Group of the Portuguese Society of Cardiology (SPC). Informed consent was provided in the first page of the questionnaire. Following its approval, the questionnaire was transposed to a Google Forms webpage and sent, by e-mail, to the mailing list of the SPC. The mailing list of the SPC was a good sample of the target audience for this questionnaire, with 1293 potential recipients, who corresponded to Portuguese CVHP and SPC members, such as: doctors, nurses, technicians, and researchers. The questionnaire was available online and collecting answers anonymously and voluntarily from the 5th of April of 2021 until the 28th of April of 2021. No financial compensation was provided for answering it. Every item of the questionnaire needed to be answered for it to be submitted, and, therefore, there were no missing values. Results were presented using descriptive statistics.

RESULTS

There were 206 valid answers (survey response rate of 16%), 65.0% from medical doctors, 17.0% from nurses, 16.0% technicians and 1.9% researchers (*Table 1*). Fifty-two percent of respondents were female and 58% were younger than 44 years of age (age distribution: 28.2% between 25-34 years; 29.6% between 35-44 years; 16.0% between 45-54 years; 16.5% between 55-64 years; 6.3% between 65-74 years; 3.4% aged 75 years or older) (*Table 1*). Cardiology was the medical specialty with the most participants (56.3%), followed by internal medicine (3.4%) and cardiac surgery (2.4%) (*Table 1*). Most of the participants were specialists (56.8%) and 8.2% were residents. The majority of CVHP worked in a public hospital or national health service (54.4%) and in the seaside (88.8%) (*Table 1*).

Of the 206 survey participants, 92.2% reported that they were currently using SoMe (*Table 1*), and most spent less than 1 hour per day on SoMe, both for professional and personal use (70.9% and 64.1%, respectively) (*Figure 1*). On the other hand, regarding the number of posts shared on SoMe for professional use, 39% reported having shared at least 1 post in the week before survey completion (*Figure 2*) and approximately 34% of CVHP have utilized SoMe for sharing content during a CV conference or congress (*Figure 3*).

Facebook and *YouTube* were the SoMe platforms mostly used by CVHP for personal use (78.6% and 74.8%, respectively), and *LinkedIn* (51.5%), *Facebook* (41.7%), and *ResearchGate* (38.8%) were the ones mostly used for professional use (*Table 2*). Although *Podcasts* were not, *per se*, a SoMe platform, 31.5% of participants were listening to them with a personal purpose and 20.9% with a professional purpose. More than 80% of the survey participants used SoMe with an intention to acquire information about conferences and congresses (85.9%), links to scientific articles (83.5%), updates in cardiology (81.1%) and information about CV research (80.1%) (*Table 3*). Adding information about guidelines, these also made the top 5 of the type of information CVHP intended to share the most whilst using SoMe (*Table 3*). Heart failure and myocardial infarction were the most searched (70.9%) and shared (42.7% and 47.1%, respectively) CV topics on SoMe. (*Table 4*).

Personal academic development (77.7%) and interacting with colleagues and other professionals of the cardiology field (73.8%) were the principal reasons appointed by CVHP for using SoMe professionally (*Table 5*). Only 12.6% of CVHP contemplated interacting with patients as reason for its use (*Table 5*). Concerning the clinical impact of SoMe use, 64.1% of participants believed that the information acquired through SoMe had had a positive impact in their clinical practice. In addition, 40.8% believed it had changed their therapeutic decision regarding a specific patient and more than 30% believed that this method of communication had changed both their CV prevention strategy regarding a specific patient (35.0%) and their decision to perform an interventional procedure (33.0%) (*Table 6*).

Regarding the hesitations for not using SoMe professionally, 58.7% presented concerns related to privacy and cybersecurity, 55.3% described the lack of time as a limiting factor, and close to 50% expressed a preference for more traditional methods of communication (*Table 7*).

Table 1 - Demographic data of the survey participants

		Total	Age					
			25-34	35-44	45-54	55-64	65-74	>75
Use SoMe	Yes	206 (100)	58 (28.2)	61 (29.6)	33 (16.0)	34 (16.5)	13 (6.3)	7 (3.4)
	No	190 (92.2)	56 (96.6)	59 (96.7)	32 (97.0)	26 (76.5)	12 (92.3)	5 (71.4)
	Not yet, but intend to	12 (5.8)	0 (0)	1 (1.6)	1 (3.0)	7 (20.6)	1 (7.7)	2 (28.6)
	Used in the past, but stopped	1 (0.5)	1 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gender	Female	3 (1.5)	1 (1.7)	1 (1.6)	0 (0)	1 (2.9)	0 (0)	0 (0)
	Male	3 (1.5)	1 (1.7)	1 (1.6)	0 (0)	1 (2.9)	0 (0)	0 (0)
Profession	Medical Doctor	107 (51.9)	34 (58.6)	38 (62.3)	17 (51.5)	15 (44.1)	2 (15.4)	1 (14.3)
	Nurse	99 (48.1)	24 (41.4)	23 (37.7)	16 (48.5)	19 (55.9)	11 (84.6)	6 (85.7)
	Technician	134 (65.0)	34 (58.6)	32 (52.5)	18 (54.5)	30 (88.2)	13 (100)	7 (100)
	Researcher	35 (17.0)	8 (13.8)	19 (31.1)	5 (15.2)	3(8.8)	0 (0)	0 (0)
Medical Training	Specialist	33 (16.0)	12 (20.7)	10 (16.4)	10 (30.3)	1 (2.9)	0 (0)	0 (0)
	Medical Specialty Intern	4 (1.9)	4 (6.9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Not Applicable	117 (56.8)	14 (24.1)	34 (55.7)	18 (54.5)	31 (91.2)	13 (100)	7 (100)
Medical Specialty	Cardiology	17 (8.2)	17 (29.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Cardiac Surgery	72 (35.0)	27 (46.6)	27 (44.3)	15 (45.5)	3 (8.8)	0 (0)	0 (0)
	Paediatric Cardiology	116 (56.3)	34 (58.6)	22 (36.1)	17 (51.5)	27 (79.4)	11 (84.8)	5 (71.4)
	Internal Medicine	5 (2.4)	1 (1.7)	2 (3.3)	1 (3.0)	1 (2.9)	0 (0)	0 (0)
	Endocrinology	3 (1.5)	0 (0)	2 (3.3)	0 (0)	0 (0)	1 (7.7)	0 (0)
	Neurology	7 (3.4)	0 (0)	4 (6.6)	0 (0)	2 (5.9)	0 (0)	1 (14.3)
	Not Applicable	2 (1.0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (7.7)	1 (14.3)
Workplace	Public Hospital National Health Service	1 (0.5)	0 (0)	1 (1.6)	0 (0)	0 (0)	0 (0)	0 (0)
	Private Hospital Private Practice	72 (35.0)	23 (40.0)	30 (49.2)	15 (45.5)	4 (11.8)	0 (0)	0 (0)
	Both	112 (54.4)	40 (69.0)	38 (62.3)	20 (60.6)	12 (35.3)	1 (7.7)	1 (14.3)
	Do Not Know / Do Not Answer	34 (16.5)	4 (6.9)	3 (4.9)	2 (6.1)	11 (32.4)	9 (69.2)	5 (71.4)
Geographical Location	Seaside	56 (27.2)	13 (22.4)	20 (32.8)	9 (27.3)	11 (32.4)	3 (23.1)	0 (0)
	Countryside	4 (2.0)	1 (1.7)	0 (0)	2 (6.1)	0 (0)	0 (0)	1 (14.3)
	Do Not Know / Do Not Answer	183 (88.8)	51 (87.9)	55 (90.2)	31 (94.0)	28 (82.4)	12 (92.3)	6 (85.7)
		20 (9.7)	6 (10.3)	5 (8.2)	2 (6.1)	6 (17.6)	1 (7.7)	0 (0)
		3 (1.5)	1 (1.7)	1 (1.6)	0 (0)	0 (0)	0 (0)	1 (14.3)

Results presented as: No. Participants (%)

Table 2 – Social media platforms used by cardiovascular healthcare professionals

	Which of the following SoMe platforms do you use for professional use?			Which of the following SoMe platforms do you use for personal use?		
	Yes	No	DNK ^a	Yes	No	DNK ^a
LinkedIn	106 (51.5)	97 (47.1)	3 (1.4)	107 (51.9)	97 (47.1)	2 (1.0)
Facebook	86 (41.7)	119 (57.8)	1 (0.5)	162 (78.6)	44 (21.4)	0 (0)
Research Gate	80 (38.8)	95 (46.1)	31 (15.1)	62 (30.0)	105 (51.0)	39 (19.0)
Twitter	70 (34.0)	135 (65.1)	1 (0.5)	66 (32.0)	138 (67.0)	2 (1.0)
YouTube	68 (33.0)	137 (66.5)	1 (0.5)	154 (74.8)	52 (25.2)	0 (0)
Podcasts	43 (20.9)	134 (65.0)	29 (14.1)	65 (31.5)	111 (53.9)	30 (14.6)
Instagram	24 (11.6)	180 (87.4)	2 (1.0)	109 (52.9)	96 (46.6)	1 (0.5)
Snapchat	2 (1.0)	168 (81.5)	36 (17.5)	8 (3.9)	159 (77.2)	39 (18.9)
Pinterest	2 (1.0)	178 (86.4)	26 (12.6)	51 (24.7)	131 (63.6)	24 (11.7)
Flipboard	1 (0.5)	133 (64.5)	72 (35.0)	4 (1.9)	115 (55.9)	87 (42.2)
Reddit	1 (0.5)	131 (63.6)	74 (35.9)	8 (3.9)	116 (56.3)	82 (39.8)
Clubhouse	1 (0.5)	129 (62.6)	76 (36.9)	5 (2.4)	116 (56.3)	85 (41.3)
Quora	0 (0)	119 (57.8)	87 (42.2)	4 (1.9)	104 (50.5)	98 (47.6)

Results presented as: No. Participants (%)

^a Do not know

Table 3 – Social media content

	Type of information intended to acquire			Type of information intended to share		
	Yes	No	DNK ^a	Yes	No	DNK ^a
Information about conferences and congresses	177 (85.9)	26 (12.6)	3 (1.5)	126 (61.2)	69 (33.5)	11 (5.3)
Links to scientific articles	172 (83.5)	31 (15.1)	3 (1.5)	131 (63.4)	65 (31.6)	10 (4.9)
Updates in cardiology	167 (81.1)	35 (17.0)	4 (1.9)	99 (48.1)	94 (45.6)	13 (6.3)
Information about cardiovascular research	165 (80.1)	35 (17.0)	6 (2.9)	115 (55.8)	75 (36.4)	16 (7.8)
Information about guidelines	153 (74.3)	50 (24.3)	3 (1.5)	89 (43.2)	107 (51.9)	10 (4.9)
Information about treatment options and interventional procedures	153 (74.3)	49 (23.8)	4 (1.9)	5 (2.4)	5 (2.4)	5 (2.4)
Information about cardiovascular prevention policies	139 (67.5)	61 (29.6)	6 (2.9)	85 (41.3)	108 (52.4)	13 (6.3)
Discussions about clinical cases	138 (67.0)	64 (31.1)	4 (1.9)	87 (42.2)	109 (52.9)	10 (4.9)
Updates in other medical fields	128 (62.1)	73 (35.4)	5 (2.4)	57 (27.7)	136 (66.0)	13 (6.3)
Job Opportunities	66 (32.0)	134 (65.1)	6 (2.9)	5 (2.4)	5 (2.4)	5 (2.4)
Questions regarding the treatment of a specific patient	5 (2.4)	5 (2.4)	5 (2.4)	62 (30.1)	129 (62.6)	15 (7.3)

Results presented as: No. Participants (%)

^a Do not know / Do not answer

^b This question was not present in the questionnaire

Table 4 – Cardiovascular terms on social media

	Searched information about this CV term			Shared information about this CV term		
	Yes	No	DNK ^a	Yes	No	DNK ^a
Myocardial Infarction	146 (70.9)	59 (28.6)	1 (0.5)	97 (47.1)	107 (51.9)	2 (1.0)
Heart Failure	146 (70.9)	60 (29.1)	0 (0)	88 (42.7)	115 (55.8)	3 (1.5)
Cardiac Arrest	117 (56.8)	87 (42.2)	2 (1.0)	56 (27.2)	145 (70.4)	5 (2.4)
Diabetes Mellitus	108 (52.4)	94 (45.6)	4 (1.9)	41 (19.9)	162 (78.6)	3 (1.5)
Arterial Hypertension	103 (50.0)	101 (49.0)	2 (1.0)	47 (22.8)	155 (75.2)	4 (1.9)

Results presented as: No. Participants (%)

^a Do not know / Do not answer

Table 5 - Reasons for using social media in a professional context

	Reasons for using SoMe		
	Yes	No	DNK ^a
Personal academic development	160 (77.7)	43 (20.9)	3 (1.5)
Interacting with colleagues and other professionals of the cardiology field	152 (73.8)	49 (23.8)	5 (2.4)
Interacting with colleagues and other professionals of other medical specialties	113 (54.9)	87 (42.2)	6 (2.9)
Leadership and healthcare management skills development	65 (31.6)	133 (64.6)	8 (3.9)
Interacting with patients	26 (12.6)	174 (84.5)	6 (2.9)

Results presented as: No. Participants (%)

^a Do not know / Do not answer

Table 6 - Clinical impact of social media use

	Yes	No	DNK ^a
Do you believe that the information acquired through SoMe has had a positive impact in your clinical practice?	132 (64.1)	57 (27.7)	17 (8.3)
Do you believe that the information acquired through SoMe has changed your therapeutic decision regarding a specific patient?	84 (40.8)	93 (45.2)	29 (14.1)
Do you believe that the information acquired through SoMe has changed your cardiovascular prevention strategy regarding a specific patient?	72 (35.0)	104 (50.5)	30 (14.6)
Do you believe that the information acquired through SoMe has changed your decision to perform an interventional procedure?	68 (33.0)	112 (54.4)	26 (12.6)

Results presented as: No. Participants (%)

^a Do not know / Do not answer

Table 7 – Social media use hesitations

	Hesitations for not using SoMe professionally		
	Yes	No	DNK ^a
Concerns related to privacy and cybersecurity	121 (58.7)	81 (39.3)	4 (1.9)
Lack of time	114 (55.3)	86 (41.8)	6 (2.9)
Preference for more traditional methods of communication	104 (50.5)	91 (44.2)	11 (5.3)
Do not want to interact with other colleagues and professionals online	28 (13.6)	169 (82.0)	9 (4.4)

Results presented as: No. Participants (%)

^a Do Not Know / Do Not Answer

Table 8 – Social media use during the COVID-19 pandemic

	Yes	No	DNK**
Have you used SoMe for acquiring information related to the COVID-19 disease?	159 (77.2)	45 (21.8)	2 (1.0)
Have you used SoMe for sharing information related to the COVID-19 disease?	101 (49.0)	103 (50.0)	2 (1.0)
Have you used SoMe for acquiring information related to the cardiovascular complications of the COVID-19 disease?	139 (67.5)	64 (31.1)	3 (1.5)
During the COVID-19 pandemic have you used SoMe for contacting a patient?	26 (12.6)	177 (85.9)	3 (1.5)
Before the COVID-19 pandemic had you previously used SoMe for contacting a patient?	21 (10.2)	180 (87.4)	5 (2.4)

Results presented as: No. Participants (%)

^a Do Not Know / Do Not Answer

The COVID-19 pandemic has also affected the way CVHP communicate with each other by means of SoMe. In fact, 59% of the participants referred an increase in the time spent on SoMe for personal use during the pandemic, and 51% mentioned an increase in the time spent for professional use (*Figure 4*). Furthermore, 77% and 49% suggested having used SoMe for acquiring and sharing information related to COVID-19, respectively (*Table 8*). More specifically, 67.5% of CVHP used SoMe for searching information related to the CV complications of COVID-19 (*Table 8*).

DISCUSSION

This is the first survey focused on describing and characterizing social media use by CV healthcare professionals in Portugal. Overall, the majority of Portuguese CVHP that participated in this survey are actively using SoMe, mostly LinkedIn and Facebook, with a greater participation of those below 45 years of age. Whilst LinkedIn, Facebook and Research Gate were the SoMe platforms mostly used for professional use (51.5%; 41.7% and 38.8%, respectively), Facebook, YouTube and Instagram (78.6%; 74.8% and 52.9%, respectively) were the main ones used for personal use (*Table 2*). Interestingly, Twitter was only in the fourth position of the most used social media platforms for professional use (34.0%). We emphasize that this platform is the main focus of the European Society of Cardiology social media activities, as detailed in a recently published review article²⁰. Therefore, we suggest its widely adoption as one of the preferred social media platforms for medical education and research dissemination.

The results of our national cross-sectional survey suggest that the Portuguese CVHP were, at the moment of the questionnaire completion, using SoMe in the same or even slightly higher proportion than the majority of international healthcare providers^{20, 21} and for a similar time period, per day.²¹ As for the SoMe platforms used, there is a relative underutilization of Twitter for professional use when compared to other international healthcare professionals^{7, 14, 20, 22}, which might be explained by the overall low use of Twitter in Portugal.²³ In fact, according to a recent review, Twitter appears to be the SoMe platform most adequate for professional use and that is supported by international scientific societies.^{10, 20, 24} LinkedIn and Facebook were the main services used with a professional intention, as it was the case of two similar cross-sectional studies reporting the SoMe use patterns by Oncology and Neurosurgery professionals, respectively.^{14, 15}

Most of the participants considered that the information acquired through SoMe had had a positive impact in their clinical practice, visibly illustrating the influence of SoMe in current Portuguese CV medicine. Indeed, SoMe is nowadays regarded as a channel of communication for medical education and research dissemination, therefore of meaningful value for clinical practice, with striking examples of cardiological procedures that were amplified through SoMe (especially Twitter), more evident in the electrophysiology and interventional cardiology subspecialties^{20, 25, 26}. In spite of this, although the majority of the participants reported that information acquired through SoMe had had a positive impact in their clinical practice, less than half reported changes in terms of the approach to specific cases or the application of interventional procedures (35.0% and 33.0%, respectively). Several factors may contribute to this and represent some of the concerns regarding SoMe²⁰, probably topped by the fear of inaccurate or biased information that could lead to medical malpractice.

The importance of SoMe in CV academia and research is undeniable.²⁰ Our results support this role, showing that personal academic development and interaction with colleagues of the cardiology field were the principal reasons for using SoMe. This is likewise accentuated by the top 4 topics of information intended to be acquired by Portuguese CVHP, namely information about conferences and congresses, links to scientific articles, updates in cardiology and information about CV research. There is an increasing interest on the role of SoMe platforms and especially Twitter on the academic community, with some evidence suggesting that mentioning an article in Twitter, compared to other SoMe platforms, has the highest correlation with the number of downloads of that same article.¹² Another example of this importance is the controversy launched on Twitter about the His-bundle pacing. Curiously, in 2019, Beer *et al* showed a positive association between the impressions (tweets x number of followers) with the hashtag “#dontdisthehis” and the number of pacing procedures using the His-bundle.

25

From a purely clinical prism, almost two-thirds of respondents considered that the information acquired through SoMe had had a positive impact in their clinical practice. This is a meaningful number describing the importance of SoMe for Portuguese CVHP. Adding to this, we can also stress the high proportion of CVHP using

SoMe for actively searching and sharing information about COVID-19 and the overall increase in SoMe use during that same period, as it was the case reported by other healthcare professionals in other countries²⁷⁻³⁰. As an example, in a cross-sectional survey done in Italy during the COVID-19 pandemic²⁷, Murry *et al.* reported that 47% of the respondents stated that information shared on SoMe had a consistent impact on their daily clinical practice. This is a lower proportion in comparison with our results, but the study was focused on COVID-19 pandemic and therefore the fear of misinformation could partially account for it.

The limitations of our study arise from the fact of, being an online survey, the people who ended up participating might be more prone to using digital communication technologies, including SoMe. Thus, our results about SoMe use can be somewhat overestimated. In fact, more than half of participants reported concerns related to privacy and cybersecurity has a hesitation for using SoMe, therefore choosing more traditional methods of communication. These results highlight the potential downsides of SoMe utilization by healthcare professionals, such as the non-professional use of SoMe platforms, the danger of breaching confidentiality and threatening patient-physician relationship, privacy concerns and the concept of “filter bubble” (concept described by Pariser in 2010 describing the context where users are preferentially offered articles and posts to support their current opinions and perspectives, based on past searches, click behaviour and location) and the fear of inaccurate or biased information²⁰. In addition, this was a survey conducted in Portugal and, hence, our results cannot be directly extrapolated to other countries.

CONCLUSION

In conclusion, our results support the clinical and academic importance of SoMe use by CVHP in Portugal. The majority of Portuguese CVHP that participated in this survey are actively using SoMe and the opinion regarding its impact in clinical practice is positive. The Portuguese community of healthcare professionals dedicated to CV care should increasingly and responsibly use social media platforms (especially Twitter), following the trend of most international societies, with the goal of improving communication and dissemination of information and eventually lead to better patient care.

ACKNOWLEDGEMENTS

The authors would like to acknowledge all the Portuguese CVHP who answered the questionnaire for making this survey possible. There are no conflicts of interest to declare.

FIGURES / LEGENDS

Take Home Figure:

Social Media (SoMe) use by Cardiovascular Healthcare Professionals (CVHP) in Portugal

Introduction and Objectives

Social Media (SoMe) has a flourishing role in cardiovascular medicine.

The main goal was to characterize SoMe use by Portuguese cardiovascular healthcare professionals and the COVID-19 impact on those SoMe habits.

Methods

- National cross-sectional survey.
- 35-item questionnaire.
- Mailing list of the Sociedade Portuguesa de Cardiologia, including 1393 recipients.

Results and Conclusion

64% believe information acquired on SoMe had had a positive impact in their clinical practice.

41% believe SoMe use had changed their therapeutic decision regarding a specific patient.

77% used SoMe for acquiring information related to COVID-19, and **49%** for actively sharing so.



LinkedIn was the most used SoMe platform with a professional purpose.

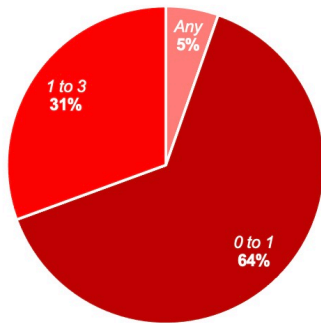
92% of the survey participants reported that they are currently using SoMe, and **71%** spend between 0 to 1 hours per day on SoMe for professional use.

35% stated that SoMe had changed their cardiovascular prevention strategy and **33%** their decision to perform an interventional procedure.

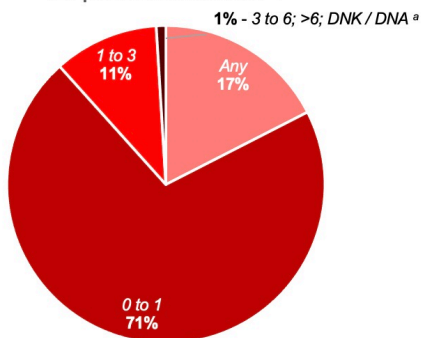
Figure 1

Time spent on social media

How many hours per day do you spend on SoMe for personal use ?



How many hours per day do you spend on SoMe for professional use ?

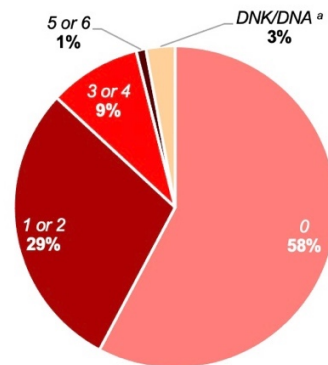


^a DNK/DNA – Do not know / Do not answer

Figure 2

Number of social media posts shared for professional use

Last week, how many posts did you share on SoMe for professional use ?

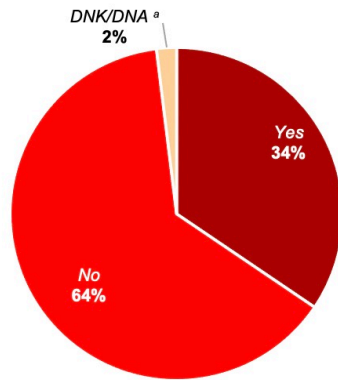


^a DNK/DNA – Do not know / Do not answer

Figure 3

In-conference social media use

Have you used SoMe for sharing content during a CV conference or congress ?

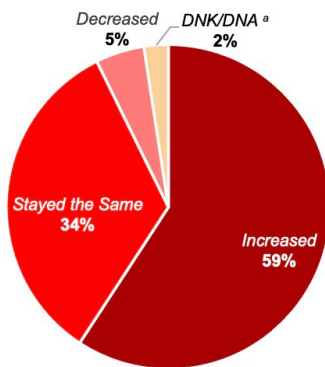


^a DNK/DNA – Do not know / Do not answer

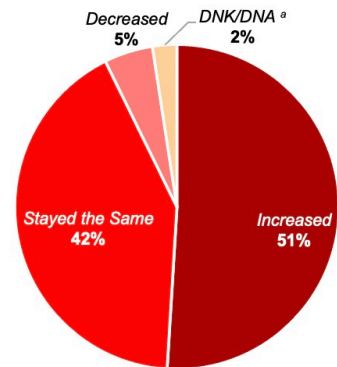
Figure 4

Time spent on social media during the COVID-19 pandemic

During the COVID-19 pandemic, the amount of time that you spent on SoMe for personal use:



During the COVID-19 pandemic, the amount of time that you spent on SoMe for professional use:



^a DNK/DNA – Do not know / Do not answer

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As Redes Sociais ao serviço dos profissionais de saúde cardiovascular em Portugal: Um retrato da atualidade em 2021

O presente questionário, apoiado pelo Grupo de Estudo de Saúde Digital da Sociedade Portuguesa de Cardiologia e desenvolvido em colaboração com o estudante Miguel Esteves Pereira da Faculdade de Medicina da Universidade do Porto, enquadra-se num projeto que visa retratar e caracterizar a utilização de Redes Sociais (ReSo) pelos Profissionais de Saúde Cardiovascular (PSCV) em Portugal.

Deste modo, apela-se à participação neste estudo preenchendo este breve questionário, cujo tempo expectável de resposta é inferior a 5 minutos. Todas as respostas serão submetidas de forma anónima e confidencial.

A participação neste estudo não implica qualquer consequência negativa ou benefícios para os envolvidos. O presente estudo não dispõe de qualquer financiamento, sendo o seu intuito meramente científico, não havendo remunerações ou conflitos de interesse.

O seu contributo é de essencial importância para o sucesso do estudo.

***Required**

Consentimento Informado

1. Aceita participar neste questionário, autorizando, para tal, a recolha e tratamento dos dados por ele aferidos? *

Mark only one oval.

- Sim *Skip to question 2*
- Não *Skip to section 6 (Conclusão)*

Utilização de Redes Sociais (ReSo)

2. Utiliza atualmente Redes Sociais (ReSo)? *

Mark only one oval.

- Sim
- Não
- Ainda não, mas tenciono utilizar
- Já utilizei, mas deixei de utilizar
- Não sei / Não respondo

3. Quais das seguintes ReSo utiliza para uso pessoal? *

Mark only one oval per row.

	Sim	Não	Não conheço
Facebook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instagram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Youtube	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LinkedIn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research Gate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snapchat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pinterest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flipboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reddit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quora	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Podcasts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clubhouse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Quantas horas passa, por dia, em ReSo para uso pessoal? *

Mark only one oval.

- Nenhuma
- 0 a 1
- 1 a 3
- 3 a 6
- Mais do que 6
- Não sei / Não respondo

5. Quais das seguintes ReSo utiliza para uso profissional? *

Mark only one oval per row.

	Sim	Não	Não conheço
Facebook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instagram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Youtube	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LinkedIn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research Gate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snapchat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pinterest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flipboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reddit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quora	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Podcasts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clubhouse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Quantas horas passa, por dia, em ReSo para uso profissional? *

Mark only one oval.

- Nenhuma
- 0 a 1
- 1 a 3
- 3 a 6
- Mais do que 6
- Não sei / Não respondo

7. Em média, com que regularidade partilha conteúdos em ReSo para uso profissional? *

Mark only one oval.

- Várias vezes por dia
- Diariamente
- Semanalmente
- Mensalmente
- Anualmente
- Não partilho conteúdos em ReSo para uso profissional
- Não sei / Não respondo

8. Na última semana, quantas publicações partilhou em ReSo para uso profissional? *

Mark only one oval.

- Mais do que 8
- 7 ou 8
- 5 ou 6
- 3 ou 4
- 1 ou 2
- 0
- Não sei / Não respondo

9. Quais as razões para utilizar ReSo na sua vida profissional? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Interagir com profissionais e colegas da área da cardiologia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interagir com profissionais e colegas de outras especialidades médicas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interagir com pacientes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Formação académica pessoal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desenvolvimento de competências de liderança e gestão em saúde	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Se tiver outra razão, que não as supra-referidas, escreva aqui por favor:

11. Que tipo de informação pretende obter através do uso profissional de ReSo? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Informação sobre investigação Cardiovascular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Links para artigos científicos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informação sobre conferências e congressos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussão de casos clínicos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informação sobre opções de tratamento/procedimentos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informação sobre guidelines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informação sobre políticas de prevenção cardiovascular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updates em Cardiologia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updates noutras áreas da medicina	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oportunidades de emprego	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Se tiver outro tipo de informação, que não os supra-referidos, escreva aqui por favor:

13. Que tipo de informação pretende partilhar através do uso profissional de ReSo? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Partilhar informação sobre investigação Cardiovascular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar links para artigos científicos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar Informação sobre conferências e congressos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar casos clínicos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar dúvidas em relação ao tratamento de um determinado paciente	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar conteúdos de guidelines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar políticas de prevenção cardiovascular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar updates em cardiologia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partilhar updates noutras áreas da medicina	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Se tiver outro tipo de informação, que não os supra-referidos, escreva aqui por favor:

15. Já consultou conteúdos sobre os seguintes temas CV nas ReSo? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Enfarte Agudo do Miocárdio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diabetes Mellitus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hipertensão Arterial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paragem Cardíaca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insuficiência Cardíaca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Já partilhou conteúdos sobre os seguintes temas CV nas ReSo? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Enfarte Agudo do miocárdio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diabetes Mellitus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hipertensão Arterial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Paragem Cardíaca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insuficiência Cardíaca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Já utilizou as ReSo para partilhar conteúdo CV durante um congresso ou conferência científica? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Quais são as suas hesitações/restrições em relação ao uso profissional de ReSo? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Falta de tempo para utilizar ReSo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Falta de interesse em interagir com colegas e profissionais por via on-line	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preocupações relacionadas com a privacidade e cibersegurança	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preferência por meios de comunicação mais tradicionais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Se tiver outro tipo de hesitação/restrrição, que não as supra-referidas, escreva aqui por favor:

20. Sente que a informação obtida através de ReSo já teve impacto na sua prática clínica? *

Mark only one oval.

- Sim
 Não
 Não sei / Não respondo

21. Sente que a informação obtida através de ReSo já alterou a sua decisão terapêutica em relação a um determinado doente? *

Mark only one oval.

- Sim
 Não
 Não sei / Não respondo

22. Sente que a informação obtida através de ReSo já alterou a sua estratégia de prevenção cardiovascular em relação a um determinado doente? *

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

23. Sente que a informação obtida através de ReSo já alterou a sua decisão de optar ou não por um determinado procedimento interventivo? *

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

Utilização de ReSo durante a pandemia de Covid-19

24. Durante a pandemia de Covid-19 o seu período de tempo despendido em ReSo para uso pessoal? *

Mark only one oval.

- Aumentou
- Diminuiu
- Manteve-se
- Não sei / Não respondo

25. Durante a pandemia de Covid-19 o seu período de tempo despendido em ReSo para uso profissional? *

Mark only one oval.

- Aumentou
- Diminuiu
- Manteve-se
- Não sei / Não respondo

26. Utilizou as ReSo para consultar conteúdos relacionados com a doença Covid-19? *

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

27. Utilizou as ReSo para partilhar conteúdos relacionados com a doença Covid-19? *

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

28. Utilizou as ReSo para consultar informação relativa às implicações Cardiovasculares da doença Covid- 19? *

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

29. Durante o período de pandemia de Covid-19, utilizou as ReSo para contactar algum doent

*

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

30. Previamente ao período de pandemia de Covid-19, já tinha utilizado as ReSo para contact algum doente? *

Mark only one oval.

- Sim
- Não
- Não sei / Não respondo

Dados Demográficos

31. Profissão: *

Mark only one oval.

- Médico *
- Investigador
- Enfermeiro
- Cardiopneumologista
- Estudante de medicina
- Other: _____

32. * Nível de formação em medicina: *

Mark only one oval.

- Especialista **
- Interno de Formação Específica **
- Interno de Formação Geral
- Médico Indiferenciado
- Não aplicável (caso não tenha respondido "Médico" na pergunta anterior)

33. ** Qual a sua especialidade: *

Mark only one oval.

- Cardiologia
- Cirurgia Cardíaca
- Cardiologia Pediátrica
- Não aplicável (caso não tenha respondido "Especialista" ou "IFE" na pergunta anterior)
- Other: _____

34. Idade: *

Mark only one oval.

- <25
- 25-34
- 35-45
- 45-54
- 55-64
- 65-74
- >75

35. Sexo: *

Mark only one oval.

- Masculino
 Feminino
 Outro

36. Local de trabalho: *

Mark only one oval.

- Hospital Público / SNS
 Hospital Privado / Clínica Privada
 Ambos
 Não sei / Não respondo

37. Localização geográfica do local de trabalho: *

Mark only one oval.

- Litoral
 Interior
 Não sei / Não respondo

38. É sócio da Sociedade Portuguesa de Cardiologia?

Mark only one oval.

- Sim
 Não
 Não sei / Não respondo

39. Segue as plataformas oficiais da Sociedade Portuguesa de Cardiologia? *

Mark only one oval per row.

	Sim	Não	Não sei / Não respondo
Facebook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instagram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LinkedIn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Conclusão

Agradecemos profundamente a sua participação e, sem dúvida, que esta será crucial para o sucesso de todo projeto.

Por favor carregue "Submeter" para submeter e encerrar este questionário.

Pelo Grupo de Estudo de Saúde Digital da Sociedade Portuguesa de Cardiologia,

Muito obrigado!

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Google Forms

REPORTING GUIDELINES - CHECKLIST

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	8
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	8
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	9
Objectives	3	State specific objectives, including any prespecified hypotheses	9
Methods			
Study design	4	Present key elements of study design early in the paper	9
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	10
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	10
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	9/10
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	----
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	10
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	10
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	10
		(b) Describe any methods used to examine subgroups and interactions	10
		(c) Explain how missing data were addressed	10
		(d) If applicable, describe analytical methods taking account of sampling strategy	10
		(e) Describe any sensitivity analyses	10
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	10
		(b) Give reasons for non-participation at each stage	----
		(c) Consider use of a flow diagram	----
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10
		(b) Indicate number of participants with missing data for each variable of interest	10
Outcome data	15*	Report numbers of outcome events or summary measures	10
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	----

		(b) Report category boundaries when continuous variables were categorized	----
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	----
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	----
Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	15
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15
Generalisability	21	Discuss the generalisability (external validity) of the study results	15
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	15

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

REPORTING GUIDELINES - EXAMPLES

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

1 - *“Hence, the main goal of this national cross-sectional survey was to accurately characterize SoMe use by Portuguese CVHP. In conclusion, the majority of Portuguese CVHP that participated in this survey are actively using SoMe, with a greater participation of those below 45 years of age; its clinical impact is positive, with a leading role in the dissemination of evidence during the COVID pandemic.”*

2 - *“Despite the crucial role that SoMe plays on contemporary CV clinical practice, there is no solid data portraying the use of SoMe by CVHP in Portugal.”*

3 - *“Hence, the main goal of this national cross-sectional survey was to accurately characterize SoMe use by Portuguese CVHP, describing which SoMe platforms are used the most by CVHP, how much time do they spent on them, what are the reasons for their use and, also, what is the type of content that CVHP want to acquire and share while using SoMe. In addition, as a secondary objective, the impact of the COVID-19 pandemic in CVHP SoMe habits was also evaluated.”*

4 - *“A 35-item open questionnaire (available as a Supplementary file), divided in three parts, was specifically developed in Portuguese language for this national cross-sectional study, inspired by questionnaires with similar objectives from different medical specialties¹⁴⁻¹⁶, following the guidelines for designing questionnaires^{17, 18} and Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines¹⁹. ”*

5 - *“The questionnaire was available online and collecting answers anonymously and voluntarily from the 5th of April of 2021 until the 28th of April of 2021.”*

6 - *“The mailing list of the SPC was a good sample of the target audience for this questionnaire, with 1293 potential recipients, who corresponded to Portuguese CVHP and SPC members, such as: doctors, nurses, technicians, and researchers.”*

7 - *“A 35-item open questionnaire (available as a Supplementary file), divided in three parts, was specifically developed in Portuguese language for this national cross-sectional study, inspired by questionnaires with similar objectives from different medical specialties¹⁴⁻¹⁶, following the guidelines for designing questionnaires^{17, 18} and Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines¹⁹. The first part, concerning the overall use of SoMe by CVHP, had 18 items related to: the overall pattern of SoMe use; the preferred SoMe platforms; the main reasons for its use; the type of information intended to acquire and share; the clinical impact of SoMe use and the hesitations for not using SoMe. The second part encompassed 7 items which focused on SoMe use during the COVID-19 pandemic, such as: alterations in the pattern of SoMe use; its use for searching and sharing information about COVID-19; and its use for contacting patients. The last part had questions about the demographic data of the questionnaire participants, namely: their profession, level of medical education, medical specialty, age, gender, workplace, and geographical location of the workplace.”*

8 - *There was only one group, therefore, comparability of assessment methods was not performed.*

9 + 10 - *“The questionnaire was approved by the Digital Health Study Group of the Portuguese Society of Cardiology (SPC). Informed consent was provided in the first page of the questionnaire. Following its approval, the questionnaire was transposed to a Google Forms*

webpage and sent, by e-mail, to the mailing list of the SPC. The mailing list of the SPC was a good sample of the target audience for this questionnaire, with 1293 potential recipients, who corresponded to Portuguese CVHP and SPC members, such as: doctors, nurses, technicians, and researchers.”

11 + 12 - “Results were presented using descriptive statistics.”

13 - “There were 206 valid answers (survey response rate of 16%)”

14 - “Fifty-two percent of respondents were female and 58% were younger than 44 years of age (age distribution: 28.2% between 25-34 years; 29.6% between 35-44 years; 16.0% between 45-54 years; 16.5% between 55-64 years; 6.3% between 65-74 years; 3.4% aged 75 years or older) (Table 1). Cardiology was the medical specialty with the most participants (56.3%), followed by internal medicine (3.4%) and cardiac surgery (2.4%) (Table 1). Most of the participants were specialists (56.8%) and 8.2% were residents. The majority of CVHP worked in a public hospital or national health service (54.4%) and in the seaside (88.8%) (Table 1).”

15 - “Of the 206 survey participants, 92.2% reported that they were currently using SoMe (Table 1), and most spent less than 1 hour per day on SoMe, both for professional and personal use (70.9% and 64.1%, respectively) (Figure 1). On the other hand, regarding the number of posts shared on SoMe for professional use, 39% reported having shared at least 1 post in the week before survey completion (Figure 2) and approximately 34% of CVHP have utilized SoMe for sharing content during a CV conference or congress (Figure 3).”

16 + 17 – Not applicable because only descriptive statistics was performed.

18 - “The results of our national cross-sectional survey suggest that the Portuguese CVHP were, at the moment of the questionnaire completion, using SoMe in the same or even slightly higher proportion than the majority of international healthcare providers^{20, 21} and for a similar time period, per day.²¹ As for the SoMe platforms used, there is a relative underutilization of Twitter for professional use when compared to other international healthcare professionals^{7, 14, 20, 22}, which might be explained by the overall low use of Twitter in Portugal.²³ In fact, according to a recent review, Twitter appears to be the SoMe platform most adequate for professional use and that is supported by international scientific societies.^{10, 20, 24}”

19 - “The limitations of our study arise from the fact of, being an online survey, the people who ended up participating might be more prone to using digital communication technologies, including SoMe. Thus, our results about SoMe use can be somewhat overestimated. In fact, more than half of participants reported concerns related to privacy and cybersecurity has a hesitation for using SoMe, therefore choosing more traditional methods of communication.”

20 + 21 - “These results highlight the potential downsides of SoMe utilization by healthcare professionals, such as the non-professional use of SoMe platforms, the danger of breaching confidentiality and threatening patient-physician relationship, privacy concerns and the concept of “filter bubble” (concept described by Pariser in 2010 describing the context where users are preferentially offered articles and posts to support their current opinions and perspectives, based on past searches, click behaviour and location) and the fear of inaccurate or biased information²⁰. In addition, this was a survey conducted in Portugal and, hence, our results cannot be directly extrapolated to other countries.”

22 - “The authors would like to acknowledge all the Portuguese CVHP who answered the questionnaire for making this survey possible. There are no conflicts of interest to declare.”



Revista Portuguesa de Cardiologia

AUTHORS INFORMATION PACK

GUIDE FOR AUTHORS

INTRODUCTION

The Portuguese Journal of Cardiology, the official journal of the Portuguese Society of Cardiology, was founded in 1982 with the aim of keeping Portuguese cardiologists informed through the publication of scientific articles on areas such as arrhythmology and electrophysiology, cardiovascular surgery, intensive care, coronary artery disease, cardiovascular imaging, hypertension, heart failure and cardiovascular prevention. The Journal is a monthly publication with high standards of quality in terms of scientific content and production. Since 1999 it has been published in English as well as Portuguese, which has widened its readership abroad.

Please, take into account that as of January 2021, Revista Portuguesa de Cardiologia will require new article submissions to be written in English language.

The Journal accepts the following categories of articles:

Research (Original Investigation and Meta-Analysis), **Review and Education** (Narrative Reviews, Systematic Reviews -without meta-analysis, Guidelines, Case Reports, Images in Cardiology and Snapshots), **Opinion** (Current Perspective), **Correspondence** (Editorial Comment, Letters to the Editor, Research Letter and Observation)

Types of article

Manuscripts submitted for publication should be prepared in accordance with the "Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals" of the International Committee of Medical Journal Editors (ICMJE). This document is available at <http://www.icmje.org/recommendations/>.

[Summary table](#) of Revista Portuguesa de Cardiologia types of article characteristics.

Original Investigation

Original Investigation articles cover areas of clinical or basic research: Clinical trial, Meta-analysis, Intervention study, Cohort study, Case-control study, Epidemiologic assessment, Survey with high response rate, Cost-effectiveness analysis, Decision analysis, Study of screening and diagnostic tests, Other observational studies). They should have a maximum of 5000 words, with a total of up to 15 tables and/or figures, and should be structured as follows: Abstract (maximum 250 words; divided into Introduction and Objectives, Methods, Results and Conclusion(s)); 3-10 keywords; Introduction; Objectives; Methods; Results; Discussion; Conclusion(s); Acknowledgements, if any; References (up to 75); and figure legends, if any. Follow EQUATOR Reporting Guidelines.

Review Articles and Systematic Reviews

Review Articles should have a maximum of 5000 words, with a total of up to 15 tables and/or figures, and should be structured as follows: Abstract (maximum 250 words; unstructured); 3-10 keywords; Introduction; thematic sections at the discretion of the authors; Conclusion(s); Acknowledgements, if any; References (up to 100); and figure legends, if any.

Systematic Reviews should be structured as Introduction, Methods, Results, Discussion and Conclusion(s). The subject should be clearly defined. The objective of a systematic review should be to produce an evidence-based conclusion. The Methods should give a clear indication of the literature search strategy, data extraction, grading of evidence and analysis.

Systematic Reviews should not normally exceed 4000 words, with a total of up to 6 tables and/or figures and up to 100 references.

Authors are strongly recommended to consult the PRISMA statement (<http://www.prisma-statement.org/>), which is intended to help improve the reporting of systematic reviews and meta-analyses. We encourage authors to develop a systematic review protocol (e.g. following PRISMA-P) and register with PROSPERO.

Guidelines

It is recommended to consult the AGREE II instrument for which items should be reported that highlighted particular quality aspects of guideline development. In general, published statements intended to guide clinical care (e.g., guidelines, practice parameters, recommendations, consensus statements and position papers) should describe the clinical problem to be addressed, the mechanism by which the statement was generated, a review of the evidence for the statement (if available), and the statement on practice itself.

To minimize confusion and to enhance transparency, such statements should begin with the following questions, followed by brief comments addressing each question:

- What other guideline statements are available on this topic?
- Why was this guideline developed?
- How does this statement differ from existing guidelines?
- Why does this statement differ from existing guidelines?

The statement should have an unstructured abstract of up to 350 words, 3 to 10 keywords and can include up to 4000 words, a total of up to 6 tables and/or figures and up to 100 references.

Case Reports

Authors should use the CARE guidelines as a guiding framework. Case reports should not exceed 1500 words of body text, with up to 15 references and four tables or figures. They must include an abstract (unstructured, maximum 250 words) and bulleted statements (maximum 70 words) in answer to the following questions: What's already known about this topic? and What does this study add?

Please see the Ethics section of the Instructions regarding preservation of patients' privacy. Case Reports must have no more than 5 authors.

Images in Cardiology

Images in Cardiology should have a maximum of 250 words, without Abstract, keywords, tables, or division into sections and up to 5 references may be included.

Snapshots

This section is intended for the publication of rare or educational cases or novel techniques in cardiology. The text should not exceed 500 words and up to 3 figures with brief captions and up to 5 references may be included. Snapshots must have no more than 3 authors.

Current Perspective

This type of manuscript is submitted upon invitation by the Editorial Board. It may cover a broad diversity of themes focusing on cardiology and healthcare: current or emerging problems, management and health policies, history of medicine, society issues and epidemiology, among others. An author who wishes to propose a manuscript in this section is requested to send an abstract to the Editor-in-Chief including the title and Author list for evaluation. The text should not exceed 1200 words, and up to 10 references, two tables or two figures are allowed. An abstract is not required.

Editorial Comment

Editorials are submitted at the invitation of the Editor. They should not exceed 1500 words and can contain up to 20 references and 1 table and 1 figure. They do not have an Abstract or keywords.

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Letters to the Editor on articles previously published in the Journal will be considered up to 8 weeks after the publication of the article in question. They should not exceed 800 words and can contain up to 2 figures but without Abstract, keywords or tables. They should have no more than 3 authors.

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Research Letters are concise, focused reports of original research. These should not exceed 600 words of text and 6 references and may include up to 2 tables or figures. Online supplementary material is not allowed. Research Letters may have no more than 7 authors.

Observation

Observations consisting of short reports of 1 or 2 complicated, unique cases should not exceed 600 words of text (not including acknowledgment, tables, figures, acknowledgments, and references) and 6 references and may include up to 2 tables or figures. Online supplementary material is not allowed. Observations may have no more than 7 authors.

If the patient(s) described in these manuscripts is identifiable, a Patient Permission form must be completed and signed by the patient(s) and submitted with the manuscript. Omitting data or making data less specific to deidentify patients is acceptable but changing any such data is not acceptable.

Contact details for submission

You can send your manuscript at <https://www.editorialmanager.com/repc>

Language

This journal is published in Portuguese and in English language.

The title (and abstract and key words if applicable) must be submitted in both English and Portuguese.

Articles submitted to the Journal should be clearly written in Portuguese (from Portugal) and/or English of a good standard. Text may be edited to maintain linguistic quality and to conform with standard American English.

ADVANCE NOTICE FOR AUTHORS

Please, take into account that as of January 2021, *Revista Portuguesa de Cardiologia* will require new article submissions to be written in English language.

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:

¿ E-mail address

¿ Full postal address

All necessary files have been uploaded:

Manuscript:

¿ Include keywords

¿ All figures (include relevant captions)

¿ All tables (including titles, description, footnotes)

¿ Ensure all figure and table citations in the text match the files provided

¿ Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)

Supplemental files (where applicable)

Further considerations

¿ Manuscript has been 'spell checked' and 'grammar checked'

¿ All references mentioned in the Reference List are cited in the text, and vice versa

¿ **Permission has been obtained for use of copyrighted material from other sources (including the Internet)**

¿ A competing interests statement is provided, even if the authors have no competing interests to declare

¿ Journal policies detailed in this guide have been reviewed

¿ Referee suggestions and contact details provided, based on journal requirements

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If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with [The Code of Ethics of the World Medical Association](#) (Declaration of Helsinki) for experiments involving humans. The manuscript should be in line with the [Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals](#) and aim for the inclusion of representative human

populations (sex, age and ethnicity) as per those recommendations. The terms [sex and gender](#) should be used correctly.

The privacy rights of human subjects must always be observed. A statement must be included to the effect that the study was conducted in accordance with the amended Declaration of Helsinki, that the local institutional review board or independent ethics committee approved the protocol, and that written informed consent was obtained from all patients. The name of the committee, the name of the chairperson of the committee (or the person who approved the protocol), the date of approval and the approval number should follow this statement in the Methods section. For multicenter studies, a list of the relevant approvals may be provided in a separate document to be published as supplementary material.

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All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. A conflict of interest may exist when an author (or the author's institution or employer) has financial or personal relationships or affiliations that could influence (or bias) the author's decisions, work, or manuscript. All authors are required to report potential conflicts of interest including specific financial interests relevant to the subject of their manuscript.

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Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. One or more authors should take responsibility for the integrity of the work as a whole, from inception to published article. According to the guidelines of the International Committee of Medical Journal Editors (ICMJE), authorship credit should be based on the following 4 criteria:

1. substantial contributions to conception or design of the work, or the acquisition, analysis, or interpretation of data for the work; and
2. drafting of the work or revising it critically for important intellectual content; and
3. final approval of the version to be published; and
4. agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Changes to authorship. Role of the corresponding author

A single corresponding author (or coauthor designee in the event that the corresponding author is unavailable) will serve on behalf of all coauthors as the primary correspondent with the editorial office during the submission and review process. If the manuscript is accepted, the corresponding author will review an edited manuscript and proof, make decisions regarding release of information in the manuscript to the news media or federal agencies, handle all postpublication communications and inquiries, and will be identified as the corresponding author in the published article. The corresponding author also is responsible for ensuring that the Acknowledgment section of the manuscript is complete and that the conflict of interest disclosures reported of the manuscript are accurate, up-to-date, and consistent with the information provided in each author's potential conflicts of interest section in the Authorship Form.

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In line with the position of the International Committee of Medical Journal Editors, the journal will not consider results posted in the same clinical trials registry in which primary registration resides to be prior publication if the results posted are presented in the form of a brief structured (less than 500 words) abstract or table. However, divulging results in other circumstances (e.g., investors' meetings) is discouraged and may jeopardise consideration of

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The ICMJE defines a clinical trial as any research project that prospectively assigns human participants to intervention or comparison groups to study the cause-and-effect relationship between an intervention and a health outcome. Interventions include but are not limited to drugs, surgical procedures, devices, behavioral treatments, educational programs, dietary interventions, quality improvement interventions, process-of-care changes, and the like.

All manuscripts reporting clinical trials, including those limited to secondary exploratory or post hoc analysis of trial outcomes, must include the following:

- [CONSORT](#) flow diagram
- Completed trial checklist
- Registry at an appropriate online public clinical trial registry
- A Data Sharing Statement to indicate if data will be shared or not. Specific questions regarding the sharing of data are included in the manuscript submission system.

Trial Registration

In concert with the ICMJE, our journal requires, as a condition of consideration for publication, registration of all trials in a public trials registry that is acceptable to the ICMJE (ie, the registry must be owned by a not-for-profit entity, be publicly accessible, and require the minimum registration data set as described by ICMJE).

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isrctn.org
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