



PULMONOLOGY

www.journalpulmonology.org

LETTER TO THE EDITOR

Perceptions of the Portuguese population on vaccination – The specific view of Chronic Respiratory Disease patients

Prevention and control of communicable diseases is crucial to ensure global health security.¹ Vaccination represents a fundamental tool to limit the progression and dissemination of infectious agents, including influenza and COVID-19.² Successful vaccination strategies depend on public perceptions, including risk perceptions, and trust.³ Despite the well-established links between public perceptions and successful vaccine adoption by the population, a comprehensive evaluation of the perceptions of the Portuguese population in the post-COVID-19 era, particularly those with a previous diagnosis of Chronic Respiratory Disease (CRD), is still lacking.

The main goal of this study was to assess the perceptions of the Portuguese population regarding vaccination (in general, and against flu and COVID-19) and particularly analyze the views of those individuals with a previous CRD diagnosis.

We designed an observational, descriptive, cross-sectional study with a quantitative approach.

To assess the perceptions of the Portuguese population regarding vaccination, we developed a questionnaire composed of demographic questions, semi-open questions, or in Likert scale.

Telephone interviews were conducted by the research team. Respondents were informed about the context and objectives of the study and the individual voluntary consent to participation was obtained. Study was reviewed and approved by the competent Institutional Review Board (NOVAIMS Ethics Committee): Project N°: STAT2023-10-123709.

The data collection period took place between 1 and 30 August 2022. The sample was post-stratified according to the distribution of the population by gender, age, and NUTS II regions. The results are presented with a confidence level of 95 %. Significant statistical differences are indicated, when the number of observations is greater or equal to 30 and the difference between the results of groups/segments exceeds the margins of error of the estimates ($p \leq 0,05$).

We obtained 605 valid, fully answered questionnaires from Portuguese citizens, residing in mainland Portugal

and aged between 18 and 74 years old (margin of error of 0.23 points, 95 % confidence level). Characterization of the study population is presented in [Table 1](#). More than half of the respondents were female, 39,4% were aged 35–54 years old and 37,2 % were from the North of Portugal. Overall, 49,8 % of participants were married, 34,3 % had completed higher education and 31,1 % had a household net monthly income of 706 – 1410 €. Approximately one quarter of the study population (24,8 %) had a previous diagnosis of CRD.

Perceptions of the Portuguese population on vaccination are presented in [Table 2](#). Most participants agreed that vaccines are important to protect others (97,2 %) and that they are tested rigorously before being authorized (90,8 %). Participants without CRD expressed higher agreement than participants previously diagnosed with CRD (92,1 versus 87,0 respectively, $p = 0,105$) ([Table 2](#)). Most participants also agreed that vaccines can produce serious side effects (74,8 %). Most study participants (64,4 %) had not been vaccinated against the flu in the previous 12 months. The flu vaccination coverage was found to be higher in eligible individuals (65,3 % for those with 60+ years of age; 25.2 % in younger individuals; $p < 0,001$) (data not shown in [Table 2](#)). Participants with a previous CRD diagnosis stood out as those with a higher frequency of vaccination against the flu (40,7 % to 33,9 %, $p = 0,137$). Furthermore, flu vaccination was found to be more prevalent among older patients (56,8 % in the 55–74 years old group versus 26,6 % and 22 % in the 18–34 and 35–54-year-old groups, respectively; $p < 0,001$) (data not shown in [Table 2](#)). Moreover, flu vaccination tends to be less prevalent in participants without income (0 %) in comparison to other income levels (ranging from 14,7 % to 42,6 %). No association was found between level of education and flu vaccination status. More than half of the participants believe that the flu vaccine is not necessary for young and healthy people (54,7 %). Slightly more than half of the participants believed the flu vaccine could transmit the flu (51,7 %). This perception was lower among individuals with higher education (34.4 %) in comparison to individuals with lower levels of education (varying between 53.6 % and 78.4 %, $p < 0,001$) (data not shown in [Table 2](#)).

Participants agree that vaccination is crucial during the flu season (8,2, on a scale of 1 to 10) and were satisfied with the effectiveness of vaccines in fighting influenza virus infection (8,1). Participants agreed that it is easy to find

<https://doi.org/10.1016/j.pulmoe.2024.05.002>

2531-0437/© 2024 Sociedade Portuguesa de Pneumologia. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: G.M. Victorino, I. Saraiva, B. Pereira et al., Perceptions of the Portuguese population on vaccination – The specific view of Chronic Respiratory Disease patients, Pulmonology (2024), <https://doi.org/10.1016/j.pulmoe.2024.05.002>

Table 1 Sociodemographic and respiratory health characteristics of the study population. Global results and segmentation according to previous CRD diagnosis are presented (the sample size is shown for each segment). The results were weighted according to the distribution of the population by gender, age, and NUTS II region. *Significant statistical difference ($\alpha < 0.05$) between segments “With CRD” and “Without CRD”.

Chronic Respiratory Disease Diagnosis (CRD)		Yes 24.8 % (n = 156)	No 75.2 % (n = 447)
Chronic Sinusitis		41,3 % (n = 66)	
Asthma		32.1 % (n = 49)	
Chronic Rhinitis		29.1 % (n = 44)	
Sleep Apnoea Syndrome		18,0 % (n = 29)	
Chronic Obstructive Pulmonary Disease		4.1 % (n = 8)	
Other		5.7 % (n = 8)	

		Global (n = 605)	With CRD (n = 156)	Without CRD (n = 447)
Self-perceived health status (0 – 100)		79.9 ⁺⁺	76.9 ⁺⁺⁺	81.0 ⁺⁺⁺
Sex	Female	53.6 % (n = 339)	62.9 %* (n = 101)	50.6 %* (n = 237)
	Male	46.4 % (n = 266)	37.1 %* (n = 55)	49.4 %* (n = 210)
Age (years)	18 – 34	24.9 % (n = 109)	21.0 % (n = 23)	26.3 % (n = 86)
	35 – 54	39.4 % (n = 281)	42.0 %* (n = 74)	38.5 %* (n = 206)
	55 – 74	35.7 % (n = 215)	37.0 %* (n = 59)	35.2 %* (n = 155)
Territorial distribution (NUTS II)	North	37.2 % (n = 194)	31.4 %* (n = 41)	39.3 %* (n = 153)
	Lisbon Area	28.9 % (n = 217)	36.6 %* (n = 68)	26.2 %* (n = 148)
	Center	22.3 % (n = 129)	23.6 %* (n = 35)	21.8 %* (n = 93)
	Alentejo and Algarve	11.6 % (n = 65)	8.4 % (n = 12)	12.7 % (n = 53)
Marital Status	Married	49.8 % (n = 313)	53.5 % (n = 87)	48.4 % (n = 224)
	Single	28.3 % (n = 148)	28.3 % (n = 40)	28.4 % (n = 108)
	Separated/ Divorced	9.7 % (n = 66)	8.2 % (n = 14)	10.3 % (n = 52)
	Non-marital Partnership	7.5 % (n = 44)	6.4 % (n = 9)	7.9 % (n = 35)
Education	Widow/Widower	4.6 % (n = 29)	3.5 % (n = 6)	5.0 % (n = 23)
	Higher Education	34.3 % (n = 207)	41.6 % (n = 63)	32.0 % (n = 144)
	Secondary Education (10th to 12th year), Incomplete Higher Education	31.0 % (n = 185)	33.8 % (n = 51)	30.0 % (n = 133)
	3rd Cycle of Basic Education (7th to 9th year)	15.8 % (n = 100)	14.4 % (n = 24)	16.1 % (n = 75)
	2nd Cycle of Basic Education (5th and 6th year)	8.6 % (n = 52)	3.9 % (n = 7)	10.2 % (n = 45)
	Primary basic education (1st to 4th year)	9.6 % (n = 54)	5.6 % (n = 9)	10.9 % (n = 45)
	Can read and write without having school education	0.7 % (n = 4)	0.7 % (n = 1)	0.7 % (n = 3)
Monthly Income (€)	4230 or more	4.0 % (n = 22)	6.9 % (n = 9)	3.0 % (n = 13)
	3526 – 4230	2.7 % (n = 16)	2.5 % (n = 4)	2.7 % (n = 12)
	2821- 3525	8.3 % (n = 43)	5.6 % (n = 9)	9.3 % (n = 34)
	2116 – 2820	11.1 % (n = 61)	8.2 % (n = 12)	12.1 % (n = 49)
	1411 – 2115	25.1 % (n = 137)	32.9 %* (n = 47)	22.5 %* (n = 90)
	706 – 1410	31.1 % (n = 159)	26.7 % (n = 38)	32.8 % (n = 121)
	705 or less	16.6 % (n = 88)	16.4 % (n = 22)	16.3 % (n = 64)
	Without income	1.1 % (n = 6)	0.8 % (n = 1)	1.3 % (n = 5)

information about the flu vaccine (7,5, on a scale of 1 to 10), that the available information is clear (7,2), that it is given the deserved prominence in the media (7,2), and that the National Health Service (NHS) provides a quality service in disseminating information about it (7,0). Overall, 80,2 % of the participants considered themselves well informed about the flu vaccine.

Nearly all participants had received at least one dose of the COVID-19 vaccine (97,6 %). No association was found between age or level of education and COVID-19 vaccination status. However, COVID-19 vaccination tends to be less prevalent in participants without income (83,2 %) in comparison to other income levels (ranging from 96,4 % to 100 %) (data not shown in Table 2).

Table 2 Perceptions regarding vaccination. Global results and segmentation according to previous CRD diagnosis are presented (the sample size is shown for each segment). The results were weighted according to the distribution of the population by gender, age, and NUTS II region. *Significant statistical difference ($\alpha < 0.05$). NHS – National Health Service. ** Mean average response on a 1–10 Likert Scale (1 - *Totally disagree*; 10 - *Totally agree*).

	Global (n = 605)		With CRD (n = 156)		Without CRD (n = 447)	
	Agree	Disagree	Agree	Disagree	Agree	Disagree
Vaccinations are important to protect others.	97.2 %* (n = 583)	2.8 %* (n = 17)	96.6 % (n = 149)	3.4 % (n = 6)	97.6 % (n = 433)	2.4 % (n = 10)
Vaccines are rigorously tested before they are authorized.	90.8 %* (n = 511)	9.2 %* (n = 53)	87.0 % (n = 128)	13.0 % (n = 18)	92.1 % (n = 381)	7.9 % (n = 35)
Vaccines can often produce serious side effects.	74.8 %* (n = 434)	25.2 %* (n = 149)	79.3 % (n = 117)	20.7 % (n = 33)	73.5 % (n = 316)	26.5 % (n = 115)
Flu vaccination status (previous 12 months)	35.6 %* (n = 215)	64.4 %* (n = 390)	40.7 % (n = 64)	59.3 % (n = 92)	33.9 % (n = 150)	66.1 % (n = 297)
Flu vaccine is not necessary for young and healthy people.	54.7 %* (n = 313)	45.3 %* (n = 256)	53.1 % (n = 80)	46.9 % (n = 68)	55.2 % (n = 233)	44.8 % (n = 188)
Flu vaccine can transmit the flu.	51.7 % (n = 299)	48.3 % (n = 274)	48.3 % (n = 73)	51.7 % (n = 76)	52.9 % (n = 225)	47.1 % (n = 197)
Pregnant women should not get vaccinated against the flu.	36.8 %* (n = 169)	63.2 %* (n = 282)	34.4 % (n = 42)	65.6 % (n = 74)	37.5 % (n = 127)	62.5 % (n = 208)
Vaccination is crucial during flu season	8.2**		8.2**		8.2**	
Personally satisfied with the effectiveness of the flu vaccine in combating infection	8.1**		7.9**		8.1**	
It is easy to find information about the flu vaccine	7.5**		7.5**		7.5**	
The available information about the flu vaccine is clear	7.2**		6.9**		7.3**	
The media give appropriate relevance to the flu vaccine during the flu season	7.2**		7.0**		7.3**	
The NHS provides a good service in informing about the flu vaccine	7.0**		6.5***		7.1***	
Do you consider yourself to be well informed about the flu vaccine?	80.2 %* (n = 483)	19.8 %* (n = 112)	84.3 % (n = 128)	15.7 % (n = 25)	78.8 % (n = 353)	21.2 % (n = 87)
COVID-19 vaccination status (at least 1 dose)	97.6 %* (n = 591)	2.4 %* (n = 14)	99.5 % (n = 155)	0.5 % (n = 1)	97.2 % (n = 435)	2.8 % (n = 12)
Personally satisfied with the effectiveness of the COVID-19 vaccines	8.0**		7.9**		8.0**	
I will continue to take the doses recommended by the European authorities, as applicable to my condition	8.1**		8.1**		8.1**	
The information about the COVID-19 vaccine is provided in a clear and explanatory manner	8.1**		7.8**		8.1**	
How do you rate the information you currently receive about the vaccines and booster doses for COVID-19	7.3**		6.8***		7.5***	

Participants were satisfied with the effectiveness of the COVID-19 vaccine (8.0, on a scale of 1 to 10) and agreed that they will continue to take the doses recommended by the Health Authorities (8,1). Most participants agreed that information regarding the COVID-19 vaccine was provided in a clear and explanatory manner (8,1) and were globally satisfied with the information they received about the COVID-19 vaccines and booster doses (7,3). Participants with CRD rated this information lower than undiagnosed participants (6,8 vs 7,5, $p = 0,002$).

We observed a highly favorable view of vaccines. Vaccine importance to protect others and rigorous testing of vaccines are significantly recognized, particularly among patients with CRD. Factors influencing the observed low flu vaccine coverage rate despite this favorable view might include low risk aversion and significant prevalence of less severe CRD (chronic sinusitis or rhinitis, for example) among the studied population.

Unfavorable perspectives or negative consequences of vaccines were mostly disagreed to by the studied population, in particular by CRD patients. Nonetheless, strengthening public involvement and maintaining trust in vaccination programs is a permanent task facing significant challenges, including elevating the interest of municipalities in health literacy, communicating about health promotion and disease prevention.^{4,5} Studies have shown that important subsets of the population do not get vaccinated due to poor access to scientific information and the spread of fake news.^{6,7} Perceptions about the specific necessity of the flu vaccine among the young and healthy and among pregnant women were divided but there was wide agreement that vaccination is crucial during the flu season and that the flu vaccine is effective. There were also favorable opinions regarding the accessibility of information about the flu vaccine. Participants expressed satisfaction with the effectiveness of the COVID-19 vaccine and the accessibility and clarity of information about the COVID-19 vaccine. Most respondents, particularly those with CRD identified the dissemination of more information and clarification about vaccination as a suggestion for improvement. Overall, our study demonstrates that the Portuguese population has a favorable perception of vaccines and the access and clarity of related information, with CRD patients demonstrating added awareness about its importance.

Authorship criteria and explanation

Authorship was attributed according to criteria established by the International Committee of Medical Journal Editors. Research leading to this manuscript (letter to the editor) involved all indicated authors, who provided substantial contributions to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; drafting the work or reviewing it critically for important intellectual content; approval of the version to be published; and agreed to be accountable for all aspects of the work.

Conflicts of interest

This work was supported by Sanofi Portugal and RESPIRA – Associação Portuguesa de Pessoas com DPOC e outras Doenças Respiratórias Crónicas

GV, BP, PB, JVC and FCS acknowledge the support of NOVA IMS Grant: ADNOVAIMS/71251/2486

Acknowledgements

This work was supported by Sanofi Portugal and RESPIRA – Associação Portuguesa de Pessoas com DPOC e outras Doenças Respiratórias Crónicas

GV, BP, PB, JVC and FCS acknowledge the support of NOVA IMS Grant: ADNOVAIMS/71251/2486

References

1. WHO. Immunization Agenda 2030: A Global Strategy to Leave No One Behind. <https://www.who.int/publications/m/item/immunization-agenda-2030-a-global-strategy-to-leave-no-one-behind> Last accessed on January 18th 2024.
2. García-Montero C, Fraile-Martínez O, Bravo C, Torres-Carranza D, Sanchez-Trujillo L, Gómez-Lahoz AM, et al. An updated review of SARS-CoV-2 vaccines and the importance of effective vaccination programs in pandemic times. *Vaccines*. 2021;9(5):433. <https://doi.org/10.3390/vaccines9050433>.
3. Vaccination and Trust: How Concerns Arise and the Role of Communication in Mitigating Crises. World Health Organization. Regional Office for Europe; 2017. Document number: WHO/EURO-2017-2908-42666-59448. <https://www.who.int/europe/publications/i/item/WHO-EURO-2017-2908-42666-59448> Last accessed on January 18th 2024.
4. Quilling E, Mielenbrink V, Osterhoff A, Terhorst S, Tollmann P, Kruse S. State of evidence on municipal strategies for health promotion and prevention: a literature and database research (scoping review). *BMC Public Health*. 2022;22:301. <https://doi.org/10.1186/s12889-022-12607-0>.
5. Vanderpool RC, Gaysynsky A, Sylvia Chou W-Y. Using a global pandemic as a teachable moment to promote vaccine literacy and build resilience to misinformation. *Am J Public Health*. 2020;110:S284–5. <https://doi.org/10.2105/AJPH.2020.305906>. PMID: 33001735; PMCID: PMC7532329.
6. Schwarzwinger M, Luchini S. Addressing COVID-19 vaccine hesitancy: is official communication the key? *Lancet Public Health*. 2021;6:e353–4. [https://doi.org/10.1016/S2468-2667\(21\)00108-0](https://doi.org/10.1016/S2468-2667(21)00108-0).
7. Burki T. Vaccine misinformation and social media. *Lancet Digit Health*. 2019;1:e258–9. [https://doi.org/10.1016/S2589-7500\(19\)30136-0](https://doi.org/10.1016/S2589-7500(19)30136-0).

G.M. Victorino^{a,*}, I. Saraiva^b, B. Pereira^c, P. Borrego^{c,d}, J.V. Cordeiro^e, F.C. Sousa^a, M. Morais-Almeida^f, J.R. Ferreira^{g,h}, P.S. Coelho^a

^a NOVA Information Management School (NOVA IMS), Portugal

^b RESPIRA – Associação Portuguesa de Pessoas com DPOC e outras Doenças Respiratórias Crónicas, Portugal

^c Qmetrics - Serviços de Consultoria em Gestão de Informação, Portugal

^d *Centre for Public Administration and Public Policies, Institute of Social and Political Sciences, Universidade de Lisboa, Portugal*

^e *NOVA National School of Public Health, Public Health Research Centre, Comprehensive Health Research Center, CHRC, NOVA University Lisbon, Lisbon, Portugal*

^f *Associação Portuguesa de Asmáticos (APA), Portugal*

^g *Associação Nacional de Tuberculose e Outras Doenças Respiratórias (ANTDR), Portugal*

^h *Clínica de Doentes Pulmonares (CDP), Lisboa, Portugal*

* Corresponding author at: NOVA Information Management School, Campus de Campolide, 1070-312 Lisboa, Portugal. E-mail address: gmvectorino@novaims.unl.pt (G.M. Victorino).

Received 22 November 2023; Accepted 2 May 2024

Available online xxx