NURSES' PERCEPTION SCALE ON SEASONAL FLU VACCINATION: CONSTRUCTION/VALIDATION

Escala de Perceção dos Enfermeiros sobre Vacinação contra Gripe Sazonal: construção/validação

Escala de percepción de enfermeras sobre la vacunación contra la gripe estacional: construcción/validación

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ABSTRACT

Background: vaccination is effective in preventing and controlling outbreaks and complications from seasonal flu. Nurses play an active role in promoting vaccination for themselves and the eligible population, limiting the transmission of the disease. It is important to know the perception and attitude of nurses regarding flu vaccination to optimize the performance of their role. **Objectives**: to build and validate the nurses' perception scale regarding seasonal flu vaccination (EPEVAGRI). **Methodology**: methodological research study. A questionnaire was developed, based on a list of 48 items, constructed from a literature review, applied to 541 Portuguese nurses, fulfilling inclusion criteria. To validate the scale, statistical tests were used using computer software. The study received a favorable opinion from the ethics committee. **Results**: the scale in its final version consists of 38 items, presented a high value of the Cronbach alpha coefficient, translating a good indicator of internal consistency overall (α=0.932). Factor analysis allowed a division into seven factors, with rational meaning, and good Kaiser-Meyer-Olkin values. **Conclusion**: The scale presents good psychometric characteristics, showing potential for future use in clinical practice in order to optimize the role of nurses.

Keywords: nurses; vaccination; knowledge; influenza human

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RESUMO

Enquadramento: a vacinação é eficaz na prevenção e controlo de surtos e complicações por gripe sazonal. Os enfermeiros têm um papel ativo na promoção da sua vacinação e da população elegível, limitando a transmissão da doença. Importa conhecer a perceção e atitude dos enfermeiros sobre a vacinação contra a gripe para otimizar o desempenho do seu papel. **Objetivos**: construir e validar a escala de perceção dos enfermeiros relativamente à vacinação contra a gripe sazonal (EPEVAGRI). **Metodologia**: estudo de investigação metodológica. Desenvolvido questionário, a partir de uma lista de 48 itens, construída a partir da revisão da literatura, aplicado a 541 enfermeiros portugueses, cumprindo critérios de inclusão. Para a validação da escala recorreu-se aos testes estatísticos através de software informático. O estudo teve parecer favorável da comissão de ética. **Resultados**: a escala na sua versão final é constituída por 38 itens, apresentou elevado valor do coeficiente alfa Cronbach, traduzindo um bom indicador de consistência interna no global (α=0,932). A análise fatorial permitiu uma divisão em sete fatores, com significado racional, e com bons valores Kaiser-Meyer-Olkin. **Conclusão**: a escala apresenta boas características psicométricas, evidenciando potencial para utilização futura na prática clínica no sentido de otimizar o papel do enfermeiro.

Palavras-chave: enfermeiros; vacinação; conhecimento; gripe humana

RESUMEN

Marco contextual: la vacunación es eficaz para prevenir y controlar los brotes y las complicaciones de la gripe estacional. Las enfermeras desempeñan un papel activo en la promoción de la vacunación para ellas mismas y para la población elegible, limitando la transmisión de la enfermedad. Es importante conocer la percepción y actitud del enfermero respecto a la vacunación antigripal para optimizar el desempeño de su rol. **Objetivos**: construir y validar la escala de percepción de enfermeras sobre la vacunación contra la gripe estacional (EPEVAGRI). **Metodología**: estudio de investigación metodológica. Se desarrolló un cuestionario, basado en una lista de 48 ítems, construido a partir de una revisión de la literatura, aplicado a 541 enfermeros portugueses, cumpliendo criterios de inclusión. Para validar la escala se utilizaron pruebas estadísticas mediante software informático. El estudio recibió una opinión favorable del comité de ética. **Resultados**: la escala en su versión final consta de 38 ítems, presentó un alto valor del coeficiente alfa de Cronbach, traduciéndose en un buen indicador de consistencia interna global (α=0,932). El análisis factorial permitió dividirlos en siete factores, con significado racional y buenos valores de Kaiser-Meyer-Olkin. **Conclusión**: la escala presenta buenas características psicométricas, mostrando potencial para uso futuro en la práctica clínica con el fin de optimizar el papel de las enfermeras.

Palabras clave: enfermeros; vacunación; conocimiento; gripe humana

INTRODUCTION

Nurses are healthcare professionals who face a higher risk of exposure and potential transmission of diseases, including those preventable by vaccination (Yu et al., 2019; Neufeind et al., 2020). They have a heightened risk of acquiring and transmitting infections to other healthcare professionals, patients, and family members (Asma et al., 2016; Yu et al., 2019; Grech et al., 2020a; Samyn et al., 2021). Naturally, this risk depends on the severity of the epidemic and the setting in which nurses work (Samyn et al., 2021).

The influenza virus can cause nosocomial outbreaks, leading to serious consequences in terms of morbidity, mortality, and associated costs, especially in hospital settings and among vulnerable or high-risk individuals, either by age or pathology criteria (Asma et al., 2016; Grech et al., 2020a; Grech et al., 2020b). Nevertheless, the flu epidemic is one of the main causes of absenteeism among healthcare professionals and numerous disruptions in healthcare services, especially during the winter months (Neufeind et al., 2020). Disease prevention emerges as the most effective and low-cost strategy, with vaccination (against the flu) of healthcare professionals considered a strategy to prevent nosocomial transmission and reduce mortality rates among hospitalized patients (Asma et al., 2016). In Portugal, flu vaccination is not integrated into the National Vaccination Program (NVP), but it is strongly recommended for healthcare professionals and high-risk groups, with this recommendation being annually outlined in guidelines (Direção-Geral da Saúde, 2020).

Healthcare professionals, by virtue of their roles, serve as examples for promoting and advocating vaccine acceptance within the population. Nurses are identified as the most trusted healthcare professionals in addressing vaccination (Yu et al., 2019), capable of influencing patients' decisions regarding vaccination (adherence versus non-adherence) (Asma et al., 2016). It is known that whenever nurses hesitate about vaccination, they tend to recommend vaccination less frequently (Yu et al., 2019).

Despite some scientific research conducted in different countries on the level of knowledge, attitudes, and adherence regarding vaccination among nurses, few studies have been conducted in Portugal. Thus, the adherence of Portuguese nurses to flu vaccination, as well as their perception and attitudes toward it, remain unknown.

It is considered important to have a tool that allows for the assessment of nurses' perception, enabling high-quality research to understand nurses' perception of flu vaccination, with the aim of subsequently optimizing nursing interventions among them and the population. Therefore, the objective of this study is to construct and validate a scale for nurses' perception regarding seasonal flu vaccination.

BACKGROUND

Influenza results from an infection with influenza viruses in the respiratory cells of the upper respiratory tract and manifests through a diverse range of clinical symptoms such as headache, fatigue, cough, rhinitis, myalgia, arthralgia, prostration, sore throat, and fever. Pneumonia, severe acute respiratory syndrome, sepsis, and exacerbation of chronic diseases can occur in severe cases of infection (Colaprico et al., 2022). The World Health Organization (2020) estimates that seasonal flu infects annually 5% to 15% of the global population, with approximately 3 to 5 million cases of severe illness and up to half a million deaths (Colaprico

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et al., 2022). Vaccination proves to be the best solution for controlling the disease; however, there is no single vaccine, which makes continuous and massive administration unfeasible. Indeed, seasonal flu vaccination does not allow for the elimination or eradication of the disease (due to the existence of a non-human natural reservoir, the genetic variability of the virus, and its rapid replication). Flu vaccination is formulated, reformulated, or adapted annually and targets the population identified as at risk, as defined each year, given the unavailability of vaccines to immunize the entire population (Vilches et al., 2020). The production of the vaccine is based on monitoring antigenic changes in circulating strains, relying on epidemiological studies to estimate which strains will be responsible for the upcoming flu season (Vilches et al., 2020). Vaccination serves as a preventive measure, reducing the possibility of virus transmission among humans, lowering absenteeism, and decreasing the incidence and mortality associated with infectious diseases (Colaprico et al., 2022). In this regard, for the prevention and control of seasonal flu, we have a vaccine whose clinical efficacy in healthy individuals reaches approximately 70% and 30% for high and low vaccination rates, respectively, in reducing infection (Filipe, 2012; Vilches et al., 2020; Colaprico et al., 2022). Vaccination reduces the severity of the disease and its complications by about 60% and mortality by 80% (WHO, 2020). The flu vaccine provides protection after approximately two weeks, offering immunity for up to six to eight months after administration. However, its efficacy and effectiveness depend on factors such as age, the individual's immune system status, the virulence of the virus, and the match between circulating and vaccine strains (Vilches et al., 2020).

Vaccination is the best form of prevention and control for the flu, requiring appropriate strategies for epidemic control. Vaccination contributes to reducing the transmission of infectious diseases by preventing and controlling infection among healthcare professionals and the population (Vilches et al., 2020; Colaprico et al., 2022). Since 1981, flu vaccination has been recommended for healthcare professionals. Healthcare professionals, by working directly with vulnerable and/or high-risk individuals, are at risk of being carriers, becoming infected, and transmitting the virus (Vallée-Tourangeau et al., 2018). Infections with the flu virus pose a significant danger to healthcare institutions, as disease outbreaks cause harm to the most vulnerable patients, increasing mortality and morbidity rates (Vallée-Tourangeau et al., 2018). Despite the flu vaccine being free for nurses, as they are included in the priority groups for flu vaccination, the results of the assessment of flu vaccine coverage demonstrate low adherence among nurses (Filipe, 2012). Not being considered a mandatory procedure, the decision to adhere to seasonal flu vaccination depends exclusively on factors intrinsic to these professionals. Some barriers and individual facilitators associated with adherence to flu vaccination in the population are known (Colaprico et al., 2022).

It is believed that the most common reason for seasonal flu vaccine hesitancy among healthcare professionals is related to lack of knowledge about it, concerns about side effects, fear of the needle, and its safety. Limitations to flu vaccination also include limited production capacity compared to demand, variable effectiveness from season to season due to the

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need for a match between the vaccine strains and circulating viruses (Colaprico et al., 2022). Therefore, it is important to understand nurses' opinions regarding flu vaccination, as well as their adherence and associated reasons (Filipe, 2012; Colaprico et al., 2022).

METHODOLOGY

Scale Construction Process

To carry out this study, it was necessary to create a scale, designated as the Nurses' Perception Scale on Flu Vaccination (EPEVAGRI). The construction process began with a literature review on the topic, drawing from the ideas presented by Asma et al. (2016), Vallée-Tourangeau et al. (2018), and Grech et al. (2020a), as well as empirical experience (nurse managers of the National Vaccination Program) regarding the variables that influence nurses' decision-making regarding flu vaccination adherence in successive vaccination campaigns. This informed the construction of scale items, without any a priori categorization of the scale. The EPEVAGRI is organized into 48 items (of which 12 are formulated in reverse), arranged in a structure that allowed for only one response alternative, where the participant positioned themselves on a five-point Likert scale, representing the level of agreement/disagreement: strongly disagree (1); disagree (2); neither disagree nor agree (3); agree (4); and strongly agree (5).

Content Validity

The list of scale items was evaluated by a group of three experts who are specialists in community nursing working in a Public Health Unit, responsible for managing the National Vaccination Program (PNV) at the Health Center. They were asked to analyze the content of the items as a whole and each one individually. The expert evaluation aimed to validate the content of each item and the scale as a whole, contributing improvements to the syntax of some items.

Subsequently, a pilot test was conducted with eight nurses (a number considered adequate by the authors for conducting the pilot test, as contributions from the fourth nurse onwards were all consistent with the previous ones, without any other input). The nurses were accessible to the researchers, aiming to identify possible shortcomings regarding the clarity of the statements. No adjustments were necessary since no doubts arose during its completion.

Data Collection Instrument and Procedure

Data collection took place between June 28th and September 12th, 2021. Support was sought from the Order of Nurses to disseminate the survey among nurses, which was granted. All registered nurses in the Order of Nurses were invited to participate, totaling 71,989 registered nurses in Portugal. An online self-administered questionnaire was used as the data collection instrument. The questionnaire was created by the authors and made available through Google Forms. It consisted of three main parts: Sociodemographic characterization (This part included questions about participants' gender, age, place of residence, living arrangements, presence of chronic illnesses/disabilities, and lifestyle); Professional characterization (This part included questions about participants' academic and professional qualifications, work context, employment status, and length of employment); Assessment of adherence to seasonal flu vaccination and perception of the vaccine (EPEVAGRI).

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The first part of the questionnaire (sociodemographic and professional data) contributed to the characterization of the sample. The second part of the questionnaire allowed for the assessment of adherence to vaccination, while the third part focused on participants' perceptions of the flu vaccine.

The population and sample

The sample was selected using a population-based sampling technique, as all nurses registered with the Order of Nurses were invited to participate. They received an email invitation from the Order of Nurses for this purpose. A total of 543 questionnaires were obtained, excluding 2 due to non-consent to participate in the study. Of the 541 participating nurses, 87.4% were female and 12.6% were male, with ages ranging from 21 to 65 years (mean age of 41.21 years ± 9.582). The majority of nurses were graduates (76.7%), and 45.8% were specialized nurses. 55.6% of the participants worked in a hospital setting, and 35.5% in primary healthcare, mostly under an indefinite employment contract (92.4%). The participants had an average of 18.03 years of professional experience (±9.818), ranging from 0 to 44 years.

The majority of participants did not report having a chronic illness (67.5%) or physical disability (93.7%), lived with children (62.7%), and did not have elderly dependents under their care (88.9%). Regarding lifestyle, 43.4% considered themselves sedentary, and 13.7% were smokers. 528 participants (97.28%) reported being familiar with the National Vaccination Program (PNV), and 540 (99.4%) stated that their vaccinations were up to date.

Formal and Ethical Considerations

This research study obtained favorable approval from the Ethics Committee (approval no. 011/2021, dated June 18th). The ethical principles inherent in research were adhered to, including voluntary participation, participant anonymity, and confidentiality and security of information.

Data Analysis

For data analysis, statistical treatment was performed using the Statistical Package for the Social Sciences (SPSS), version 25. The Cronbach's alpha coefficient was used to analyze reliability, and exploratory factor analysis with principal component analysis and orthogonal Varimax rotation with Kaiser normalization was conducted to assess construct validity. Additionally, the relationship between the dimensions of EPAVAGRI was analyzed using parametric statistical tests, considering the normality of the sample distribution (Kolmogorov-Smirnov test) at a 95% confidence interval.

RESULTS

To analyze the psychometric characteristics of the measurement instrument (EPEVAGRI), the Cronbach's alpha coefficient was calculated, resulting in a good value for the overall coefficient (α=0.913). It was necessary to eliminate items 23 ("Nurses are afraid of serious adverse events from the flu vaccine, so some do not get vaccinated") and 26 ("The low adherence of nurses to the flu vaccine is due to a bad previous vaccination experience") as they had negative values, indicating that fear of adverse effects and previous vaccination experiences were not related to the phenomenon under study (Pestana and Gageiro, 2014). Additionally, seven items (6, 13, 19, 21, 28, 32, and 33) were excluded because their correlation with the total scale was less than 0.2 (Pestana and Gageiro, 2014).

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The items 2, 4, 8, 11, 16, and 18, being stated in negative sense, were reversed, so their interpretation had to be made in a positive sense. After the extraction of the above-mentioned items, the internal consistency of the measurement instrument was re-evaluated (Table 1) by calculating the Cronbach's alpha coefficient, which remained a good indicator of internal consistency for the overall scale (α=0.932) (Hill & Hill, 2016).

Table 1

Analysis of internal consistency of the Scale (38 items) using Cronbach's alpha coefficient (α = 0.932)

ITENS		Mean	Standard deviation	The corrected item-total correlation	The Cronbach's alpha coefficient if the item is eliminated
1	The flu vaccine is important due to the pandemic context (COVID-19 pandemic)	3.976	1.131	0.478	0.930
2	The flu vaccine is not necessary or beneficial	4.507	0.851	0.351	0.931
3	The flu vaccine is important to prevent a dual infection (e.g., influenza and the novel coronavirus)	3.638	1.355	0.444	0.931
4	The flu is a benign and self-limiting disease, dispensing the vaccine	4.277	0.957	0.320	0.932
5	The flu vaccine protects me from seasonal flu	3.985	1.110	0.513	0.930
7	The flu vaccine is important to prevent flu complications	4.466	0.878	0.608	0.930
8	I have a low risk of getting the flu, so I don't consider it important to vaccinate myself	4.233	1.084	0.368	0.931
9	The flu vaccine is important because it prevents the spread of the virus	3.841	1.233	0.545	0.930
10	The flu vaccine is important to prevent infection transmitted by patients	3.780	1.221	0.550	0.930
11	I have doubts about the effectiveness of the flu vaccine	4.102	1.074	0.336	0.932
12	The flu vaccine is important to protect the patient I come into contact with	4.072	1.116	0.629	0.929
14	My colleagues have been vaccinated and encouraged me to get vaccinated	2.998	1.337	0.371	0.932
15	I believe that nurses should get vaccinated against the flu	4.104	1.082	0.750	0.928
16	I do not consider that the patient I come into contact with is at risk if I do not get vaccinated	3.836	1.243	0.379	0.931
18	I prefer natural immunity over the flu vaccine	4.009	1.146	0.400	0.931
20	Nurses get vaccinated because the vaccination conditions are convenient	2.669	1.328	0.214	0.933
22	Nurses get vaccinated against the flu, especially those with chronic diseases	3.473	1.241	0.326	0.932
24	Nurses get vaccinated against the flu to protect their family	3.357	1.177	0.629	0.929
25	Nurses get vaccinated against the flu, especially those who live with a high-risk person	3.431	1.187	0.549	0.930
27	Nurses get vaccinated, especially those who live or interact daily with children	2.895	1.170	0.472	0.930
29	Nurses get vaccinated, especially those who live with one or more people with chronic illness	3.113	1.211	0.514	0.930
30	Nurses get vaccinated against the flu, especially those who live with a person aged 65 and older	3.067	1.215	0.536	0.930
31	Nurses get vaccinated against the flu, especially those who live with a pregnant woman	2.834	1.216	0.477	0.930
34	Nurses get vaccinated against the flu, especially to avoid missing work and medical certificates	2.311	1.102	0.230	0.933
35	Nurses get vaccinated against the flu, especially out of habit from previous years	2.980	1.187	0.273	0.932
36	Nurses have updated knowledge about the flu, its pathogenesis, and transmissibility, so they get vaccinated against the flu	3.743	1.069	0.489	0.930
37	The flu is a potentially serious illness	3.932	0.961	0.519	0.930
38	As a nurse, I have a responsibility to get vaccinated against seasonal flu to protect everyone and reduce the spread of the Influenza virus	4.068	1.103	0.773	0.928
39	The flu vaccine is the most effective method to prevent the flu and its complications	4.026	1.078	0.758	0.928
40	Flu vaccination within the community reduces the workload during an epidemic	3.850	1.094	0.656	0.929
41	Nurses should be vaccinated against the flu to ensure the continuity of health services	3.654	1.150	0.707	0.928
42	The flu can cause a nosocomial infection outbreak	3.669	1.130	0.576	0.920
43	The Ministry of Health provides free flu vaccination to healthcare professionals	4.470	0.949	0.452	0.931
44	Surgical mask use should be mandatory for healthcare professionals not vaccinated agains the flu in healthcare facilities during the critical phase of the flu season	3.523	1.313	0.452	0.931

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45	The flu vaccine has a very important positive contribution to my health and well-being	3.839	1.110	0.740	0.928
46	Seasonal flu is one of the leading causes of increased absenteeism in the workplace and schools	3.401	1.114	0.563	0.930
47	I recommend the flu vaccine to my family members, friends, and patients	4.161	1.053	0.707	0.928
48	The flu vaccine should be mandatory for nurses	2.834	1.399	0.446	0.931

The Kaiser-Meyer-Olkin (KMO) measure of 0.935 indicated a good sample adequacy, and the Bartlett's test of sphericity yielded a value of $x^2 = 11601.289$; p = 0.000, which allowed for proceeding with the factor analysis.

Table 2

Principal factor matrix using *Varimax* rotation with Kaiser normalization

ITENS - EPEVAGRI	FATORES						
	F1VFlu	F2VFlu	F3VFlu	F4VFlu	F5VFlu	F6VFlu	F7VFlu
37	0.670						
39	0.662						
7	0.640						
40	0.592						
43	0.588						
5	0.581						
38	0.552						
36	0.548						
47	0.508						
42	0.507						
15	0.491						
30		0.910					
29		0.898					
31		0.860					
25		0.788					
27		0.725					
24		0.682					
18			0.735				
11			0.729				
8			0.710				
2			0.674				
4			0.671				
16			0.654				
48				0.719			
44				0.706			
46				0.579			
45				0.555			
41				0.518			
10					0.770		
9					0.765		
12					0.634		
20						0.660	
34						0.627	
35						0.516	
14						0.508	
22						0.399	
1							0.743
3							0.719

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Eigenvalue	11.78	4.29	2.11	1.52	1.36	1.11	1.04
Explained Variance	31.24	11.28	5.55	4.01	3.59	2.91	2.75
Total Variance	61.33%						
KMO	0.935						
Sig,	0.000						

KMO - Kaiser-Meyer-Olkin

Sig. – Significance

From the factorial analysis, a differentiation of the items into 7 factors resulted, explaining together 61.33% of the total variance. The designation of the factors was made afterwards, based on the empirical analysis of the items aggregated in each factor, taking into account their rational meaning.

Factor 1, named "vaccine impact," explains 31.24% of the total variance and represents items reflecting the impact of the flu and the vaccine. Factor 2, "protection of family members," explains 11.28% of the variance and includes items related to the importance of flu vaccination for the protection of family members. Factor 3, named "efficacy," explains 5.55% of the variance and covers items related to the efficacy of the vaccine. Factor 4, "organizational context," explains 4.01% of the variance and refers to items related to the organizational aspect. Factor 5, named "infection control strategy," explains 3.59% of the variance and integrates items related to infection control strategies. Factor 6, "nurses' motivation," explains 2.91% of the variance and aggregates items related to nurses' motivation for vaccination. Finally, Factor 7, named "pandemic context," explains 2.75% of the variance and is related to the pandemic context caused by COVID-19. It is concluded that the EPEVAGRI presents good psychometric characteristics, both in validity and reliability, as evidenced by the results of the Cronbach's alpha coefficient and the KMO value.

The relationships between the total and the various factors of the EPEVAGRI were explored through the analysis of Pearson correlation coefficients (Table 3).

Table 3

Pearson Correlation Test Results between Factors and the Overall EPEVAGRI

	F1VFlu	F2VFlu	F3VFlu	F4VFlu	F5VFlu	F6VFlu	F7VFlu	TotalVFlu
F1VFlu (Vaccine Impact)	1							
F2VFlu (Protection of Family Members)	0.415 **0.000**	1						
F3VFlu (Efficacy)	0.491 **0.000**	0.094 **0.029**	1					
F4VFlu (Organizational Context)	0.740 **0.000**	0.385 **0.000**	0.418 **0.000**	1				
F5VFlu (Infection Control Strategy)	0.631 **0.000**	0.341 **0.000**	0.360 **0.000**	0.516 **0.000**	1			
F6VFlu (Nurses' Motivation)	0.373 **0.000**	0.527 **0.000**	-0.088 **0.040**	0.306 **0.000**	0.246 **0.000**	1		
F7VFlu (Pandemic Context)	0.504 **0.000**	0.268 **0.000**	0.269 **0.000**	0.389 **0.000**	0.474 **0.000**	0.195 **0.000**	1	
TotalVFlu	0.903 **0.000**	0.664 **0.000**	0.542 **0.000**	0.803 **0.000**	0.706 **0.000**	0.5331 **0.000**	0.570 **0.000**	1

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Regarding nurses' perception of the flu vaccine, it was found that participants had a mean score for the overall EPEVAGRI items of 3.66 (±0.61), indicating a tendency towards agreement regarding the importance of flu vaccination.

DISCUSSION

The discussion of the results takes into account some limitations of the study, which require caution in their interpretation. These include the specificity of the sample and the lack of instruments coinciding with the specific construct, which prompted the construction of this scale. These aspects limit the possibility of establishing comparisons regarding the psychometric characteristics of the scales. However, this study allows for comparison of the construct with existing specific literature and suggests paths that can be followed, indicating the use of EPEVAGRI in future research.

The high internal consistency is confirmed by the Cronbach's alpha coefficient of the final scale, and the factor analysis with *Varimax* rotation grouped the items into seven factors: (1) the impact of influenza and the vaccine, (2) protection of family members, (3) efficacy, (4) organizational measures, (5) infection control strategies, (6) nurses' motivations, and (7) the current pandemic context caused by COVID-19.

Many factors influence nurses' perceptions and decisions regarding influenza vaccination, and therefore their vaccination coverage (Gołębiak et al., 2020; Colaprico et al., 2022). It is understood that, for a positive influence, strategies targeting the factors described above should be implemented.

In this regard, the literature highlights the importance of considering organizational factors and factors sensitive to change, related to individual behavior (Moretti et al., 2020; Chan et al., 2021).

Different studies indicate that having knowledge about the influenza virus and the importance of flu vaccination is essential to improve nurses' adherence to vaccination (Madewell et al., 2021; Samyn, 2021; Colaprico et al., 2022), as well as to increase their recommendation, particularly to patients (Yu et al., 2019). Naturally, lack of knowledge leads to doubts about the effectiveness of the flu vaccine, distorting nurses' perception, so it should be strongly emphasized in future flu vaccination campaigns (Yu et al., 2019; Madewell et al., 2021; Mignot et al., 2020; Moretti et al., 2020; Colaprico et al., 2022).

Similarly, other studies reinforce the need to discuss the protection of family members, as it is one of the main factors for raising awareness about flu vaccination among nurses (Yu et al., 2019; Moretti et al., 2020; Neufeind, 2020).

In close contact with patients, nurses' flu vaccination is seen as an infection control strategy, so efforts should be made to raise awareness (Samyn, 2021; Colaprico et al., 2022).

The pandemic context caused by COVID-19 has influenced healthcare professionals' perception of the flu vaccine, likely due to increased awareness of viral respiratory diseases (Di Giuseppe et al., 2021; Robbins et al., 2021).

In this study, the dimensions of the EPEVAGRI scale correlate positively with each other, except for the dimension of vaccine efficacy and vaccine motivation. This could be explained by the fact that some items in the motivation dimension refer to conditions that nurses may not have, such as chronic illness or previous vaccination. That is, as nurses recognize the effectiveness of vaccination, their motivation to

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vaccinate decreases. This may also be related to the fact that the sample consists of relatively young individuals (mean age of 41.21 years ± 9.582), and the majority do not feel vulnerable to the disease or do not have chronic illnesses or disabilities, sometimes preferring disease-induced immunity over vaccination.

CONCLUSION

Healthcare professionals, particularly nurses, play a crucial role in promoting adherence to seasonal influenza vaccination among eligible populations. It is known that this role can be influenced by nurses' perceptions of influenza vaccination. Understanding nurses' perceptions of influenza vaccination is essential because it affects the promotion of adherence to seasonal influenza vaccination among eligible populations. Although there are some scientific studies conducted in different countries on the level of knowledge, attitudes, and adherence to vaccination among nurses, there is limited research in Portugal. This study aimed to construct and validate a scale of nurses' perceptions regarding seasonal influenza vaccination, making nurses' perceptions of seasonal influenza vaccination measurable.

Overall, the EPEVAGRI demonstrates good psychometric properties in both reliability and validity, thus acquiring potential for use in scientific research. This study has shown that the EPEVAGRI can be a useful tool in assessing nurses' perceptions of seasonal influenza vaccination, and its future use is recommended. Therefore, it is recommended that further studies be conducted to assess nurses' knowledge, attitudes, and adherence to seasonal influenza vaccination and to improve immunization promotion campaigns among nurses. This approach could be extended to other healthcare professionals, directing policies and intervention strategies to promote vaccination adherence among eligible populations, with the aim of preventing the spread of seasonal influenza in the community.

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