



Nursing knowledge, attitudes, and practices on adverse events from COVID-19 vaccines*

Conhecimentos, atitudes e práticas da enfermagem sobre os eventos adversos das vacinas contra covid-19*

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ABSTRACT

Objective: To assess the knowledge, attitudes, and practices of nursing staff regarding adverse events from COVID-19 vaccines. **Method:** Methodological and participatory study through the construction and validation of a Knowledge, Attitudes, and Practices (KAP) survey on the adverse events of COVID-19 vaccines, carried out with 5 expert judges, and the subsequent application of the instrument to 16 primary health care professionals working in the municipality of Recife-PE. **Results:** the instrument was finalized with 21 items, considered valid in content, and with satisfactory CVI values (> 0.80). In the assessment of health professionals, 37.5% had adequate knowledge, 56.25% had positive attitudes and 25% had adequate practice. **Conclusion:** the survey was validated in terms of content, from a multi-professional perspective, and applied to the target audience, and is considered an important tool to add to active and effective qualification strategies on good vaccination practices.

Descriptors: Health Knowledge, Attitudes, Practice; COVID-19 vaccines; Nursing; Drug-Related Side Effects and Adverse Reactions; Primary Health Care.

RESUMO

Objetivo: Avaliar os conhecimentos, atitudes e práticas da equipe de enfermagem acerca dos eventos adversos das vacinas contra a COVID-19. **Método:** Estudo metodológico e participativo por meio de: construção e validação de um inquérito do tipo Conhecimentos, Atitudes e Práticas (CAP) acerca dos eventos adversos das vacinas contra a covid-19, realizado com 5 juízes especialistas; e posterior aplicação do instrumento a 16 profissionais da atenção primária em saúde que atuam no município de Recife-PE. **Resultados:** o instrumento foi finalizado com 21 itens, considerado válido em conteúdo e com valores de IVC satisfatórios ($> 0,80$). Na avaliação com os profissionais de saúde, 37,5% apresentaram conhecimento adequado, 56,25%, atitudes positivas e 25% tiveram a prática adequada. **Conclusão:** o inquérito foi validado quanto ao conteúdo, em uma perspectiva multiprofissional, e atuantes na área de imunização, aplicado ao público-alvo a que se destina, sendo considerado uma ferramenta importante para somar às estratégias de qualificações ativas e efetivas sobre boas práticas em vacinação.

Descritores: Conhecimentos, Atitudes e Prática em Saúde; Vacinas contra COVID-19; Enfermagem; Efeitos Colaterais e Reações Adversas Relacionadas a Medicamentos; Atenção Primária à Saúde.

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INTROCUCTION

The sudden public health emergency caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) virus, responsible for the COVID-19 pandemic, has had an expansive impact on various political and social scenarios, including the daily lives and ways of thinking of billions of people around the world.¹⁻² The control and prevention of morbidity and mortality has become a global priority through the discovery of vaccines that would allow the virus to be controlled along with other public health measures to contain the disease in the population.³⁻⁴

In 2021, Brazil developed a National Plan for the Operationalization of Vaccination against COVID-19 to be implemented rapidly in all regions, to initially target the main risk groups, such as healthcare workers and the elderly. The plan's goal was to achieve 80% coverage of the population over 12 years of age vaccinated with two doses by the end of the year.⁵ The proposal was coordinated by the Ministry of Health, which mobilized resources, acquired immunobiological substances and supplies, coordinated information between the three spheres of management of the Brazilian Unified Health System (SUS) with laboratories, and created vaccination points, such as the drive-thru strategy.⁶

The COVID-19 vaccine poses a major challenge due to the fast pace of production and clinical trials; the inclusion of new technologies in its production process; the gradual increase in new variants of the virus, leading to a decrease in the effectiveness of some vaccines and the need for new doses and vaccine boosters. In addition, the various fake news stories disseminated by the media, contrary to the effects of the immunobiological, coupled with the weakness of the federal government as a policymaker in instituting active and positive communication about vaccination in the country, resulted in high fear among the population about the possible adverse events of the immunobiological.⁶⁻⁹

Adverse Events Following Immunization (AEFI) are any unwanted reaction following the administration of an immunobiological, whether local or systemic, which may or may not be caused by the vaccination of any immunobiological. They can be due to the administration technique, the type of vaccine, attenuated or not, the strain, and the characteristics of the vaccinated person, such as age, reaction to previous doses, allergic diseases, and immune deficiency, and can occur up to

48 hours after vaccination, varying according to the individual and the immunobiological used.¹⁰ In Brazil, because of the inclusion of COVID-19 vaccines not yet included in the National Immunization Program (PNI), a specific system has been adopted for the notification and surveillance of post-vaccination adverse events, *e-SUS Notifica*. This system can be accessed by any health professional to notify the reactions observed and felt by the user.¹¹

Primary health care is the gateway to the Brazilian Unified Health System (SUS), with the greatest links to the population, and it is therefore essential that its health professionals are active, knowledgeable, skilled, and qualified in the means and types of surveillance and notification of AEFI.¹²⁻¹⁴

The level of knowledge of the nursing team that makes up primary health care actively reflects on the vaccination coverage rates of their assigned population. To this end, knowledge of the particularities of each vaccine, dosages for each age group, and adverse events are essential for good acceptance and strengthening the bond with the population.^{13,15}

In the event of AEFI, the nursing team in primary health care carries out specific procedures, including welcoming, health education, use of correct techniques for administering and handling immunobiologicals, guidance and clarification about vaccination and possible doubts, as well as guidance on AEFI. Among these actions, welcoming is seen as favoring the development of trust and commitment between health professionals and individuals.¹³

In this sense, it is also essential to assess the suitability of these professionals for the new vaccines, as well as to develop health assessment tools. It is known that integrating new health technologies makes it possible to promote positive impacts in terms of quality of care and prevention of health problems, especially to reduce gaps in access to information.¹⁶⁻¹⁸

Recognizing the specificities of this health context, this study is justified by the growing need for updated data in the literature and, with this, the development of relevant indicators for evaluating the performance and intrinsic skills of the professionals involved.

OBJECTIVE

To assess the knowledge, practices, and attitudes of primary health care staff in Health District IV of the municipality of Recife regarding adverse events

from COVID-19 vaccines.

METHOD

This is a methodological and participatory study, conducted in three stages to create a survey-type instrument, validate it, and apply it to the target audience.

The first stage involved the process of constructing the data collection instrument, based on the Knowledge, Attitudes, and Practices (KAP) methodological strategy. This facilitates an educational diagnosis of the study population, and adapts to different contexts, enabling strategies and interventions aimed at the specific needs of individuals or communities, contributing to improved planning and health initiatives.¹⁷

Knowledge is understood as the ability to record or understand elements of the process of learning and understanding knowledge to solve problems. Attitude involves the formation of opinions and feelings associated with specific objectives or situations. In turn, practice represents decision-making to carry out a concrete action.¹⁷

In this phase, a survey of the scientific literature on adverse events from COVID-19 vaccines was carried out, including an extensive reading of manuals, protocols, and package leaflets for immunobiologicals available in Brazil. In addition to topics related to active surveillance of adverse events following vaccination, and validation methodology as a quantitative instrument.¹⁷

The final instrument had 21 closed questions, structured to be self-administered and divided into three segments to be assessed in the proposed survey: "knowledge, attitudes, and practices". It was based on another CAP study and the guidelines of the Ministry of Health's 2020 manual on adverse events following vaccination.^{17,19}

The second stage consisted of validating the content of the CAP survey with expert judges obtained through the Lattes Platform (CNPq), considering the criteria of knowledge and recent scientific production related to the topic (vaccination; public or collective health and/or health technology and/or management). The criteria for constructing the panel of judges followed the one proposed by Fehring, and those selected had at least two criteria: between degrees, clinical skills, experience in the subject discussed, and specialized knowledge. All those selected received an invitation letter by e-mail containing an initial presentation by the

researcher; explanations about the research topic; a copy of the Research Ethics Committee's opinion; an Informed Consent Form; a Googleforms® link containing the survey and instructions on how to carry out the validation, which was based on the Nursing Diagnosis Content Validation model proposed by Fehring, in which the instrument is evaluated on three criteria: objective, clarity and relevance. Composed of Likert-type statements, 0= inadequate, 1= partially adequate and 2= adequate, 05 judges took part in this process.²⁰

The last stage was carried out in six family health units in Health District IV, in the municipality of Recife-Pernambuco, from August 2021 to September 2022. Nursing professionals were invited and, upon accepting, received an e-mail with guidelines, a link to access the Informed Consent Form (ICF), and a KAP-type survey instrument.

To analyze the results, adequate knowledge was considered when: the health professional reported knowing the post-vaccination adverse events manual, the concept of a post-vaccination adverse event, its classifications, at least one of the main post-immunization adverse events arising from COVID-19 vaccines, and they knew the electronic system for reporting post-vaccination adverse events, or inadequate, when they reported not knowing the manual, did not know how to classify a post-vaccination adverse event, as well as did not know how to recognize at least one event arising from COVID-19 vaccines and how to report it.

The adequate attitude was when the professional recognized the responsibility of primary health care units and, with that, the team itself, to monitor and report these events, whether they were serious or not; or inadequate when they thought that reporting and monitoring these events was not necessary, nor as one of the responsibilities of care.

Appropriate practice was estimated when the professional reported possible post-vaccination adverse events, assessed the presence of flu-like symptoms before vaccination, advised users of possible local events and subsequent dose dates, and warned them to return to the service if anything different occurred, or inadequate practice was estimated when they did not report these events, nor did they assess complaints of flu or fever before vaccination, as well as providing guidance on these possible events.

To organize and analyze the data, a database was built in the Epi Info™ program, version 3.5.2, where validation was carried out (double entry for later

comparison and correction of discrepancies). The results were categorized into table formats with frequencies.

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RESULTS

The construction of the guiding instrument, the knowledge, attitudes, and practices (KAP) survey on adverse events from COVID-19 vaccines, considered: recent manuals on adverse events in immunization, mainly the 2020 Epidemiological Surveillance Manual for Adverse Events Following Vaccination and the list of vaccines available in the COVID-19 vaccination program in the municipality of study. It was composed of 21 questions, self-administered, comprising three aspects: individual characterization: sociodemographic aspects, such as age, the highest level of qualification, and reading of technical material; knowledge: it focuses on variables about content on the subject, to level the professional's knowledge and understanding of what adverse events from Covid-19 vaccines are and what they are; and attitudes and practices: it contains variables about how the professional acts in a situation of surveillance of adverse events following COVID-19 vaccination and/or how they carry out this safety action.²⁰

As for the profile of the judges participating in the validation of the content of the instrument, the majority were residents of the state of Pernambuco, 2 (40%), predominantly aged over 50, 3 (60%), nurses 2 (40%), doctors 2 (40%) and a dentist, 3 (60%) were women and all had a doctorate as their highest degree.

The judges validated the content of the instrument based on four aspects: presentation, objectives, structure, and the relevance of the instrument. In the first stage, the concordance index for the content was greater than or equal to 0.80, but two aspects were inadequate, resulting in corrections, namely the clarity and conciseness of the instrument's objective and the language that was easy for health professionals to understand, as can be seen in table 1.

Table 1. Judges' agreement on the suitability of the questionnaire (n=3)

Aspect addressed	n	%	I-CVI ¹	p-value
OBJECTIVES				
1.1 Are the contents consistent with the objective of the KAP survey? 5 100 1 0,328 ³	5	100	1	0.328 ³
1.2 Are the objectives of the survey on assessing the knowledge, practices, and attitudes of health professionals about the adverse effects of COVID-19 vaccines clear and concise? 3 60 0.6 0.58 ²	3	60	0.6	0.58 ²
1.3 Is the information presented scientifically, correct?	5	100	1	0.328 ³
1.4 Is there a logical sequence to the proposed content?	4	80	0.8	0.672 ³
1.5 Is the information/content important for the quality of care provided and the consolidation of good immunization practices?	5	100	1	0.328 ³
1.6 Does it encourage changes in behavior?	5	100	1	0.328 ³
STRUCTURE AND PRESENTATION				
2.1 Is the questionnaire appropriate for health professionals?	5	100	1	0.328 ³
2.2 Is the language used easy for health professionals to understand?	3	60	0.6	0.58 ²
2.3 Are the data presented in a structured and objective manner?	4	80	0.8	0.627 ³
2.4 Does it contain necessary information?	5	100	1	0.328 ³
RELEVANCE				
3.1 Does it contribute to knowledge in the field?	5	100	1	0.328 ³
3.2 Does the topic portray key aspects that should be reinforced in post-vaccination adverse event care, with an emphasis on COVID-19 vaccines?	5	100	1	0.328 ³
3.3 Does it propose the construction of knowledge?	5	100	1	0.328 ³

¹Content validity index.

²p-value of the Binomial test (H0: p=0.80 x H1: p<0.80).

³p-value of Binomial test (H0: p=0.80 x H1: p>0.80).

Source: authors (2022).

All the experts' suggestions were accepted, with the last validation involving three judges from the previous group. Table 2 shows that all the items evaluated had a content agreement index greater than 0.80 and showed statistical significance in the binominal test regarding the objective, structure presentation, and relevance of the questionnaire.

Table 2. Judges' agreement on the adequacy of the questionnaire (n=3)

Aspect addressed	n	%	I-CVI ¹	p-value
OBJECTIVES				
1.1 Are the contents consistent with the objective of the KAP survey?	3	100	1	0.512 ³
1.2 Are the objectives of the survey on assessing the knowledge, practices, and attitudes of healthcare professionals about the adverse effects of COVID-19 vaccines clear and concise?	3	100	1	0.512 ³
1.3 Is the information presented scientifically, correct?	3	100	1	0.512 ³
1.4 Is there a logical sequence to the proposed content?	3	100	1	0.512 ³
1.5 Is the information/content important for the quality of care provided and the consolidation of good immunization practices?	3	100	1	0.512 ³
1.6 Does it encourage changes in behavior?	3	100	1	0.512 ³
STRUCTURE AND PRESENTATION				
2.1 Is the questionnaire appropriate for health professionals?	3	100	1	0.512 ³
2.2 Is the language used easy for health professionals to understand?	3	100	1	0.512 ³

2.3 Is the data presented in a structured and objective manner?	3	100	1	0.512 ³
2.4 Does it contain necessary information?	3	100	1	0.512 ³
RELEVANCE				
3.1 Does it contribute to knowledge in the field?	3	100	1	0.512 ³
3.2 Does the topic portray key aspects that should be reinforced in the care of adverse events following vaccination, with an emphasis on COVID-19 vaccines?	3	100	1	0.512 ³
3.3 Does it propose the construction of knowledge?	3	100	1	0.512 ³

¹Content validity index.

²p-value of the Binomial test (H0: p=0.80 x H1: p<0.80).

³p-value of Binomial test (H0: p=0.80 x H1: p>0.80).

Source: authors (2022).

In the evaluation stage of the study, 11 nurses and five nursing technicians took part, the majority of whom were female, 13 (81%). As for further training among the professionals with higher education, 5 (31%) of them had specialist qualifications in their area of work, and 6 (6%) had a master's degree.

The survey has a maximum score of 21 points, with each question being equivalent to one point. As a percentage of correct answers, 2 (12%) of the professionals got between 5 and 10 points right, 7 (44%) between 11 and 15 points, and 7 (44%) between 16 and 20 points, as can be seen in Table 3.

Table 3. Knowledge, attitude, and practice of nursing professionals about adverse events of the COVID-19 vaccine, Recife- PE, 2022. (n=16)

Knowledge domain results n=16 (%)			
Question topic	Hits/Yes	Errors/No	
To know the Manual for the epidemiological surveillance of adverse events following vaccination	56.2	43.8	

To know the Protocol for the Epidemiological and Health Surveillance of Adverse Events Following Vaccination for the vaccination strategy against the SARS-CoV2 virus (COVID-19).	31.2	68.8
Post-vaccination adverse events.	56.2	43.8
Serious adverse events following vaccination.	100	0
Factors associated with adverse events.	75	25
Very common symptoms of COVID-19 vaccines.	93.7	6,3
Frequency of joint pain or muscle pain after COVID-19 vaccination.	43.8	56.2
Lymph node enlargement after administration of the recombinant COVID-19 vaccine.	81.2	18.8
Adverse event of the diarrheal type following vaccination against COVID-19 by the Pfizer vaccine.	12.5	87.5
Know the form for reporting and investigating adverse events following vaccination made available by the Ministry of Health.	81.2	18.8
The e-SUS Notifica electronic system for reporting adverse events following vaccination.	62.5	37.5
Attitude domain Results n (%)		
Question topic	Hits/Yes	Errors/No
Monitoring adverse events following vaccination in primary care.	81.2	18.8
Classification according to the severity of the post-vaccination adverse event.	81.2	18.8
Post-vaccination adverse events are considered non-serious.	62.5	37.5
Local and systemic non-serious adverse events following vaccination.	62.5	37.5
Investigation of a serious adverse post-vaccination event after the first dose.	100	0

Domain Practice results n (%)		
Question topic	Hits/Yes	Errors/No
Reporting time for serious adverse events.	81.2	18.8
Notification of flu-like symptoms following vaccination against COVID-19	18.8	81.2
User guidance on possible local adverse events, subsequent dose dates, and alerts.	100	0
Pre-vaccination assessment of the presence of flu-like syndromes and fever episodes.	100	0
Control of ideal temperatures in COVID-19 vaccines	87.5	12.5

Source: authors (2022).

Table 4. Assessment of the adequacy of knowledge, attitude, and practices of nursing professionals regarding adverse events of the COVID-19 vaccine, Recife-PE, 2022. (n=16).

Evaluation of the domains	Evaluated Domain		
	Knowledge	Attitude	Practice
Adequate	6(37.5%)	9(56.25%)	4(25%)
Inadequate	10(62.5%)	7(43.75%)	12(75%)

Source: authors (2022).

When assessing the adequacy of professionals' knowledge, attitude, and practice about adverse events caused by COVID-19 vaccines, only 6 (37.5%) had adequate knowledge, 9 (56.25%) had positive attitudes towards taking responsibility and reporting these events, and 4 (25%) practiced adequate reporting and effective management of AEFI. There was a statistically significant difference between the adequacy of knowledge, attitude, and practice, indicating that practice and knowledge have a higher prevalence of non-adequacy, while attitude has a significantly higher prevalence of adequacy.

DISCUSSION

The use of evaluative technologies in health has been improved, such as the use of knowledge, practices, and attitude (KAP) surveys, specifically around nursing, to improve and support care practices and knowledge in different

application scenarios. The aim is not only to disseminate information but also to encourage a detailed evaluation based on a scientific and validating approach, thereby ensuring the effectiveness of the care and systems implemented.²¹⁻²²

The results found in the study show weaknesses in scientific knowledge on strategic points, attitudes, and practices that demonstrate the need to understand the primary role of the notifier and health watchdog. This was based on the scientific foundation of recognizing and knowing how to act in the event of an adverse event, whether serious or not.

Knowing adverse event manuals and protocols has a positive impact on the conduct and good practice when managing cases of people with adverse events, resulting in better identification and appropriate standardized conduct. Of the study's findings, less than half of the professionals were aware of the Adverse Event Surveillance Protocol for COVID-19 vaccination.^{23,24}

In the current scenario of doubts and fears about COVID-19 vaccines, knowing the package leaflets and the main adverse events that they may be causing are extremely important factors for the health team to have skills and technical-scientific mastery. The data obtained in the study raises issues of concern. Only half of the participants were aware of what an adverse event following vaccination (AEFI) might be, and fewer than that were aware that diarrheal events following administration of the Pfizer COVID-19 vaccine and the frequency of joint pain or muscle pain following COVID-19 vaccination were common.²⁵⁻²⁶

A similar result was found in a study carried out in Ceará, where it was possible to observe superficial knowledge, both measures to be taken in cases of adverse events and of the existence of AEFI manuals and protocols.²⁷

It is important to note that the municipality studied began the process of collective vaccination against COVID-19 using spaces at universities and public centers, in drive-thru formats or facilities adapted for vaccination, through the implementation of an online vaccination appointment system. There has also been little public awareness of possible adverse events following vaccination and how to proceed if they occur.

In another study on users' perceptions of access to vaccination, the lack of knowledge of possible AEFIs emerges as a factor that compromises continuity and willingness to be vaccinated. Although vaccination has currently been promoted as

a form of prevention, the strengthening of health education in the vaccination room by primary health care professionals is an intrinsic necessity for achieving goals.²⁸

Regarding guidance to users on possible local adverse events, dates of subsequent doses, and warnings, all the professionals taking part in the survey knew how to provide information to users. When well instructed, users tend to pay more attention to the signs and symptoms and follow the instructions given by the returning professionals, as well as informing the service in the event of possible post-vaccination adverse events.^{12,29}

This bond of reliability and guidance is intrinsically important, and it is up to nurses to play an educational role at vaccination times, being a highly influential figure in the adherence of this user, in the scenario of notifications and investigations, contributing to the reduction of underreporting of AEFI. It also strengthens the user's confidence in primary health care and in vaccination, helping them to become more adept at vaccination.^{12,28}

Among the specific measures that contribute to the prevention of AEFI and, at the same time, to users' adherence to vaccination, is an adequate assessment on arrival at the unit. They check for possible contraindications and if there is a need to postpone a vaccine or not, as well as taking care with temperature control and the correct handling and administration of immunobiologicals. According to this survey, all professionals carry out an initial assessment of the presence of flu-like syndromes and fever episodes, and most of them know the temperature control ideas for COVID-19 vaccines.^{13,25,28}

Primary health care has a key role to play in reporting and investigating adverse events following vaccination. The attitude of recognizing this responsibility and knowing the notification form facilitates the insertion of variables into the institutional notification platform for these vaccines and are therefore considered factors of great importance for the continuity of this practice and the reduction of underreporting.^{24,22,15}

It was noted that most professionals are familiar with the Ministry of Health's AEFI notification form and agree that primary healthcare units have a responsibility to monitor, and help vaccinated people who are allegedly affected by adverse events associated with the vaccine(s); however, there is a weakness in knowing the means of notification.^{22,23}

A similar study carried out in Ghana points out that there is a direct

relationship between the increase in AEFI notification rates by professionals who have a higher level of annual training on the subject and the weakness in the transmission of knowledge about pharmacovigilance and its importance. Professional training at universities and colleges can also lead to possible setbacks in the diagnosis, management, prevention, and reporting of AEFI.²⁹

Considering this, the lack of support in terms of knowledge, attitudes, and practices, as seen in our results, tends to be due to several factors, including lack of professional training related to the vaccination room, overload of services in health units, as well as the recent transfer of vaccination against Covid-19 to these units.

Among the methodological limitations of this study, we highlight the fact that data collection took place online, in compliance with the rules of the current CEP, Resolution 466/12, which involves research with human beings, of the National Health Council of the Ministry of Health, considering the aspects of autonomy, non-maleficence, beneficence, and justice. As a result, there was little adherence to the invitations sent to professionals. Regarding validation, the time taken to obtain responses was also prolonged due to the difficulty in getting specialists to accept. Exploratory factorial validity was also not checked, to analyze the internal consistency of the instrument and the satisfactory number of questions to measure what the construct is intended to investigate. It is also suggested that studies be carried out into the psychometric analysis of the instrument used, to better adapt the scores suggested for evaluating the domains.³⁰

CONCLUSION

The results indicate that there are shortcomings and limitations in the nursing team's knowledge, attitudes, and practices regarding adverse events following vaccination. As a result, there is a need for strategies that enable: professional performance, adding knowledge about the new protocols for COVID-19 vaccines, updating immunization practices through professional training, such as continuing education, as well as expanding the topic addressed in other districts of the municipality.

In addition, the results obtained are beneficial to the scientific community and society, as they include up-to-date data that can provide subsidies for new

improvement and quality actions that help manage care at all levels of comprehensive healthcare.

CONTRIBUTIONS

The authors of this study contributed equally to the development of the research, collection, analysis, discussion of the data and writing of the text, as well as reviewing the content.

CONFLICTS OF INTERESTS

Nothing to declare.

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