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SCREENING OF METALLIC HYPERSENSITIVITY BY HEALTH PROFESSIONALS AND STUDENTS IN CLINICAL-SURGICAL PRACTICE

RASTREAMENTO DA HIPERSENSIBILIDADE METÁLICA PELOS PROFISSIONAIS E ESTUDANTES DE SAÚDE NA PRÁTICA CLÍNICO-CIRÚRGICA

SEGUIMIENTO DE LA HIPERSENSIBILIDAD METÁLICA POR PROFESIONALES Y ESTUDIANTES DE SALUD EN LA PRÁCTICA CLÍNICO-QUIRÚRGICA

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Objective: to investigate the screening of metallic hypersensitivity performed by health professionals and students during clinical-surgical practice. Method: an exploratory-descriptive study conducted with 228 health professionals and students, through a semi-structured electronic questionnaire, applied during April and May 2021, analyzed through descriptive statistics and the frequency of words. Results: 11.0% of participants conducted research on metallic hypersensitivity. 67.1% stated that they could very likely include this theme during screening in their care. Lack of knowledge about metal allergy and multifactorial causes during clinical-surgical practice were cited as barriers to the implementation of metallic hypersensitivity screening. Conclusion: there is little evidence of metallic hypersensitivity screening in patients during the clinical-surgical practice of health professionals and students.

Descriptors: Metals. Hypersensitivity. Allergy. Allergic Reaction. Adverse Event.

Objetivo: investigar o rastreamento da hipersensibilidade metálica realizada pelos profissionais e estudantes de saúde durante a prática clínico-cirúrgico. Método: estudo exploratório-descritivo realizado com 228 profissionais e estudantes da área da saúde, por meio de questionário eletrônico semiestruturado, aplicado durante abril e maio de 2021, analisado por meio da estatística descritiva e da frequência de palavras. Resultados: 11,0% dos participantes realizaram a investigação sobre a hipersensibilidade metálica. 67,1% declararam que muito provavelmente poderiam incluir essa temática durante a triagem em seus atendimentos. Falta de conhecimento sobre alergia a metais e causas multifatoriais durante a prática clínico-cirúrgica foram citadas como barreiras para a implementação do rastreamento da hipersensibilidade metálica. Conclusão: pouco se evidencia o rastreamento da hipersensibilidade metálica em pacientes durante a prática clínico-cirúrgica dos profissionais e estudantes de saúde.

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Descritores: Metais. Hipersensibilidade. Alergia. Reação Alérgica. Evento Adverso.

Objetivo: investigar el rastreo de la hipersensibilidad metálica realizada por los profesionales y estudiantes de salud durante la práctica clínico-quirúrgica. Método: estudio exploratorio-descriptivo realizado con 228 profesionales y estudiantes del área de la salud, por medio de cuestionario electrónico semiestructurado, aplicado durante abril y mayo de 2021, analizado por medio de la estadística descriptiva y de la frecuencia de palabras. Resultados: 11,0% de los participantes realizaron la investigación sobre la hipersensibilidad metálica. El 67,1% declaró que muy probablemente podrían incluir esa temática durante la selección en sus atenciones. La falta de conocimientos sobre la alergia a los metales y las causas multifactoriales durante la práctica clínico-quirúrgica se citaron como barreras para la implementación del seguimiento de la hipersensibilidad metálica. Conclusión: poco se evidencia el rastreo de la hipersensibilidad metálica en pacientes durante la práctica clínico-quirúrgica de los profesionales y estudiantes de salud.

Descriptores: Metales. Hipersensibilidad. Alergia. Reacción Alérgica. Evento Adverso.

Introduction

Metallic hypersensitivity is characterized as an excessive immune response caused by lesions or tissue reactions promoted by contact with metals[1].The main metals that cause allergic hypersensitivity are nickel, chromium, cobalt, platinum, mercury, palladium, titanium, iron, molybdenum, zirconium, silver and gold[1].

In the health area, especially in hospital institutions, the presence of metals in work instruments is identified, which can integrate diagnostic, therapeutic or surgical treatment, through their composition in orthoses, prostheses and special materials[2]. The use of metals in surgeries is increasingly frequent and, according to the literature, more than 5 million metal implant surgeries were designed to occur in 2021, being the metal alloys, especially those of titanium and stainless steel, the materials most used in these surgeries[3].

The lack of screening of metallic hypersensitivity by health professionals during their clinical-surgical practice[4] and the non-obligatory performance of contact sensitivity tests to metals[5] may contribute to the increasing number of allergic reactions in patients[6] of surgical reoperations to replace orthoses and implanted prostheses[7] and, consequently, to the elevation of adverse events arising from contact with metals[8]. Therefore, it is important to investigate the screening of metallic hypersensitivity in surgical procedures to produce evidence on its adverse events and to seek preventive measures for patients undergoing these procedures[9].

Interventions with higher rates of adverse events, secondary to metallic hypersensitivity, come from the dental area[10], from coronary surgery[11] from orthopedic surgery[12] and from neurological surgery[6,13]. However, it is believed that there is underreporting[11] of cases of metal allergies in patients who have undergone treatment with the use of orthotics, prostheses and or special materials[2]. This information is essential in the identification of knowledge gaps, as well as in the analysis of research on this subject to achieve a collective understanding.

According to a bibliometric survey[14] there was an increase in publications on metallic hypersensitivity between 1946 and 2020, this scientific progress may be associated with the expansion of technology in surgical procedures involving the use of metals. Thus, the publications on metallic hypersensitivity reactions highlight the importance of metallic screening by health professionals and students in their clinical-surgical practice, in order to reduce risks, reduce hospitalization costs, surgical interventions and generate statistical scientific evidence for the discussion of the theme.

Thus, in order to effectively achieve strategies for the screening of metallic hypersensitivity, scientific evidence is necessary in clinical-surgical

practice in order to increase safety in patient care and ensure the prevention of adverse events.

In this sense, the objective of this study is to identify the screening of metallic hypersensitivity performed by health professionals and students during clinical-surgical practice.

Method

This is an exploratory-descriptive study, with a mixed approach and following the guidelines of Strengthening the reporting of observational studies in epidemiology (STROBE).

The population was composed of health professionals and students from Brazil. We included health professionals and students of technical education, graduate and postgraduate working in clinical-surgical practice, excluding those who did not work directly in patient care, such as management, education, research and administration personnel.

Non-probabilistic sampling by convenience was used for the selection of research participants. Participants were recruited by snowball sampling (snowball), in which the first participants included in the study had the characteristics desired by the researchers, from their contact networks following the inclusion and exclusion criteria. Of these, the subsequent participants unfolded, who in turn indicated new participants and so on, thus constituting the participants of the research.

Data were collected during the months of April and May 2021, through a questionnaire with closed and open questions, with the help of the REDCap® research software platform[15]. The questions of the research instrument dealt with the practices of metallic allergic hypersensitivity screening during the clinical-surgical performance, the barriers of its implementation, brief information on social and professional data.

The objective data were encoded in the Statistical Package for the Social Sciences (SPSS), version 21.0, and analyzed using absolute (n) and relative (%), mean and standard deviation distributions. The subjective data were analyzed using the program WordArt® with the creation of "word cloud", in which it analyzes, through the frequency, the number of times that the word was used by the participants of the research.

The submission of this study was sent to a Research Ethics Committee, followed all ethical precepts and obtained approval under opinion n. 30889120.7.0000.5544.

Results

The sample consisted of 228 participants with a mean age of 30 years (SD 8.9). Of the total participants, 80.9% were female and 19.1% were male. Most were graduate students (41.2%), followed by nursing professionals (37.7%). Regarding the field of activity, there was a predominance of participants who worked in an outpatient clinic (23.7%), followed by an intensive care unit (18.3%) and a medical clinic (17.9%). Table 1 describes the characteristics of the participants.

Table 1 – Characteristics of study participants. Brazil, 2021. (N=228)

(continued)

Characteristics of the participants	n (%)
Age	
18-29 years	131 (57.5)
30-50 years	89 (39.0)
Over 50 years	8 (3.5)
What is your biological sex?	
Feminine	184 (80.9)
Masculine	44 (19.1)
What is your position in clinical practice?	
Student	94 (41.2)

Table 1 – Characteristics of study participants. Brazil, 2021. (N=228) (conclusion)

Characteristics of the participants	n (%)
Nurse	86 (37.7)
Doctor	9 (4.0)
Others	39 (17.1)
What is the main are / unit where you work?	
Outpatient	54 (23.7)
Intensive Care Unit	42 (18.3)
Medical Clinic	41 (17.9)
Surgical center	17 (7.5)
Emergency	11 (4.8)
Surgical clinic	5 (2.2)
Obstetrics	3 (1.3)
Long-term institution	3 (1.3)
Others	52 (23.0)

Source: Created by the authors.

Table 2 shows a predominance of health professionals and students who perform research during their clinical-surgical practice on allergens, such as drugs (97.4%), food (79.8%) and latex (40.4%). However, only 11% of respondents include metallic hypersensitivity screening in clinical-surgical practice.

On the other hand, just over half of the study participants (53.1%) know the consequences of metallic hypersensitivity to patients' health. This indicates that 93% of health professionals and students would incorporate screening questions about metallic hypersensitivity during their clinical-surgical practice (Table 2).

The lack of knowledge and poor identification of allergies in sedated patients are the main difficulties cited by 15.4% of respondents about the barriers to screening for metallic hypersensitivity. In Figure 1, it is possible to verify other words that were part of the context of the responses of the 35 study participants about the difficulties in implementing hypersensitivity screening in clinical-surgical practice.

Table 2 – Distribution of study participants according to the investigation of metallic hypersensitivity. Brazil, 2021. (N=228) (continued)

Investigation of metallic hypersensitivity	n (%)
When caring for patients, what allergens do you examine/investigate?	
Drugs	222 (97.4)
Food	182 (79.8)
Latex	92 (40.4)
Is it part of your routine to investigate metallic hypersensitivity (i.e., allergy to any metal) in treated patients?	
No	203 (89.0)
Yes	25 (11.0)
If you answered Yes to the previous question, how often do you investigate metal allergies? (n=25)	
Few times	11 (44.0)
Normally	8 (32.0)
Always	4 (16.0)
Rarely	1 (4.0)
Never	1 (4.0)
Are you aware that there is a link between metallic hypersensitivity and serious consequences for patients?	
Yes	121 (53.1)

Table 2 – Distribution of study participants according to the investigation of metallic hypersensitivity. Brazil, 2021. (N=228) (conclusion)

Investigation of metallic hypersensitivity	n (%)
No	107 (46.9)
Now that you know the link between metallic hypersensitivity and patient outcomes, how likely are you to incorporate this screening question into your clinical practice? *	
Very likely	153 (67.1)
Likely	59 (25.9)
Neither likely nor unlikely	8 (3.5)
Very unlikely	7 (3.1)
Unlikely	1 (0.4)
Do you identify any difficulties or barriers to the implementation of metallic hypersensitivity screening in your clinical routine?	
No	193 (84.6)
Yes	35 (15.4)

Source: Created by the authors.

* In this question, the participants were offered a previous reading of a paragraph, with the citation of three articles on the scientific evidence of allergies to metals and their consequences.

Figure 1 – Word cloud expressing barriers to the implementation of metallic hypersensitivity screening by study participants. Brazil, 2021. (N=228)

Source: Created by the authors.

Discussion

In this study, the results reveal a low index of investigation of metallic hypersensitivity screening performed by health professionals and students during clinical-surgical practice.

A correlated study[4] showed the majority of respondents as being women and mean age of 35 years, which corroborates the findings of this study. This can be explained by the progression of female insertion in health networks and the predominance of this public in the field of

nursing[16]. Thus, the primary role of nursing in screening, in the identification of allergies during clinical-surgical practice[17] and, consequently, as a possible collaborator in the theme of this study, for intensification of metallic hypersensitivity screening is evident.

In this research, it was found that drug, food and latex allergies are the most investigated during the clinical-surgical practice of health professionals and students. Corroborating this result, a study[4] conducted in 14 different countries found that, among respondents, 96% were researching drug allergy, 81% food allergy and 72% investigated latex allergy. It is noted, therefore, that these items are already well inserted in the clinical-surgical practice of the health professional and is widely discussed in the academic area among students. In contrast, metallic hypersensitivity is still little investigated[18], especially when related to those most commonly used in surgery, such as titanium and stainless steel alloys[3].

Although most of these professionals do not investigate metal hypersensitivity in their routine in clinical-surgical practice, participants point out to be aware that this conduct can mitigate the risk of adverse events, secondary to metal allergy. Failure to perform metallic screening may lead to delayed diagnosis, weaken adequate therapeutic procedures and, consequently, lead to surgical reinterventions and morbidity[8]. Thus, it is believed that the delay diagnosis can be overcome through knowledge, debates, discussions, studies and the inclusion of the theme in the curricula of courses in universities.

From this perspective, it is suggested that universities promote discussions about the risks of metallic hypersensitivity to patients, causing a positive impact on the clinical conduct of health professionals and on the insertion of this element as essential during the anamnesis and clinical examination. Such measures become important tools to overcome barriers to the investigation of metallic hypersensitivity. On the other hand, it is necessary that health institutions create structured alternatives, such as Checklist and Bundles to improve the process of investigation of metallic hypersensitivity during the care of professionals to their patients.

Multifactorial causes, such as the patient's state of consciousness and educational level[6,8], may interfere with the performance and implementation of metallic hypersensitivity screening in clinical-surgical practice. Corroborating the multifactorial causes, this study evidenced as barriers the difficulty and/or impossibility to perform the screening in unconscious or sedated people, as well as the lack of previous knowledge of health professionals about the possible consequences to metal allergy.

In addition to the consequences, the investigation of metallic hypersensitivity should be part of current clinical practice in order to reduce adverse events arising from the use of metals in procedures[6]. The insertion of this routine will bring positive reactions in the healing process and lower risk of adverse events[12], as well as reduce hospital costs in public and private networks[5].

A study[7] showed that metallic screening, before the surgical procedure and through allergic tests, can reduce adverse events secondary to metal allergy, reduce hospital costs and increase the patient's prognosis. Therefore, metallic screening, either by clinical examination or by means of antiallergic tests, proves to be effective in ensuring patient safety, avoiding surgical reopenings and prolonged hospitalization.

The limitations of this study are concentrated on the short time for data collection, due to the consequences of the COVID-pandemic19, as well as the lack of proportional statistical representation of all health professionals and students in the country and by Brazilian regions, which could have provided comparisons between the Brazilian states and sectors of clinical-surgical practice, in addition to the limited number of studies in the literature on the subject, especially in Brazilian research, restricted further discussion. However, the research brings contributions to the area of health and nursing, since it provides indications of the fragility of metallic hypersensitivity screening in patients and the need to include this theme in clinical practice

of health professionals and students for better care and patient safety. On the other hand, it is recommended that more studies occur, aiming to obtain better indexes before the investigation on the screening of metallic hypersensitivity in the clinical-surgical environment, and its efficiency indicators to reduce adverse events associated with metal allergy.

Conclusion

During the clinical-surgical practice of health professionals and students, little is investigated about the screening of metallic hypersensitivity in patients. These results indicate the need for greater investments in university education and continuing education in the hospital environment, which are fundamental for the improvement of skills and updating of knowledge.

However, through prior knowledge and massification of the importance of this practice for patient safety and quality of health care, the interviewees proved feel sensible to include this theme during the service in their professional practice spaces. It should be said that strategies on the investigation of metallic hypersensitivity screening should be implemented and standardized, in order to reduce morbidity and mortality events and promote resources available by both health professionals and students.

Colaborações:

1 – conception and planning of the project: Tássia Teles Santana de Macedo, Itana Lúcia Azevedo de Jesus and Wilton Nascimento Figueredo;

2 – analysis and interpretation of data: Tássia Teles Santana de Macedo, Itana Lúcia Azevedo de Jesus and Wilton Nascimento Figueredo;

3 – writing and/or critical review: Tássia Teles Santana de Macedo, Itana Lúcia Azevedo de Jesus, Wilton Nascimento Figueredo and Dzifa Dordunoo;

4 – approval of the final version: Tássia Teles Santana de Macedo, Itana Lúcia Azevedo de Jesus, Wilton Nascimento Figueredo and Dzifa Dordunoo.

Conflicts of interests:

There are no conflict of interests

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