Autoimmune/inflammatory syndrome induced by adjuvants (ASIA): signs and symptoms experienced by women

Síndrome autoimune induzida por adjuvantes (ASIA): sinais e sintomas experienciados por mulheres

Síndrome autoinmune inducido por adyuvante (ASIA): signos y síntomas experimentados por mujeres

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ABSTRACT: Objective: To identify signs and symptoms experienced by women with autoimmune/inflammatory syndrome induced by adjuvants (ASIA) due to the use of breast implants and the treatments performed. **Method:** Field study with a qualitative approach carried out through online interviews using the snowball technique. 13 participants were included. **Results:** Based on data analysis, four categories were listed: knowledge about the syndrome; signs and symptoms; treatment; and nursing care and implications. Over 120 signs and symptoms were identified, and the explant was mentioned as a definitive treatment by all interviewees. The signs and symptoms presented by the participants are in line with what is described in the literature. **Conclusion:** Before discovering the disease, the participants underwent treatment focused on symptom relief. After diagnosis, all women proceeded with the explant.
Keywords: Autoimmune diseases. Prothesis implantation. Breast implantation. Silicones. Perioperative nursing.

RESUMO: Objetivo: Identificar sinais e sintomas experienciados por mulheres com síndrome autoimune induzida por adjuvantes (ASIA) devido ao uso de prótese mamária e os tratamentos realizados. **Método:** Estudo de campo de abordagem qualitativa realizado por meio de entrevistas *online* utilizando-se a técnica bola de neve. Incluíram-se 13 participantes. **Resultados:** A partir da análise dos dados, foram elencadas quatro categorias: conhecimento acerca da síndrome; sinais e sintomas; tratamento; e cuidados e implicações de Enfermagem. Identificaram-se mais de 120 sinais e sintomas, e o explante foi mencionado como tratamento definitivo por todas as entrevistadas. Os sinais e sintomas apresentados pelas participantes vão ao encontro do que é descrito pela literatura. **Conclusão:** Antes da descoberta da doença, as participantes realizaram tratamento com foco no alívio dos sintomas. Após o diagnóstico, todas as mulheres procederam com o explante.
Palavras-chave: Doenças autoimunes. Implantação de prótese. Implante mamário. Silicones. Enfermagem perioperatória.

RESUMEN: Objetivo: Identificar los signos y síntomas experimentados por mujeres con síndrome autoinmune inducido por adyuvantes (ASIA) debido al uso de implantes mamarios y los tratamientos realizados. **Método:** Estudio de campo con enfoque cualitativo realizado a través de entrevistas en línea utilizando la técnica de bola de nieve. Se incluyeron 13 participantes. **Resultados:** Con base en el análisis de los datos, se enumeraron cuatro categorías: conocimiento sobre el síndrome; signos y síntomas; tratamiento; y cuidados e implicaciones de enfermería. Se identificaron más de 120 signos y síntomas, y todos los entrevistados mencionaron el explante como tratamiento definitivo. Los signos y síntomas presentados por los participantes están en línea con lo descrito en la literatura. **Conclusión:** Antes de descubrir la enfermedad, los participantes realizaban un tratamiento enfocado en el alivio de los síntomas. Después del diagnóstico, todas las mujeres procedieron al explante.
Palabras clave: Enfermedades autoinmunes. Implantación de prótesis. Implantación de mama. Siliconas. Enfermería perioperatoria.

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INTRODUCTION

Silicone implants have been used since the 1960s, and their purpose ranges from heart valves to breast implants. The safety of the material has already been proven, but the occurrence of autoimmune/inflammatory syndrome induced by adjuvants (ASIA) in genetically predisposed patients is still possible[1].

The syndrome was first described by Israeli physicians[2]. It is an autoimmune or inflammatory reaction due to the body's contact with a foreign substance, such as the silicone of breast implants. The clinical symptoms presented are similar to those of some rheumatic diseases, such as chronic fatigue, joint and muscle pain, dry mouth and eyes, irritable bowel syndrome, and neurological complaints[3,4].

Since they are nonspecific signs and symptoms, which may be linked to several other conditions, there are no clinical and/or laboratory tests or globally validated diagnostic criteria for the identification of this syndrome. In Brazil, the diagnosis is made based on the presence of two major criteria or one major and two minor criteria.

Major criteria include[2]:

- Exposure to external stimuli, such as silicone;
- Appearance of one of the clinical manifestations: myalgia, myositis or muscle weakness; arthralgia and/or arthritis; chronic fatigue, unrefreshing sleep or sleep disturbances; neurological manifestations; cognitive impairment and memory loss; fever; dry mouth;
- Improvement of symptoms after silicone removal.

Minor criteria are[2]:

- Development of autoantibodies directed against the suspected adjuvant;
- Clinical manifestations such as irritable bowel;
- Development of autoimmune disease such as multiple and systemic sclerosis.

Once the syndrome is diagnosed, treatment consists of breast explantation[5]. However, the diagnosis is still difficult to make, and it may take a long time for the cause to be identified. Meanwhile, only the symptoms are treated, a situation that impacts the quality of life of those affected[6,7].

Given this context, the following research question was listed: what are the signs and symptoms experienced by women with ASIA syndrome due to the use of breast implants and what treatments were performed?

OBJECTIVES

The objective of the study was to identify the signs and symptoms experienced by women with ASIA syndrome due to the use of breast prostheses and which treatments were performed.

METHOD

This is a field study with a qualitative approach carried out through online interviews. The snowball method was used, a technique to obtain sampling in research through the use of reference networks[8]. For the construction of this study, the consolidated criteria for reporting qualitative research were followed through the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist [9].

Data collection was carried out by the auxiliary researcher from June to August 2022, through individual online interviews using the Google Meet tool. The interviews were recorded to later be transcribed, only the audio was recorded, without images.

All interviews were conducted by the auxiliary researcher, who received guidance from the teacher-advisor on the approach and how to carry out the interview. This process took place before the beginning of data collection. To ensure understanding of how to proceed, two test interviews were carried out with two people chosen at random, who were not included as participants in the research.

To guide the interviews, a script prepared by the authors was used, consisting of seven semi-structured questions regarding the signs and symptoms experienced, treatment, diagnosis, and knowledge about the pathology. The script also included questions regarding the sample's profile, such as age, race, marital status, number of children, education level, year of implantation, purpose of the prosthesis (aesthetic or repairing), permanence or not of the prosthesis and previous illnesses.

Fourteen women were invited to participate in the study; one did not accept, due to the unavailable agenda, thus totaling 13 participants. From the moment it was observed that the information began to be repeated in the interviews, data collection was interrupted, taking into account the data saturation sampling, which is described in the literature as the moment when the addition of data and information in a survey does not change the understanding of the studied phenomenon, making it no longer necessary to continue with data collection[10,11].

The following inclusion criteria were considered: Brazilian women over 18 years of age who had ASIA syndrome related to the implantation of a silicone breast prosthesis and who, at the time of the interview, had already completed the treatment. Women unable to carry out the online interview were considered as an exclusion criterion. Each of them participated in only one interview, with duration ranging from 16 to 54 minutes. The interviews were recorded and later transcribed using the Transkriptor software, for better data analysis. It is noteworthy that only the audio was recorded, without images of the participants.

The first interview was conducted with a woman known to the researchers, diagnosed with ASIA syndrome in 2020, and who underwent treatment. The other participants were invited according to the snowball method, contacted via WhatsApp, e-mail or Instagram, as indicated by the last interviewee.

The participants had access to the objectives of the study and the credentials of the researchers, in order to decide whether or not to participate in it. Upon acceptance, the Informed Consent was sent via e-mail or WhatsApp, according to preference, to be read and signed. Subsequently, an individual online interview was scheduled between each participant and the auxiliary researcher (Nursing student at a university in the South) through Google Meet. Before starting the interview, participants were explained who the interviewer was and the information contained in the TCLE was reinforced. At the time of the interview, the auxiliary researcher remained in a private environment, in order to protect the participants' image and privacy.

The transcripts of the interviews were returned to the participants via WhatsApp or e-mail (according to their choice), for possible corrections and/or comments to be made. One participant corrected a statement, which was immediately documented, and four others were surprised by the amount of slang spoken during the interview and were explained that this would not influence the research results. All participants validated the transcripts, responding to the auxiliary researcher that they agreed with the transcribed text.

The data were analyzed from the perspective of Minayo's thematic analysis[12], which consists of three phases:

a. pre-analysis, for organizing the material that will be analyzed for further exploration, enabling data processing and interpretation through exhaustive reading of the material by the researcher, who will come into contact with the structure and write down their perceptions;
b. reading the material, in order to take advantage of all the information, being the moment to distribute excerpts or fragments of the texts, inserting their own conclusions, as well as data from other studies; and
c. treatment of the results obtained, including the analysis of subliminal information, such as trends and ideologies[12].

Data analysis derived themes that were presented in categories in the results, without secondary themes. Four free codes were selected to organize the categories and, thus, the coding tree was built (Figure 1). The quotes from the participants were presented to illustrate the description of the results, each one being identified by the letter P, for participant, followed by a number according to the order of interviews.

The study was carried out in accordance with Resolution 466/12, of the National Health Council, and submitted to the Research Ethics Committee (*Comitê de Ética em Pesquisa* – CEP) of the university that proposed the research, being approved under CAAE 55843622.0.0000.5344, on May 25th, 2022. The study also followed Law No. 9.610/1998, regarding copyright

RESULTS

Thirteen women self-declared with ASIA syndrome participated in the study. The sociodemographic characteristics of the research participants can be seen in Chart 1.

The recorded interviews were transcribed and, based on the analysis of the collected data, they were listed into four categories (Chart 2):

- Category 1: knowledge about ASIA syndrome;
- Category 2: signs and symptoms;
- Category 3: treatment;
- Category 4: Nursing care and implications.

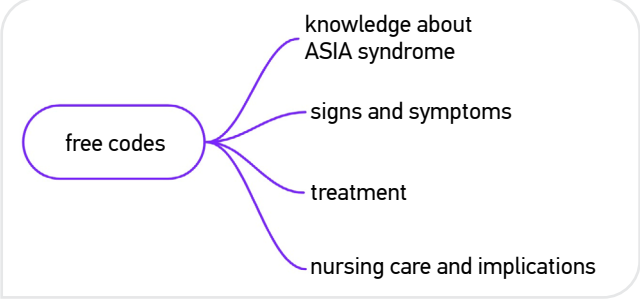

Figure 1. Free code map. São Leopoldo (RS), Brazil, 2021.

Category 1: knowledge about ASIA syndrome

Through the participants' reports, it was observed that, until the moment of diagnosis, all of them had no knowledge about the ASIA syndrome and were not informed about the possible risks of silicone at the time of breast implantation. This lack of knowledge is evidenced in the following statements:

Chart 1. Sociodemographic characteristics of participants (n = 13), São Leopoldo (RS), Brazil, 2022.

	Date of the interview	Age	Skin color	Marital status	Children	Education	Purpose of the prosthesis	Year of implant and age of participant at the time	Do they still have the prosthesis?	Previous diseases
P1	Jun/3	39 years old	White	Married	2	Complete higher education	Aesthetics	2008 (24 years old)	No (explant March 2020)	No
P2	Jun/10	51 years old	Brown	Married	2	Complete higher education	Aesthetics	2018 (47 years old)	No (explant May 2022)	No
P3	Jun/20	41 years old	White	Married	1	Post graduation	Aesthetics	2004 (23 years old)	No (explant December 2021)	Rheumatic disease
P4	Jun/20	36 years old	White	Single	0	Complete higher education	Aesthetics	2009 (23 years old)	No (explant May 2022)	No
P5	Jun/21	32 years old	Brown	Married	0	Complete higher education	Aesthetics	2013 (23 years old)	No (explant June 2021)	No
P6	Jun/29	37 years old	Black	Married	0	Complete higher education	Aesthetics	2017 (32 years old)	No (explant February 2022)	No
P7	Jul/1	37 years old	Undefined	Married	0	Complete higher education	Aesthetics	2019 (33 years old)	No (explant December 2021)	No
P8	Jul/6	34 years old	White	Married	2	Complete post-graduation	Aesthetics	2005 (17 years old)	No (explant December 2020)	No
P9	Jul/20	34 years old	White	Single	0	Complete post-graduation	Aesthetics	2010 (21 years old)	No (explant July 2019)	No
P10	Aug/1	32 years old	White	Divorced	1	Incomplete post-graduation	Aesthetics	2009 (18 years old)	No (explant April 2022)	No
P11	Aug/2	34 years old	Brown	Married	2	Complete higher education	Aesthetics	2007 (19 years old)	No (explant April 2022)	No
P12	Aug/4	42 years old	White	Married	1	Complete higher education	Aesthetics	2013 (33 years old)	No (explant June 2022)	No
P13	Aug/9	31 years old	Brown	Single	0	Complete higher education	Aesthetics	2015 (26 years old)	No (explant July 2022)	No

> *"And I opted for the prosthesis, but I had no idea, like, I had no idea what could happen. [...] I had never heard of it, I didn't know about the risks, really, for real, like this, I didn't know."* (P2, June 10th, 2022)

> *"No, at the time nobody would speak of it. They said that the prosthesis was for life, that it was textured, like a muscle. Hence my body would adjust to it."* (P3, June 20th, 2022)

It was also mentioned by a participant that, for her, at the time, due to lack of information about possible complications related to the implantation of silicone, the choice to place the breast prostheses was like deciding to "lighten your hair". The procedure was seen as simple, without major consequences, and that it would make her more beautiful, which is evidenced in the following statement:

> *"So, if I had known, maybe I wouldn't have done it. Because it wasn't a dream for me. [...] You know when you get some more highlights [on the hair] to boost it up a bit? That was it. 'Ah, I'm gonna get some implants to make them even fuller'. [...] and I went there and got it. Then, only after that is that I felt it all myself, you know, in my own skin."* (P7, July 1st, 2022)

Category 2: signs and symptoms

When the participants were asked about the clinical manifestations they had, they all stated that they had at least two major criteria or one major and two minor criteria, thus fitting the diagnosis of ASIA syndrome[2]. It is noteworthy that all participants reported exposure to external stimuli, that is, the silicone prosthesis, and showed improvement when this agent was removed. Chart 3 shows the clinical manifestations reported by the participants, as described in the literature.

The signs and symptoms experienced by the participants had consequences in the lives of these women, such as pain and suffering. Some of the participants reported the feeling of being dying and thinking that they would not survive all

Chart 2. Meaning units present in each category and by which participants were referred. São Leopoldo (RS), Brazil, 2022.

Category	Unit of meaning	Participants	Number of participants (%)
Information about ASIA syndrome	Unawareness of the disease before implantation	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13	13 (100)
Signs and symptoms	Neuropsychiatric	P1, P2, P3, P4, P5, P6, P7, P8, P11, P12	10 (77)
	Musculoskeletal	P1, P2, P3, P4, P5, P7, P8, P9, P10, P11, P12, P13	13 (100)
	Dermatological	P1, P2, P3, P4, P6, P9, P10, P13	8 (61)
	Gastrointestinal	P1, P2, P3, P4, P6, P7, P9, P10, P11, P12	10 (77)
	Respiratory	P3, P4, P7, P8, P13	5 (38)
	Gynecological	P8, P9, P10	3 (23)
	Breast discomfort/prosthesis	P4, P6, P7, P10, P11, P12	6 (46)
	Fatigue/sleepiness	P1, P2, P3, P4, P5, P6, P8, P9, P11, P13	10 (77)
	Ocular and oral	P1, P2, P4, P9, P10, P12	6 (46)
	Numbness and tingling	P2, P4, P6, P9	4 (31)
	Sensitivity to light and sounds	P2, P4, P7	3 (23)
	Related to body temperature	P1, P4, P7, P8	4 (31)
	Change in body weight	P5, P9, P12	3 (23)
	Triggering of autoimmune diseases	P5, P8, P13	3 (23)
	Others	P1, P2, P4, P6, P7, P8, P9, P11, P13	9 (69)
Treatment	Explant	P1, P2, P3, P4, P5, P7, P8, P9, P10, P11, P12, P13	12 (92)
	Symptomatologic	P1, P2, P3, P6, P8, P9, P11, P13	8 (61)
Nursing care/ implications	Humanized contact	P9	1 (7)

Chart 3. Diagnostic criteria presented by the participants (n = 13). São Leopoldo (RS), Brazil, 2022.

Clinical manifestation according to Shoenfeld and Agmon-Levin criteria[2]	Number of participants who presented the clinical manifestation (%)	Participants
Major criteria		
Exposure to an external stimulus (silicone)	13 (100)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13
Appearance of one of the clinical manifestations		
Myalgia, myositis, or muscle weakness	6 (46)	P1, P2, P4, P6, P10, P12
Arthralgia and/or arthritis	9 (69)	P1, P2, P4, P5, P7, P8, P11, P12, P13
Chronic fatigue, restless sleep, or sleep disturbances	9 (69)	P1, P2, P4, P5, P6, P8, P9, P11, P13
Neurological manifestations	3 (23)	P2, P3, P7
Cognitive impairment, memory loss	8 (61)	P1, P2, P4, P5, P7, P9, P11, P12
Fever, dry mouth	2 (15)	P2, P9
Removal of the indicator agent induces improvement	13 (100)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13
Typical biopsy of involved organs	0 (0)	-
Minor criteria		
Appearance of autoantibodies directed against the suspected adjuvant	0 (0)	-
Other clinical manifestations (for example: irritable bowel syndrome)	13 (100)	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13
specific HLA	0 (0)	-
Onset of an autoimmune disease	3 (23)	P5, P8, P13

the symptoms they were experiencing, as reported in the following statements:

> *"It was like I was really dying, you know? And it really affected me when, at Christmas, I was hanging ornaments, you know, on the tree, and I felt like I was going to die, because I had these shortages of air with the slightest effort. […] I told my husband: 'I think I'm dying, if this surgery doesn't happen soon, I don't know if I'll be able to take it, 'cause it's too hard for (sic) me.'"* (P7, July 1st, 2022)

> *"I was already like, transferring my business in my company to the teachers, I was already, like, preparing myself to die, I was absolutely sure I wasn't going to make it much longer; another six months at best."* (P2, June 10th, 2022)

The range of signs and symptoms reported by the participants was wide, but with emphasis on musculoskeletal, gastrointestinal and neuropsychological symptoms and complaints of chronic fatigue, as can be seen in the statements:

> *"[…] any time I had to spare, I wanted to stay in bed, sleeping. Then, in 2019, I was diagnosed with arthritis, […] arthritis, arthrosis. […] Then, in 2021, this chronic fatigue, this depression, became very accentuated, and then I […] started to have fibromyalgia to the maximum degree. I had pains in the soles of my feet, in the palms of my hands, nobody knew why. I had to change all my shoes to insole shoes. Wouldn't wear any other anymore. It was like I was 80 years old, 80 years old."* (P2, June 10th, 2022)

"I had hip pain, knee pain, hand and wrist joints also had a lot of pain, and they'd swelled too, right? My finger knuckles would swell up. Hair loss, thinning hair, dry eyes, yellow eyelids, very swollen face, lots of acne too. Extreme fatigue, my fatigue, was like, very extreme. Problems sleeping, I had a lot of difficulty, you know, sleeping, like, despite being very tired, because I already had a day-to-day wear and tear due to the fact that I didn't have... or rather had chronic fatigue there, right? So I had this difficulty sleeping." (P4, June 20th, 2022)

Category 3: treatment

All women interviewed for the study reported removal of silicone prostheses as definitive treatment. However, until the discovery of the syndrome, the treatment was symptomatic.

In the participants' statements, it is observed that there were several types of medication used, such as: medication for insomnia, anxiety, and depression (P2); immunobiological for spondyloarthritis (P8); azathioprine and nifedipine for systemic sclerosis (P8); domperidone for gastrointestinal disorders (P8); colchicine and methotrexate for arthritis; antihistamine for hives (P8); psychiatric medication for fibromyalgia (P11); and a vasodilator to decrease the symptoms of Raynaud's phenomenon triggered by the prosthesis (P13).

Time to diagnosis ranged from 4 months to 16 years from the onset of the first symptoms. It is observed that, during this period, the participants received different treatments for the symptoms, without, however, treating the cause, which had not yet been identified. The following statements show this scenario:

"[...] five years, I had been to more than eight psychiatrists. And test requests all over. Then I started taking tests, to find out what I had, and changed my diet, and this and that... and muscle strength... and today I understand that the first symptom of systemic inflammation actually appeared with the diagnosis of burnout, in September 2018, which is when I started taking medication for insomnia, for anxiety, for depression, for extreme fatigue. And then [...] that's when I started taking medicine. Until then I wouldn't even take contraceptives." (P2, June 10th, 2022)

"I started to reduce the foods I ate more and more, because, for example, when I got to the explant, I lost 10 kg in a month, and I had intolerance [to] absolutely everything. I could only [...] eat potatoes, bananas, rice and even chicken, meat, like, as light as it was, would made me sick. I slept sitting up for four years because I used to drown at night with my own reflux." (P9, July 20th, 2022)

When the cause of the complications was identified, all participants proceeded with the explantation of the silicone prosthesis. The patients reported that the signs and symptoms presented so far regressed or ceased quickly, as can be seen in the following statements:

"You won't believe this… I had the explant done on a Friday. I left the clinic on Saturday, [...] it was the only day I took [...] painkillers; on Monday morning [...] I went to the doctor to remove the drain [...] I was feeling so good that I said to my husband: 'let's find a new gym for us, with a good swimming pool'. I really like swimming too. So I left there and went straight to look for a place to swim." (P2, June 10th, 2022)

"As soon as they took it off. The air returned first. When you get to breathe again, you say: 'God, it's such a simple thing', you know, that we do in life, but it changes your whole life." (P7, July 1st, 2022)

"I had an itchy eye every night. It was very unpleasant. Then I had to wash my eyes, apply eye drops. Then they'd say: 'ah, it's conjunctivitis'. Then I would get it treated and, soon enough, there it was again. They'd say it was from the dust. And today I don't have it anymore, I have nothing. [...] I couldn't even use makeup, no mascara, everything, everything itched my eyes. And today, thank God, I have nothing. And then, after I removed the prosthesis, everything was back to normal, even my blood count was back to normal, my hair grew back. I used to have curly hair, I had even stopped getting the chemical straightening. And now, today, I was able to do it without my hair falling out." (P1, June 3rd, 2022)

"I think they're all gone, because I don't feel anything anymore. I don't have migraines, I don't feel pain in my joints, I was like a 90 [year-old] lady. No, actually, not even 70 [years old], 'cause 70 [year-olds] are in better shape than many people [...]. You see, I used to feel a lot of pain, even to bend down, when I was taking a shower, if the soap fell, I would say: 'guys, I've never

felt that in my life'. It hurt, like, the little bones. And once it was taken off, it was gone; no, there is no chronic pain [...]." (P7, July 1st, 2022)

Category 4: nursing care and implications

Performing a surgical procedure involves several risks for patients: clinical, anesthetic-surgical complications, surgical positioning, medication use, infections, among others[13,14]. However, the benefit of the surgical procedure is taken into account in relation to the risks. In this context, perioperative Nursing care (which involves the pre, trans, and postoperative periods) is essential to ensure patient safety and encompasses risk management, prevention of adverse events and postoperative complications, and welcoming the patient, in order to provide quality and safety care throughout the perioperative course[14].

After the implantation of breast prostheses, women are under medical follow-up, and the contact with the nurse usually takes place in the perioperative period or during Nursing consultations in Primary Care. One of the participants highlights the humanization of Nursing care, emphasizing the importance of listening to understand what the individual is experiencing, as can be seen in the following speech:

> *"[...] sometimes we have an even more human contact with the nurses, often [more] than with the doctors, you know, depending on the situation; if you're in a hospital, having tests... there should be this exchange with the patients to understand them."* (P9, July 20th, 2022)

In view of the context evidenced in this study, it is necessary for nurses to be aware of this pathology and its manifestations, acting, above all, in Primary Care, in which Nursing consultations are carried out with a focus on women's health and on the care of adults with noncommunicable chronic diseases. The population places hope in professionals, who seek to expand their knowledge about this pathology, as can be seen in the statement:

> *"There are a lot of people studying it, thank God. This is coming to light, right? Because it is indeed a matter of health, public health. People need to be aware of everything when they are receiving a foreign body."* (P1, June 3rd, 2022)

DISCUSSION

In 2021, the performance of surgical procedures increased by 19.3% in the world. In that same year, Brazil performed 1,634,220 surgical procedures, among which 177,960 operations aimed at placing a breast implant and another 23,520 surgeries aimed at removing implants[15]. These data indicate that, in Brazil, every seven surgeries performed to place a breast implant, an explant surgery is performed.

The signs and symptoms described in the literature are in line with the findings in the present study, in which all participants declared at least one of the clinical manifestations described above, the most prevalent being: chronic fatigue (P1, P2, P4, P5, P7, P8 , P11, P12, P13); arthralgia and arthritis (P1, P2, P4, P5, P7, P8, P11, P12, P13); and memory loss and cognitive impairment (P1, P2, P4, P5, P7, P9, P11, P12)[2].

Other signs and symptoms were pointed out by the participants, such as Raynaud's phenomenon (P8, P13), characterized by a change in the color of the fingers to white-blue-red, mainly after exposure to cold temperatures[16]. The phenomenon was also observed in the case report of a 32-year-old woman with ASIA syndrome after implantation of a silicone breast prosthesis[1]. Likewise, the participants of this study who developed Raynaud's phenomenon due to the ASIA syndrome remained with the symptom even after the removal of the implants.

The psychiatric signs and symptoms mentioned by the participants are noteworthy, with special emphasis on depression (P1, P2, P6, P8), irritability (P1, P3, P6), and hallucinations (P2). However, no articles were found that prove the occurrence of psychiatric symptoms as a result of the ASIA syndrome.

Hair loss was a symptom manifested by most (8) of the participants; allergies and skin spots were described by participants P2, P8, P10, and P13; and skin allergy in the breast region was described by participant P12. These findings are in line with other findings present in the literature on the subject[3,6,17].

There are reports of the development of systemic sclerosis as a result of the ASIA syndrome[18]. The disease was also reported by one of the participants (P8) in this study, who, in addition to sclerosis, had Raynaud's phenomenon and developed cervical intraepithelial neoplasia (CIN 1) due to the silicone implants.

The literature presents some risk factors that favor the development of ASIA syndrome, such as previous presence or family history of autoimmune disease, vitamin D deficiency, previous autoimmune reaction to adjuvants or history of allergy or atopic diseases[4,5,19]. It is noteworthy that

only one participant in the present study had one of these risk factors — rheumatic disease —, while the others reported being in good health and having no complications until the implantation of the prosthesis.

With regard to the treatment of ASIA syndrome, the most effective is to perform the silicone explant, a procedure to which all participants in this study underwent[5]. A study carried out with 15 participants with ASIA syndrome who underwent breast silicone explantation proves the effectiveness of the procedure as a treatment for the disease[7]. Still, the benefits of the explant associated with immunosuppressive therapy are explored in the literature[19]; however, such a combination was not reported by any of the participants in this study.

Participants P1, P3, P4, and P7 reported complete improvement of all symptoms. The other participants had improvement in most signs and symptoms, however some still remain, although not as intense as when they had the prosthesis. Namely: dry eyes and mouth (P9); allergies, dermatitis and intestinal problems (P11); joint pain (P5); body pain (P12); and Raynaud's phenomenon (P8 and P13).

A case study carried out in Ecuador shows similar results: the participant reports improvement in all symptoms, with the exception of Raynaud's phenomenon and polyarthralgias[1]. Another study pointed out that myalgia, arthralgia, chronic fatigue, and dry skin and hair improved for the majority (80%) of participants at the end of the 12-month follow-up after explantation[7].

However, due to broad and nonspecific signs and symptoms, it is difficult to make the diagnosis[6]. This conclusion is similar to what was described by the participants of this study, who reported having gone through long periods of suffering and various ineffective symptomatologic treatments until they discovered the real diagnosis.

Thus, it is necessary that nurses, as members of the health team, working at different points in the care network, know about the pathology and its manifestations, in order to contribute with the team to the identification of the disease. Welcoming and actively listening to the individual affected by the syndrome regarding the signs and symptoms presented are essential and are part of care.

In this context, nursing is the area of expertise that is closest to the patient, able to identify the first signs and symptoms in collaboration with the medical team. These are, therefore, functions of the nurse in the face of the ASIA syndrome: to list the nursing diagnoses and the care plan in a singular way; carry out health education actions; and act in such a way as to promote the quality of life of these people. It should be noted that, when faced with individuals likely to develop the ASIA syndrome, nurses must refer the patient and contact the medical team, so that the situation can be investigated[20].

Field contributions of the study

Based on the results of this study, the main signs and symptoms of the ASIA syndrome presented by Brazilian women and the treatment performed were listed. Such data can contribute to broadening the knowledge of the lay and scientific population regarding the pathology, in order to facilitate the possible diagnosis. In addition, the study provides information so that nurses can learn more about possible complications resulting from breast prosthesis implantation, contributing to their work in the processes of prevention, identification and treatment of the disease.

It is noteworthy that the identification of signs and symptoms arising from complications of breast implantation can occur in Primary Care, in outpatient nursing consultations, as described by the National Policy for Primary Care, which establishes that the care network must develop relationships of bond and responsibility between the teams and the population, ensuring the continuity of health and care actions, such as, for example, from the nursing consultation.

The results of the study may also contribute to the performance of nurses in the perioperative period, providing instruments and sensitizing professionals to the reception of patients who need breast prosthesis extraction surgery, as well as in the postoperative period, since knowledge about the inherent risks to the silicone prosthesis may contribute to the identification of signs and symptoms of complications, allowing referral for evaluation by the surgeon.

Study limitations

Because the syndrome is still little known, there were difficulties in obtaining a larger number of participants. In addition, the time elapsed between the explant surgery and the interview was not standard for all women, which means that those who had the explant more recently may have symptoms of ASIA syndrome that may still disappear.

CONCLUSION

The study allowed listing the main signs and symptoms experienced by women with ASIA syndrome as a result of

the use of breast implants, such as memory loss, joint pain, hair loss, fatigue and/or tiredness, and depression. In total, more than 120 signs and symptoms mentioned by the participants were identified.

As for the treatment for the syndrome, the explantation of silicone prostheses was reported by all study participants. However, until the diagnosis was made, treatments were carried out to relieve the various symptoms.

For future studies, it is suggested to investigate the knowledge and actions of nurses regarding this health condition, as they are professionals who must be aware of signs, symptoms, treatments, and preventive measures. It is also suggested that further research on the subject continue to be carried out, in order to increase knowledge on the subject.

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CONFLICT OF INTERESTS

The authors declare no conflict of interests.

AUTHORS' CONTRIBUTIONS

BP: Project management, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing, Software, Supervision, Validation, Visualization. VCDM: Formal analysis, Writing – review & editing, Validation, Visualization. AASP: Formal analysis, Writing – review & editing, Validation, Visualization. KORC: Writing – review & editing, Validation, Visualization. MEPB: Writing – review & editing, Validation, Visualization. BLRA: Writing – review & editing, Validation, Visualization. PT: Project management, Formal analysis, Conceptualization, Methodology, Writing – review & editing, Supervision, Validation, Visualization.

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