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# *Positive and negative emotions in patients with Sudeck's syndrome according to religiosity before and after the disease*

BACKGROUND
Sudeck's syndrome is a chronic and painful disease that affects a significant number of people. Despite this, it is a disease little researched in general and even less in the field of the psychology of religion. The aim of this study was to analyze the relationship between religiosity and emotions in patients with Sudeck's syndrome.

PARTICIPANTS AND PROCEDURE
The sample consisted of 80 people with Sudeck's syndrome, 92.5% of whom were women. The average age of the participants was 41.8 years, with a range of 23 to 60 years. Participants came from fourteen different countries in the Americas and Europe, including Spain (36.3%), Argentina (20%) and Peru (15%). A clinical and sociodemographic data sheet was used, as well as questions aimed at assessing the emotional state of the participants.

RESULTS
The results indicate that patients experienced a significant increase in anxiety and sadness after the diagnosis of the disease, while optimism and energy decreased significantly. On the other hand, no differences were found in positive or negative emotions in believing or non-believing patients.

CONCLUSIONS
The data suggest that the diagnosis of Sudeck's syndrome has a negative impact on the emotional health of individuals and that this is independent of whether the patient is a believer or non-believer. However, further research is needed to confirm these findings and to explore the underlying mechanisms of this relationship.

KEY WORDS
religiosity; Sudeck's syndrome; pain; health

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## BACKGROUND

Sudeck's syndrome, also known as complex regional pain syndrome, peripheral neuralgia, post-traumatic dystrophy, or reflex sympathetic dystrophy, was mentioned for the first time in the 17th century by Paré. In 1864, Mitchell made the first clinical description of it under the name of algodystrophy (Vega, 2015), which remained in use until 1946, when Evans called it complex regional pain syndrome (CRPS), as it is now generally known (Buller et al., 2016). The syndrome is characterized by the presence of severe and diffuse pain associated with allodynia, i.e. pain without the presence of painful stimuli, and is accompanied by vasomotor manifestations after an injury. Such injuries were reported to be fractures in 46% of cases (Montes-Iturrizaga et al., 2023).

Regarding its incidence, in the United States it was reported that per 100,000 population, 5.5 suffer from Sudeck's syndrome, while in Europe the incidence was reported to be 26.2 per 100,000 population, and in South Korea, 29 per 100,000 population (Hyungtae et al., 2018). In terms of sex, it is more prevalent in females, with ratios of 3:5 in the United States, 1:4 in Canada, and 1:3 in South Korea (Yilmaz & Demir, 2020). The age at which the syndrome usually manifests is around 49 years (Buller et al., 2016), within a range of 7 to 90 years, but more frequently after menopause (Mos et al., 2007).

Although the diagnosis of Sudeck's syndrome is primarily clinical, tests such as simple radiography, bone densitometry, triphasic bone scintigram and bone scintigraphy are used (Vega, 2015). Two types are differentiated: type 1, or reflex sympathetic dystrophy; and type 2, or causalgia (Sandroni et al., 2003). Different patterns of pain propagation are also recognized in this syndrome. In the continuous type, symptoms spread upward to the upper extremities; in the mirror image type, symptoms spread to the limb on the opposite side; and in the independent type, symptoms spread to a distal part of the body (Buller et al., 2016). The results are, however, sometimes dissimilar depending on the study populations. Yilmaz and Demir (2020) reported that out of a sample of 88 patients diagnosed with CRPS, 60.2% had upper extremity involvement, while in the remaining percentage, pain manifested in the lower extremities, with left-sided predominance. Regarding sex, a higher prevalence was found in males, representing 55.7%. However, in a more recent study, by Young-Hoon et al. (2019), with a sample of 1,103 cases of CRPS type 1 after surgery to correct a distal radius fracture, 83.2% were women, with an age between 50 and 60 years. This is related to the main risk factor identified in women, which is menopause. Another important factor is smoking in men. Likewise, seropositivity for rheumatoid arthritis and having had an open fracture, in addition to fibromyalgia, have been pointed out as possible risk factors (Crinjs et al., 2018).

On the other hand, Elsharydah et al. (2017) pointed out that there was a higher incidence in patients with a higher median family income and who had private insurance compared to those of lower socioeconomic status, with state health insurance, since the first type of population may seek healthcare earlier than the others and have better long-term treatment follow-up. Regarding comorbidities, a positive association was found between the rate of CRPS type 1 and depression and drug abuse, while other conditions such as diabetes, obesity, hypothyroidism or anemia are associated with lower rates. Since Sudeck's syndrome is rare, the causes are not known for certain, but it is thought that genetic, psychological and sociocultural factors are involved. Treatment efficacy rates are very low, since in most cases only analgesics and antidepressants are administered to counteract the mood disturbances associated with symptoms of anxiety and depression (Montes-Iturrizaga et al., 2023).

In terms of treatment, although more than 90% require physical therapy, no surgery or physiotherapy has been effective in relieving pain, although there are attempts to reduce it with analgesics, nonsteroidal anti-inflammatory drugs and antidepressants, since the severity and persistence of pain lead to various mental health problems and emotional adjustment difficulties in patients (Crinjs et al., 2018). However, no therapy is fully effective, so patient self-care constitutes an extremely important alternative for treatment adherence (Martín, 2006). As a result, coping strategies are essential for palliative management, as they are in the case of chronic diseases (Bolaños & Sarría, 2006; Cassaretto & Paredes, 2006; Martínez-Soto & Ramos-Fausto, 2022; Nava et al., 2010) These strategies have demonstrated improvement in patient quality of life (Contreras et al., 2007; Ruíz et al., 2013).

Religious coping in particular (Pargament, 1997; Trejos et al., 2023; Vinaccia et al., 2012) has been associated with low levels of depression, better physical health, spiritual growth and reduced mortality rates, as it allows for greater self-control, strengthening meaning of life, as well as providing a greater sense of inner comfort (Pargament et al., 2000). However, it is convenient to differentiate religiosity from spirituality, because, while the former is related to externalized aspects of religious beliefs, the latter is more of an internal experience (Hood et al., 2009; Richards, 2011); hence some authors point out that spirituality is part of religiosity. Thus, one could not speak of religiosity if spirituality were not present (Valencia & Zegarra, 2014). However, for other authors, religiosity and spirituality are two different phenomena; that is, one can be spiritual but not religious (MacDonald, 2000; Ripamonti et al., 2010; Saucier & Skrzypińska, 2006; Skrzypińska, 2022). Thus, religiosity is associated with the cognitive (religious beliefs), behavioral (religious rites and practices) and affective components of religion (links of transcendence between Man and

God) (García & Pérez, 2005); and it is defined as the behavioral expression of the belief system, doctrine and organized worship of religion (MacDonald, 2000; Rivera-Ledesma & Montero-López, 2007). However, some authors, while acknowledging the differences between these two constructs, consider that religiosity constitutes the construct studied with greater empirical rigor, and, consequently, prefer to point to spirituality as a kind of privatized religion.

Spirituality, on the other hand, alludes to a set of feelings, beliefs and actions that involve a search for the transcendent, the sacred or divine; hence it is recognized as having two dimensions: a vertical one, which involves the relationship with God, and a horizontal one, which focuses on oneself and others. Therefore, the personal and social dimensions of spirituality are also distinguished (Salgado, 2016). Spirituality, for example, has been related to better family functioning and an adequate organizational climate (Moroni et al., 2022), lower levels of work stress (Arias et al., 2012), higher levels of happiness at work (Arias et al., 2013), and higher rates of productivity (Calderón et al., 2020; Pérez, 2007) and organizational citizenship (Duffy, 2010).

Likewise, spirituality has also been associated with better academic performance and emotional adjustment in school (Mendez & MacDonald, 2017) and university contexts (Bazán et al., 2015; Miguel-Rojas & Vílchez-Quevedo, 2018). However, spirituality has been reported to be associated with greater repercussions in both the physical and mental health of people since, in clinical practice, spirituality can include diverse approaches, such as accompaniment, counseling, psychotherapy and propaedeutic systems (Rivera-Ledesma & Montero-López, 2007). Thus, as Quiceno and Vinaccia (2009) note, several theoretical models have been developed to explain the role of spirituality in the restoration of health, with their respective measurement instruments (Arias et al., 2021). Consequently, research on spirituality and health indicates that spirituality is negatively associated with neuroticism (Lemos & Oñate, 2018) and positively with need satisfaction (Miner et al., 2013), with a higher quality of life (Holland et al., 1998; Valencia & Zegarra, 2014). It assists in the development of purpose in life, as well as reducing anxiety (Jang, 2016) and promoting resilience (Peres et al., 2007), optimism, hope (Lamas, 2004) and psychological well-being in people with disabilities (Sánchez-Herrera, 2009) and patients with chronic diseases such as cancer (Brady et al., 1999; Peterman et al., 2002; Reed, 1987; Ripamonti et al., 2010; Urrego et al., 2015) and kidney failure (Koenig, 2008; Quiceno & Vinaccia, 2013).

On the other hand, religiosity, a phenomenon to which the present research is oriented, has also been reported to show positive associations with subjective well-being (MacDonald, 2000; Roberts et al., 2010), happiness (Saldías-Ortega & Moyano-Díaz, 2023), academic performance and work productivity (Beit-Hallahmi & Argyle, 1997), prosocial behavior (Escudero, 2017), grief coping (Yoffe, 2007), quality of life and psychological well-being in terminal cancer patients (Quiceno & Vinaccia, 2009; Reed, 1986) with diabetes mellitus (Argüelles-Nava et al., 2017), with painful clinical disorders, including post-traumatic stress (Walker & Aten, 2012), rheumatoid arthritis (Quiceno & Vinaccia, 2013) and chronic pain (Salvat et al., 2023). Considering these observations, the purpose of this study was to analyze the association between positive and negative emotions with religiosity in a sample of patients with Sudeck's syndrome.



However, it should be taken into account that a differential aspect of great relevance is the religion to which a person is ascribed and whether or not he/she is a practitioner of the religion he/she professes (Campo-Arias et al., 2021; García & Pérez, 2005). Thus, religiosity implies experiences close to God or religious mysticism (Caycho-Rodríguez et al., 2023) that favor the satisfaction of spiritual needs in relation to a life purpose (Miner et al., 2014), and part of its proven effectiveness in health (Levin, 1994) can also be explained by its social component, because belonging to a religious community increases psychological well-being through the social support received from its members (Freeze, 2017). Likewise, the social dimension of religiosity mobilizes interpersonal resources that make it possible to better cope with situations of scarcity, suffering, and vulnerability (Caycho-Rodríguez et al., 2020, 2022).

Thus, it is predicted that patients with Sudeck's syndrome who exhibit greater religiosity will present more positive emotions and fewer negative emotions, in contrast to patients with less religiosity or who do not profess a religion. For those who demonstrate little or no connection to religion, it is anticipated that the opposite will be found, and no significant associations will be documented. It should be noted that we are not considering personality traits or variables associated with religiosity, which have been tested in studies with chronic patients (Anarte et al., 2000; April et al., 2012; López & Calero-García, 2008; Montes-Iturrizaga et al., 2023). Hence, this research is of an associative nature (Ato et al., 2013) and aims to analyze a topic that has been given limited attention in Latin America, especially in patients with Sudeck's syndrome. This clinical condition has seen scant study in general and even less investigation within the framework of the psychology of religion.

## PARTICIPANTS AND PROCEDURE

### PARTICIPANTS

The sample consisted of 80 people with Sudeck's syndrome, 92.5% of whom were women. The average

age of the participants was 41.8 years, within a range of 23 to 60 years. Regarding the educational level of those evaluated, 8.8% had primary or elementary education, 25% had secondary or high school education, 28.7% had technical studies, 22.5% had university studies and 15.0% had postgraduate studies. Regarding marital status, most participants were married or cohabiting (48.8%), while 40% were single and 11.2% were divorced or separated. In terms of nationalities, participants came from fourteen different countries in the Americas and Europe, including Spain (36.3%), Argentina (20%) and Peru (15%).

**Table 1**

*Sociodemographic characteristics*

| | Frequency | Percentage |
|---|---|---|
| Gender | | |
| Male | 6 | 7.5 |
| Female | 74 | 92.5 |
| Educational level | | |
| Primary | 7 | 8.8 |
| Secondary | 20 | 25.0 |
| Technic | 23 | 28.8 |
| University | 18 | 22.5 |
| Postgraduate | 12 | 15.0 |
| Marital status | | |
| Married | 28 | 35.0 |
| Divorced | 5 | 6.3 |
| Single | 32 | 40.1 |
| Separated | 4 | 5.0 |
| Cohabitation | 11 | 13.8 |
| Country | | |
| Argentina | 16 | 20.0 |
| Brazil | 2 | 2.5 |
| Chile | 4 | 5.0 |
| Colombia | 5 | 6.3 |
| Costa Rica | 3 | 3.8 |
| Ecuador | 1 | 1.3 |
| Spain | 30 | 37.6 |
| United States | 1 | 1.3 |
| Mexico | 1 | 1.3 |
| Paraguay | 2 | 2.5 |
| Peru | 12 | 15.0 |
| Puerto Rico | 1 | 1.3 |
| Uruguay | 2 | 2.5 |
| Total | 80 | 100.0 |

## INSTRUMENT

A clinical and sociodemographic data sheet was used, including sex, age, education level, marital status, occupation, nationality, and religion (a single item that asked about membership in a particular religion) and religiosity (which asked, in a single item, about the intensity of this connection, ranging from very weak to very strong). Also, data were collected through questions aimed at assessing their emotional state before and after the disease in relation to emotions such as anxiety, sadness, optimism, energy and their character. These emotional manifestations, which were included in the questionnaire, obey the empirical evidence reported in studies of the psychological aspects seen in these patients (Bruscas et al., 2001; Crinjs et al., 2018) This information was coded according to the level of measurement in each case.

## PROCEDURE

The data were collected by means of a form distributed through Google Forms, after approval by the Research Ethics Committee of the Sudeck's Syndrome Society of Peru; through which it contacted the homologous associations in different countries of America and Europe. It is important to mention that the participants answered the form (online) voluntarily and within a framework of informed consent, and where the various associations (and groups) of patients who suffer from this disease were responsible for distributing the respective link. Likewise, and given the characteristics of these patients (chronic pain and the psychological manifestations mentioned in this introduction), it was decided to send the link only once and not insist on a second and third opportunity, especially considering that our sample did not receive any remuneration or belong to a governmental organization, as can be seen in the background. The analysis was performed by means of frequencies and percentages for categorical variables and measures of central tendency and dispersion for quantitative variables. The program JASP version 0.16.2 was used to process the data.

## DATA ANALYSIS

Descriptive analysis was performed by means of frequencies and percentages for categorical variables and measures of central tendency and dispersion for quantitative variables. For inferential analysis, Student's *t* test was used for data with a normal distri-

bution and the Mann-Whitney *U* test for data with a non-normal distribution. To analyze the effect size, when statistically significant differences were detected, Cohen's *d* test was used, since, in these cases, the data were processed with Student's *t* test. The program JASP version 0.16.2 was used for statistical processing of the data.

## RESULTS

Table 1 shows that 92.5% of the sample were women. Regarding the educational level of those evaluated, 8.8% had primary or elementary education, 25% secondary or high school, 28.7% technical studies, 22.5% university studies and 15% had postgraduate studies. Regarding their marital status, most participants were married or living together (48.8%), while 40% were single and 11.2% were divorced or separated. Regarding nationalities, participants came from fourteen different countries in America and Europe, among which Spain (36.3%), Argentina (20%) and Peru (15%) stand out. Likewise, the age of the participants ranged from 23 to 60 years, with an average of 41.8 years.

Table 2 shows the frequencies of the study variables, with the majority of those evaluated believing in a religion such as Catholic or Evangelical (80.3%), while 19.7% defined themselves as atheists, agnostics or non-believers. Regarding the level of religiosity, the majority of believers reported having a regular (32.3%) or strong (21%) level.

Table 3 shows the results of the comparison of some emotions before presenting with Sudeck's syndrome and then at the time of data collection (current time). Emotions with a negative connotation showed a significant increase at the current time with moderate effect sizes: being anxious ($t(77) = -2.78$, $p = .007$, $d = -.32$), being sad or melancholic ($t(77) = -4.73$, $p < .001$, $d = -.54$) and being reserved or quiet ($t(77) = -3.50$, $p < .001$, $d = -.40$). Likewise, it was observed that emotions with a positive connotation



**Table 2**

*Characteristics of religiosity*

| | Frequency | Percentage |
|---|---|---|
| Religion | | |
| Non-believer | 15 | 19.7 |
| Believer | 61 | 80.3 |
| Total | 76 | 100.0 |
| Religiosity level | | |
| Very weak | 11 | 17.7 |
| Weak | 9 | 14.5 |
| Regular | 20 | 32.3 |
| Strong | 13 | 21.0 |
| Very strong | 9 | 14.5 |
| Total | 62 | 100.0 |

**Table 3**

*Comparison of emotions before getting sick vs. current situation*

| | *N* | *M* | *SD* | $g_1$ | $g_2$ | *t* | *df* | *p* | *d* |
|---|---|---|---|---|---|---|---|---|---|
| Anxious before | 80 | 1.86 | 1.38 | 0.34 | −1.04 | −2.78 | 77 | .007 | −.32 |
| Anxious current | 78 | 2.28 | 1.26 | −0.23 | −0.76 | | | | |
| Sad, melancholic before | 80 | 1.40 | 1.17 | 0.94 | 0.45 | −4.73 | 77 | < .001 | −.54 |
| Triste, melancholic current | 78 | 2.24 | 1.35 | 0.06 | −1.25 | | | | |
| Optimistic before | 79 | 3.17 | 0.97 | −1.04 | 0.53 | 4.97 | 76 | < .001 | .57 |
| Optimistic current | 78 | 2.42 | 1.30 | −0.14 | −1.18 | | | | |
| Energetic, vital before | 80 | 3.16 | 0.80 | −0.76 | 0.19 | 6.55 | 77 | < .001 | .74 |
| Energetic, vital current | 78 | 2.15 | 1.38 | 0.11 | −1.32 | | | | |
| Reserved, quiet before | 80 | 1.38 | 1.27 | 0.71 | −0.28 | −3.50 | 77 | < .001 | −.40 |
| Reserved, quiet current | 78 | 1.96 | 1.40 | 0.13 | −1.15 | | | | |
| | *N* | *M* | *SD* | *Mdn* | $g_1$ | $g_2$ | *U* | *p* | $r_{pb}$ |
| Good character before | 80 | 1.38 | 0.94 | 4.0 | −1.52 | 2.44 | 723 | < .001 | .60 |
| Good character current | 78 | 1.96 | 1.17 | 3.0 | −0.18 | −1.28 | | | |

*Note.* $g_1$ – skewness; $g_2$ – kurtosis; *df* – degrees of freedom; $r_{pb}$ – point-biserial correlation.

**Table 4**

*Comparison of emotions before getting sick according to religiosity*

| Group | *N* | *M* | *SD* | *t* | *df* | *p* |
|---|---|---|---|---|---|---|
| Anxious | | | | | | |
| Non-believer | 15 | 2.40 | 1.45 | 1.76 | 74 | .082 |
| Believer | 61 | 1.71 | 1.35 | | | |
| Sad, melancholic | | | | | | |
| Non-believer | 15 | 1.73 | 1.10 | 1.19 | 74 | .240 |
| Believer | 61 | 1.33 | 1.21 | | | |
| Optimistic | | | | | | |
| Non-believer | 14 | 2.86 | 1.29 | −1.35 | 73 | .181 |
| Believer | 61 | 3.25 | 0.89 | | | |
| Energetic, vital | | | | | | |
| Non-believer | 15 | 3.20 | 0.94 | 0.15 | 74 | .878 |
| Believer | 61 | 3.16 | 0.78 | | | |
| Reserved, quiet | | | | | | |
| Non-believer | 15 | 1.20 | 1.15 | −0.56 | 74 | .574 |
| Believer | 61 | 1.41 | 1.32 | | | |
| Group | *N* | *M* | *SD* | *Mdn* | *U* | *p* |
| Good character | | | | | | |
| Non-believer | 15 | 3.40 | 0.83 | 4 | 493.50 | .611 |
| Believer | 61 | 3.25 | 0.98 | 3 | | |

showed a significant decrease at the current time with moderate effect sizes: being optimistic ($t(76) = 4.97$, $p < .001$, $d = .57$), being energetic or vital ($t(77) = 6.55$, $p < .001$, $d = .74$), having a good character ($U = 723$, $p < .001$, $r_{bp} = .60$). These results indicate that Sudeck's disease had altered not only the physical health but also the psychological health of those who suffered from it.

Then, when comparing the various positive and negative emotions before presenting Sudeck's syndrome according to the religious beliefs of those evaluated, it can be seen in Table 4 that in none of the cases are there statistically significant differences ($p > .05$), which indicates that being a believer or not did not have an impact on the emotions of those evaluated when they were healthy.

When comparing the various positive and negative emotions at the present time when the participants have Sudeck's disease according to their religious beliefs, it can be seen in Table 5 that in none of the cases are there statistically significant differences ($p > .05$), which indicates that being a believer or not does not have an impact on the emotions of those evaluated at the present time.

## DISCUSSION

This investigation analyzed various manifestations of positive and negative emotions in patients with Sudeck's syndrome as a function of religiosity. The sample comes from fourteen countries in America and Europe, with a predominance of participants from Spain, Argentina, and Peru. A statistically significant change in people's emotions was found when compared before and after being diagnosed with the syndrome, so that negative emotions had increased and positive emotions had decreased. Thus, people reported feeling less energetic and less optimistic, as well as more anxious and sadder, with moderate effect sizes.

In this context, although human beings experience both positive and negative emotions, since the emergence of positive psychology, abundant evidence has accumulated that anxiety and sadness are associated with health deterioration, while optimism has a positive impact on physical and mental health (Contreras & Esguerra, 2006; González, 2004; Hood et al., 2009; Park et al., 2013; Seligman et al., 2005; Vásquez, 2013). In the case of the patients who were part of

**Table 5**

*Comparison of emotions in the current situation according to religiosity*

| Group | *N* | *M* | *SD* | *t* | *df* | *p* |
|---|---|---|---|---|---|---|
| Anxious | | | | | | |
| Non-believer | 15 | 2.47 | 1.30 | 0.73 | 72 | .470 |
| Believer | 59 | 2.20 | 1.24 | | | |
| Sad, melancholic | | | | | | |
| Non-believer | 15 | 2.47 | 1.41 | 0.71 | 72 | .481 |
| Believer | 59 | 2.19 | 1.36 | | | |
| Optimistic | | | | | | |
| Non-believer | 15 | 2.47 | 1.25 | 0.16 | 72 | .875 |
| Believer | 59 | 2.41 | 1.33 | | | |
| Energetic, vital | | | | | | |
| Non-believer | 15 | 2.07 | 1.39 | −0.42 | 72 | .675 |
| Believer | 59 | 2.24 | 1.41 | | | |
| Reserved, quiet | | | | | | |
| Non-believer | 15 | 2.20 | 1.27 | 0.70 | 72 | .484 |
| Believer | 59 | 1.92 | 1.43 | | | |
| Good character | | | | | | |
| Non-believer | 15 | 3.00 | 1.20 | 1.32 | 72 | .192 |
| Believer | 59 | 2.56 | 1.15 | | | |



the sample, it seems that the disease has not allowed them to develop adequate coping mechanisms for the pain they experience, one of the most studied being religious coping (Pargament et al., 2000; Trejos et al., 2023; Vinaccia et al., 2012).

Precisely this approach to Sudeck's syndrome led us to propose that religion could be a source of social support and coping as occurs with other chronic conditions (Argüelles-Nava et al., 2017; Quiceno & Vinaccia, 2009; Reed, 1986) or those that involve enduring intense pain (Quiceno & Vinaccia, 2013; Salvat et al., 2023; Walker & Aten, 2012). However, our comparative results reveal that religious beliefs do not demonstrate significant differences in the expression of positive or negative emotions in patients with Sudeck's syndrome, either before or after the diagnosis.

A possible explanation could be due to the fact that, in the composition of the sample, almost 20% self-defined as atheist, agnostic or non-believer, and up to 32.2% expressed having weak religious beliefs. This is striking, given that the largest number of people evaluated come from Latin America, a region of the world in which the Catholic religion predominates, and forms part of the cultural identity of its inhabitants (Arias et al., 2021; Sacco, 2017). However, modernity has brought with it a process of secularization that is expanding with increasing force throughout the world (Richards, 2011). Consequently, and in relation to the comparison of emotional manifestations before and after diagnosis, it is likely that the lack of religious beliefs or practicing religiosity is the cause of the results obtained, since, as mentioned, there has been an increase in negative emotions and a decrease in positive emotions, to the detriment of patients with Sudeck's syndrome. Additionally, it is likely that other constructs, such as spirituality, may offer greater scope for understanding the results regarding religiosity.

Sudeck's syndrome causes severe pain that at present has no specific and effective treatment. In fact, several studies have indicated that people with chronic pain conditions, since they cannot access a cure and, in many cases, the diagnosis is sometimes ambiguous, experience high levels of neuroticism and psychosomatic alterations (Duarte et al., 2019; Ramirez et al., 2001; Salvat et al., 2023). Therefore, it results in lower levels of well-being and quality of life (Vasquez, 2013; Valencia & Zegarra, 2014).

It is likely, then, that if the persons evaluated were to establish a strong connection to religion or spirituality, their levels of psychological well-being

would increase, as has been reported in several investigations with patients who have chronic conditions (Brady et al., 1999; García-Viniegras & González, 2000, 2007; Koenig, 2008; Montes-Iturrizaga et al., 2023; Peterman et al., 2002; Quiceno & Vinaccia, 2013; Reed, 1987; Ripamonti et al., 2010; Sánchez-Herrera, 2009; Urrego et al., 2015). But if we attend to what some authors have called the negative side of religion (Allport & Ross, 1967; Salgado, 2016), it is possible that people with greater religiosity feel let down by their faith, having to suffer a painful and distressing illness, and thus experience a loss of their religiosity. However, it has also been reported that terminal illnesses tend to promote, in sufferers, an approach to faith that has been associated with various forms of religious coping (Argüelles-Nava et al., 2017; Caycho-Rodríguez et al., 2022; Pargament, 1997; Reed, 1987; Rivera-Ledesma & Montero-López, 2007).

In that sense, Sudeck's syndrome is a painful but not life-threatening condition, and it is in near-death experiences that people generally have a greater openness to religion (Koenig, 2008; Peterman et al., 2002; Quiceno & Vinaccia, 2009; Ripamonti et al., 2010; Vinaccia et al., 2012). Hence, in conjunction with the factors just mentioned, one could better understand the results of the present investigation, in which religiosity does not seem to be associated with negative emotions before or after the diagnosis of Sudeck's syndrome. It is necessary, however, to continue research on this topic, because patients with chronic conditions who experience negative emotions or who do not use effective coping strategies tend to discontinue their treatment or not to follow the self-care indications given by the physician, which may aggravate their situation (Filgueira, 2014; Naranjo et al., 2017; Velandia-Arias & Rivera-Álvarez, 2009). In any case, and following the contributions of MacDonald (2000) and Skrzypińska (2022), it is considered important to continue in this thematic field and include spirituality as a different and complex construct that could not be subsumed under religiosity.

Finally, it is necessary to mention some limitations that could affect the results of the study. Firstly, the sample is small and was not probabilistic, nor was there an equivalence of groups according to country of origin, or clinical manifestations of the syndrome included, which could affect the variability of the results. However, because Sudeck's syndrome is a rare clinical condition, it was not possible to collect data from more uniform or representative samples. In addition, objective or standardized measurement instruments that would provide more accurate data, both in the assessment of the clinical manifestations of Sudeck's syndrome and of religiosity and positive and negative emotions, have not been used. However, it should be noted that it will be a great challenge for future studies to develop mechanisms or incentives so that subjects suffering from this disease (characterized by chronic pain and psychological suffering) can respond to standardized and complete instruments, not only for the construct of religiosity, but also for emotional manifestations. This clarification is made given that the very condition of patients suffering from this rare disease always constitutes a relevant impediment to having larger samples in psychological studies that involve instrumentation, unlike medical studies focused on the analysis of clinical histories. Therefore, further studies should address these limitations and delve more deeply into the subject matter presented here.

## Disclosures

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The authors declare no conflict of interest.

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