ORIGINAL ARTICLE

Type D Personality Is Associated with Poorer Quality of Life in Patients with Chronic Spontaneous Urticaria: A Cross-sectional Study

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Type D personality (TDp) is a stable personality type that has been associated with poor quality of life in the general population and in patients with a variety of diseases, such as cancer, cardiac diseases, and dermatological diseases (e.g. psoriasis). To date, the potential association between chronic spontaneous urticaria and TDp has not been studied. The aim of this study is to analyse the impact of TDp on patients with chronic spontaneous urticaria, regarding mood disturbances, quality of life, sexuality, and sleep disturbances. A cross-sectional study including 75 patients with chronic spontaneous urticaria was performed. Data on sociodemographic variables and disease activity, quality of life, sleep, sexual dysfunction, anxiety, depression and TDp were collected using validated questionnaires. TDp was present in 28% (21/75) of the patients. Although TDp was not related to worse disease control, the presence of anxiety and depression was higher in patients with TDp. Regarding quality of life, TDp was associated with poorer quality of life and higher frequency of sleep disturbances. Prevalence of TDp in patients with chronic spontaneous urticaria is similar to that in the general population. It is associated with mood status disturbances and worse quality of life regardless of disease severity, especially in the emotional and psychological domains. This group of patients could benefit from additional psychological support as a complement to their medical treatment.

Key words: urticaria; type D personality; quality of life.

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SIGNIFICANCE

Type D personality is characterized by social inhibition and negative affectivity. Although it has been associated with poor quality of life in the general population and in a variety of diseases, its association with chronic spontaneous urticaria has not been studied. The current study shows that patients with chronic spontaneous urticaria and type D personality have poorer quality of life, higher rates of anxiety and depression, and worse quality of sleep regardless of the severity of the chronic spontaneous urticaria. Therefore, this group of patients could benefit from additional psychological support as a complement to their medical treatment.

Chronic spontaneous urticaria (CSU) is defined as the presence of typical urticarial lesions for a period of time exceeding 6 weeks (1), generating symptoms most days and without any detectable trigger. Its aetiology is unknown, and most cases are thought to be idiopathic (2). CSU is usually self-limiting in time, generally lasting 2–5 years, although it can be prolonged over a longer period. There are different therapeutic strategies aimed at the symptomatic control of CSU, although there is no curative treatment. The first line of therapy is based on the use of antihistamines at high doses, reserving drugs such as omalizumab or cyclosporine for refractory cases (2). Since this disorder produces visible lesions that are often accompanied by intense pruritus, it can greatly affect patients' quality of life (QoL) (3, 4), limiting social relationships, self-esteem and increasing mood status disturbances, such as anxiety or depression (5).

Personality represents the way a person interacts with the inner and outer environment and is composed of inherent and acquired thoughts, feelings and beliefs (6). Different personality patterns have been described that serve to group people according to key features of their personality (7). A person's predominant personality pattern has an influence on their social and work interactions (8). In the presence of disease, personality type also has an important influence on how a patient copes with the disease and, thus, how the disease impacts the patient's life (9). Type D personality (TDp) presents increasing scientific evidence regarding its negative impact on the physical, mental and emotional aspects of healthy individuals (10) and also in a wide range of diseases from cancer (11, 12), cardiovascular disorders (13), atopic dermatitis (14) and psoriasis (15). It is defined as a combination of social inhibition and negative affectivity (16). Social inhibition can be defined as the tendency to withdraw from new people and avoidance of social situations, whereas negative affectivity is defined as the tendency to experience negative emotions (16). To date, the potential relationship and implications between CSU and TDp have not been evaluated. TDp could be a marker of subjects who are more vulnerable to QoL impairment due to CSU, who may benefit from additional screening for mood disturbances or psychological support.

The aims of this study are: (*i*) to evaluate the prevalence of TDp in patients with CSU; (*ii*) to analyse the relationship between TDp and mood disturbances; and (*iii*) to evaluate the potential impact of TDp on different aspects of QoL.

MATERIALS AND METHODS

Design

A cross-sectional study was performed including patients with mild to severe cases of CSU, to evaluate TDp, to analyse the relationship between TDp and mood disturbances, and to evaluate the potential impact of TDp on different aspects of QoL.

Patients

Patients were recruited from 2 sources: (*i*) patients who received healthcare in the Urticaria Clinic at the Virgen de las Nieves University Hospital, Granada, Spain. Patients were invited to complete an online questionnaire after their standardized follow-up consultation; (*ii*) patients who were contacted by e-mail by the "Asociación de Afectados por Urticaria Crónica", the official Spanish patient association for people with CSU. These patients were invited to complete the online version of the questionnaire. Patients were recruited between January 2020 and August 2021. The questionnaire for both sources of patients was identical and was completed online.

Inclusion criteria

The inclusion criteria were: (*i*) patients with a clinical diagnosis of CSU, at all degrees of severity and with any type of treatment; (*ii*) patients aged 18 years or older; (*iii*) informed consent from the patient to be included in the study.

Exclusion criteria

Patients who reported with any other major disease that could affect their QoL were excluded. Diseases considered were: (*i*) active oncological diseases; (*ii*) any cardiopulmonary, neurological, digestive, metabolic, musculoskeletal or urinary disease limiting daily activity or generating significant symptomatology; (*iii*) psychiatric disorders existing prior to the onset of urticaria; and (*iv*) skin diseases other than urticaria that cause significant impairment of QoL.

Specific questions were collected during the survey, so that patients who did not meet the criteria were automatically excluded from the study. After collecting the questionnaires, a further individual check was made to ensure that all patients met the inclusion criteria and none of the exclusion criteria.

Ethics

The study was approved by the Research Ethics Committee of Hospital Universitario Virgen de las Nieves (internal code 2367-N-21) and was conducted in accordance with the principles of the Declaration of Helsinki.

Variables of interest

Main variables. The main variables included variables related to the severity of the disease and to QoL assessment:

- Variables related to the severity and characteristics of the disease:
  - Urticaria Control Test (UCT): this consists of 8 different questions about physical and QoL symptoms related to urticaria in the 4 weeks prior to the consultation. The questions are answered using a Likert scale, which values the severity of the urticaria from 0 to 4. The values obtained range from 0 (indicating no control) to 32 (indicating total control) (17).
  - Age of onset, evolution time of the disease, date of diagnosis and current treatments were collected.
- Variables related to QoL, anxiety and depression, sleep disturbance, sexual dysfunction and TDp. The following validated questionnaires were collected:
  - Dermatology Life Quality Index (DLQI): this is an indicator of general dermatological QoL in patients over 16 years of age. The questionnaire consists of 10 questions, each scored on a Likert scale from 0 to 3, with 0 being the least affected and 30 the most affected. The questions refer to the last 7 days (18).
  - Chronic Urticaria Quality of Life Questionnaire (CUQoL): this is a questionnaire that includes physical, emotional, social characteristics and aspects of the urticaria itself. It consists of 23 Likert-type questions evaluated from 1 (never) to 5 (very much), finally obtaining a range of 0 (no QoL impairment) to 100 (maximum QoL impairment). Different subscales are collected in this questionnaire, including pruritus, swelling, impact on daily activities, sleep disturbances, daily limitations, and physical aspect, as well as the overall CUQoL score (9).
  - Hospital Anxiety and Depression Scale (HADS): this validated questionnaire is composed of 14 statements, whereby the patient must show their degree of agreement/disagreement, scoring each question using an adapted Likert scale. It is subdivided into 2 scales, with odd-numbered questions being scored for anxiety and even-numbered questions for depression. A score ≥ 8 on any of the subscales is considered indicative of anxiety or depression, respectively (19).
  - DS14 Questionnaire: this was used to evaluate the presence of TDp. It consists of a Likert-type questionnaire composed of 14 items, 7 for negative affectivity and 7 for social inhibition. Each response is answered with values between 0 (completely false) and 4 (completely true). A score ≥ 10 in both spheres is established as the cut-off point as an indicator of TDp (16, 20).
  - International Index of Erectile Function (IIEF-5) (21) and Female Sexual Function Index (FSFI-6) (22) questionnaires: these were used to collect data on sexual dysfunction in men and women. The IIEF-5 covers all 5 spheres of sexual function in men and a score ≤ 21 was considered significant. The FSFI-6 assesses the 6 items of female sexual function and a score ≤ 19 was established as indicative of dysfunction.
  - Pittsburgh Sleep Quality Index (PSQI) Questionnaire: this is a validated questionnaire to study patients' sleep quality. It consists of different questions where the patient must mark 1 of the multiple answers offered. The overall score is from 0 to 21 points, with 21 being the greatest impairment of sleep quality. An overall score greater than 5 is considered relevant from the point of view of impairment of sleep quality (23).
  - Numerical rating scale (NRS) for sexual impairment was also collected: patients had to choose their degree of sexual impairment associated with the CSU from 1 to 10, as has been previously stated (24).

Other variables. Socio-demographic, biometric and clinical variables, including age, sex, comorbidities, previous treatments for CSU, marital status and educational level were recorded by questionnaires. Specific questions regarding all exclusion criteria were included, which were mandatory to answer.

Statistical analysis

Descriptive statistics were used to evaluate the characteristics of the sample. The Shapiro–Wilk test was used to assess the normality of the variables. Continuous variables are expressed as mean and

standard deviations (SD). Qualitative variables are expressed as relative and absolute frequency distributions. The χ^2 test was used to compare nominal variables and the Student's *t*-test was used to compare nominal and continuous data. Significantly associated variables ($p<0.05$) or those showing trends towards statistical significance ($p<0.20$) were included in multivariate analysis. Multivariate logistic regression analyses were carried out to identify the factors associated with target variables. Statistical significance was considered for *p*-values <0.05. Statistical analyses were performed using JMP version 14.1.0 (SAS Institute, Cary, NC, USA).

RESULTS

Sociodemographic and clinical features of the sample

A total of 77 patients with CSU were invited to join the study and started the questionnaire. A majority of 97.4% (75/77) agreed to participate and completed the questions. The majority (68%, 51/75) were contacted through the official urticaria association, whereas the remainder attended the Urticaria Clinic. There were no differences in terms of age, sex, disease control, disease duration, occupation or marital status between patients recruited from the 2 different sources.

Table I. Sociodemographic features of the sample and characteristics of chronic spontaneous urticaria (CSU) ($n=75$)

Characteristics	
Socio-demographic features	
Age, years, mean (SD)	46.48 (11.25)
Sex, % (*n*)	
Male	29.3 (22/75)
Female	70.7 (53/75)
Marital status, % (*n*)	
In a couple	77.3 (58/75)
Single	22.7 (17/75)
Occupation, % (*n*)	
Employed	78.7 (59/75)
Unemployed	21.3 (16/75)
Educational level, % (*n*)	
Basic education	8 (6/75)
Secondary education	13.3 (10/75)
Professional education	28 (21/75)
University education	50.7 (38/75)
Disease characteristics	
Disease duration, years, mean (SD)	10.73 (10.69)
Urticaria Control Test score, mean (SD)	18.64 (6.90)
Disease duration, % (*n*)	
<10 years	60 (45/75)
>10 years	40 (30/75)
Current treatment for CSU, % (*n*)	
Antihistamines	41.3 (31/75)
Antihistamines + corticosteroids	6.7 (5/75)
Corticosteroids	2.7 (2/75)
Omalizumab	38.7 (29/75)
No medical treatment	10.6 (8/75)
Quality of life indicators	
DLQI, mean (SD)	8.12 (7.15)
DS14 (% of positive test), % (*n*)	28 (21/75)
HADS Depression (% of positive test), % (*n*)	41.33 (31/75)
FSFI (% of female sexual dysfunction), % (*n*)	54.54 (30/55)
Overall CUQoL, mean (SD)	28.63 (21.73)
PSQI, mean (SD)	9.53 (4.68)
HADS Anxiety (% of positive test), % (*n*)	46.67 (35/75)
IIEF (% of male sexual dysfunction), % (*n*)	63.63 (14/22)

CUQoL: Chronic Urticaria Quality of Life questionnaire; CSU: chronic spontaneous urticaria; DLQI: Dermatology Quality of Life Index; DS14: Type D-14 scale; FSFI Female Sexual Function Index; HADS: Hospital Anxiety and Depression Scale; IIEF: International Index of Erectile Function; PSQI: Pittsburg Sleep Quality Index; SD: standard deviation.

The mean age of the participants was over 45 years old. Female to male ratio was 2:40. Most patients had partners and a university-level education. Most of the sample had an active job. Furthermore, the mean evolution time of the disease in the sample was longer than 10 years. Regarding current treatment, most patients were in treatment with omalizumab or antihistamines.

The mean values and outcomes of the quality of life questionnaires are shown in **Table I**. The prevalence of anxiety and depression in the sample was higher than 40% in both cases. Sexual dysfunction was detected in 58.7% of patients (44/75). Detailed distribution of sexual dysfunction in males and females is shown in Table I.

Prevalence of type D personality in patients with chronic spontaneous urticaria

The results regarding the presence of TDp in the sample were as follows: 28% (21/75) of patients were considered to have TDp. Regarding TDp components, 37.3% (28/75) of patients presented social inhibition; and 66.67% (50/75) of patients presented negative affectivity.

Both groups (patients with and without TDp) were similar in terms of socio-demographic characteristics. Although patients with TDp were younger than those without TDp ($p=0.04$), no differences were found in terms of sex, marital status or occupation (**Table II**).

Type D personality and disease features

Type D personality was not associated with indexes depending directly on the disease control or symptomatology (**Tables II and III**): it was not associated with the UCT, DLQI subscales pruritus or CUQoL subscales pruritus and swelling. Moreover, disease control measured as UCT was found not to be related to TDp. No differences were found regarding current treatments between patients with and without TDp.

Type D personality and mood status disturbances

Regarding anxiety and depression, it was found that both HADS scores (HADS anxiety and HADS de-

Table II. Association of type D personality with sociodemographic characteristics and comorbidities in patients with chronic spontaneous urticaria (CSU)

	Type D personality +	Type D personality –	*p*-value
Age, years, mean (SD)[a]	42.31 (1.49)	48.12 (1.49)	**0.04**
Sex (female/male), %[b]	30.18/22.72	69.82/77.27	0.51
Marital status (couple/single), %[b]	25.86/35.27	74.14/64.70	0.45
Occupation (employed/unemployed), %[b]	30.50/18.75	69.49/81.25	0.34
Duration of the disease, years, mean (SD)[a]	8.95 (2.33)	11.42 (1.46)	0.37
Current treatment for urticaria (omalizumab/other)[b]	24.13/30.4	75.86/69.56	0.55
Urticaria Control Test, mean (SD)[a]	16.85 (1.49)	19.33 (0.93)	0.16

[a]Student's t-test; [b]χ^2 test.
SD: standard deviation. Bold means *p*-value within statistical significance ($p<0.05$).

Table III. Association of Type D personality with different quality of life indexes

	Type D personality + Mean (SD)	Type D personality – Mean (SD)	*p*-value
Overall DLQI	10.76 (1.53)	7.09 (0.95)	**0.04**
DLQI – Pruritus, pain, discomfort	1.80 (0.21)	1.70 (0.13)	0.25
DLQI – Embarrassment, self-consciousness	1.19 (0.23)	0.91 (0.14)	0.31
DLQI – Interference in daily activities	1.00 (0.18)	0.51 (0.11)	**0.02**
DLQI – Chose of clothes	1.57 (0.24)	1.07 (0.15)	**0.04**
DLQI – Social or leisure activities	1.28 (0.21)	0.67 (0.13)	**0.01**
DLQI – Sport	1.33 (0.21)	0.62 (0.13)	**0.007**
DLQI – Work and study	0.71 (0.19)	0.53 (0.11)	0.43
DLQI – Social relationships	0.76 (0.58)	0.51 (0.11)	0.11
DLQI – Sexual difficulties	0.61 (0.23)	0.72 (0.14)	0.70
DLQI – Treatment inconveniences	0.47 (0.14)	0.27 (0.09)	0.26
Overall CUQoL	37.78 (4.60)	25.08 (2.87)	**0.02**
CUQoL – Pruritus	44.64 (6.49)	37.27 (4.05)	0.34
CUQoL – Swelling	22.61 (5.18)	14.81 (3.23)	0.20
CUQoL – Daily activities	32.73 (5.22)	20.37 (3.25)	**0.04**
CUQoL – Sleep disturbances	42.61 (5.25)	29.35 (3.46)	**0.04**
CUQoL – Limitations	42.85 (5.29)	24.69 (3.42)	**<0.01**
CUQoL – Aspect	39.28 (5.63)	25.92 (3.51	**0.04**
HADS – Anxiety score	9.38 (0.92)	6.53 (0.97)	**0.01**
HADS – Depression score	8.33 (0.82)	5.53 (0.52)	**<0.01**
NRS sexual activity	3.95 (0.81)	3.48 (0.50)	0.19
FSFI index	18.8 (1.9)	19.35 (1.35)	0.80
IIEF index	13.88 (2.16)	15.76 (1.44)	0.47
PSQI	11.47 (0.99)	8.77 (0.61)	**0.02**

CUQoL: Chronic Urticaria Quality of Life questionnaire; DLQI: Dermatology Quality of Life Index; FSFI Female Sexual Function Index; HADS: Hospital Anxiety and Depression Scale; IIEF: International Index of Erectile Function; PSQI: Pittsburg Sleep Quality Index; NRS: numerical rating scale; SD: standard deviation.
All the comparisons have been performed with Student's *t*-test. Bold means *p*-value within statistical significance ($p < 0.05$).

pression) were higher in patients with TDp ($p < 0.02$) (Table III). In fact, when contingency analysis was performed for TDp and depression, it was found that TDp increased the probability of having anxiety by 51% (odds ratio (OR) 1.51; 95% confidence interval (CI) (1.01–2.41)) and depression by 86% (odds ratio 1.86; 95% CI (1.12–3.07)).

Association of type D personality with quality of life indexes and disease control scores

Univariate analyses were performed to explore the association between TDp and different elements of QoL (Table III). Regarding general and urticaria-related QoL, it was found that TDp was associated with higher DLQI and CUQoL scores, indicating that patients with TDp have poorer general and urticaria-specific QoL ($p < 0.05$). Moreover, TDp was associated with impairment in most DLQI subscales: social relationships, interference in social activities, clothing choice, and sport limitations ($p < 0.05$). CUQoL subscales daily activities, limitations and physical aspect and was also more affected in patients with TDp ($p < 0.05$).

Regarding sexuality, NRS for sexual activity, DLQI sexuality subscale, and specific sexual impairment indexes (FSFI, IIEF) were not found to be related to TDp in patients with CSU. Sleep quality impairment was found to be greater in patients with TDp, as was shown in CUQoL subscale sleep ($p = 0.04$) and PSQI index ($p = 0.02$).

After multivariate logistic analysis, type D personality was confirmed to be associated with older age ($p = 0.01$), poorer QoL measured by DLQI ($p = 0.04$), and, approaching statistical significance, mood disturbances (depression, $p = 0.11$) (**Table IV**).

DISCUSSION

Distressed personality, or type D personality, defined by the combination of social inhibition and negative affectivity, has been associated with poorer outcomes in patients with other diseases, such as psoriasis (15), atopy (14), and cardiovascular disorders (13). To date, the relationship between chronic urticaria and TDp has not been studied.

The primary aim of this study was to assess the prevalence of TDp in a sample of patients with CSU. The obtained prevalence for TDp seems to be similar to those described for the general population (13–34%) (10, 25). Several reports show a higher prevalence of TDp in other diseases: Psoriasis (38.4%) (26, 27), myocardial infarction (50.7%) (28), and brain cancer (34.1%) (11) are some examples. This might be explained by the fact that, although CSU is a chronic disease, the total duration of the disease, which in most cases is self-limiting (1), is not sufficient to lead to substantial changes in personality. The high prevalence of patients who, despite not meeting TDp criteria, have abnormal scores on the negative affectivity subscale is also noteworthy. Negative affectivity is defined as a tendency to experience negative emotions (15), which is related to dysfunctional coping strategies. As a chronic disease, CSU could play an important role in the development of dysfunctional and negative ways of coping with reality, which would be shown as a high proportion of patients with negative affectivity. This hypothesis could also be seen from the opposite point of view. In the case of presupposing TDp as a completely stable trait throughout people's lives, its presence would indicate worse coping strategies in those patients. These traits would result in higher levels of chronic stress in patients, which could be responsible for a higher incidence of diseases such as CSU.

Table IV. Multivariate logistic analysis ($R^2 = 0.15$) for type D personality

Factors	Beta	*p*-value
Age, years	0.10 (SE 0.05)	**0.01**
Urticaria Control Test	0.05 (SE 0.04)	0.27
Dermatology Quality of Life Index	0.10 (SE 0.05)	**0.04**
Hospital Anxiety and Depression Score – Anxiety	0.27 (SE 0.30)	0.37
Hospital Anxiety and Depression Score – Depression	0.49 (SE 0.31)	0.11
Numerical rating scale sexual activity	0.07 (SE 0.09)	0.45
Pittsburg Sleep Quality Index – Sleep index	0.17 (SE 0.42)	0.68

On the other hand, socio-demographic and disease features are homogeneously distributed between the groups of patients with and without TDp, as has been previously described in other diseases, such as psoriasis (15). This fact is compatible with the concept of personality as a typical and stable characteristic of the subject, which may be unaffected by most life experiences (26). However, there is controversy about the possibility that personality may change throughout a person's life (29). Therefore, it is not possible to ensure a concrete causal relationship when dealing with the issue of TDp in a disease process. Whether the personality influences the disease, or whether it is the disease that motivates certain ways of interacting with reality, is yet to be clarified.

The current study also aimed to assess the impact of TDp on impairment in QoL in patients with CSU. In light of the results, TDp should be considered to be an indicator of poorer QoL in patients with CSU, since it seems to be associated with an impairment in almost all areas of QoL, including sleep, self-image, and daily limitations due to CSU.

In this regard, we have found that TDp is linked to poorer DLQI and CUQoL scores, including subscales addressing sleep disturbances, physical aspect, social limitations, social relationships, clothing choice, and daily activities. In contrast, disease control, CUQoL pruritus and swelling and DLQI pruritus subscales have not been associated with TDp. This data might show that subjective symptoms and thoughts are related to TDp, but that physical symptoms (such as pruritus, swelling or disease control indexes) are not related. Moreover, general reports addressing the issue of TDp and sleep (30) agree with the findings of the current study, placing TDp as an entity related to insomnia and poorer sleep quality.

More importantly, TDp increases the risk of mood disturbances in patients with CSU. In particular, increases in anxiety and depression rates of 51% and 86%, respectively, were found in patients with TDp. This might be due to more dysfunctional coping strategies in patients with TDp, and should be taken into account when assessing a patient with CSU, as discussed below. Moreover, specific comparisons between not only TDp, but also between all personality types, would be of great interest for further studies on personality and skin diseases, as have previously been performed for other diseases (7).

Similar studies have been performed regarding TDp and other skin conditions, such as psoriasis (15, 31). These reports describe an increase in the risk of developing anxiety, and an increased impairment in QoL in psoriasis patients with TDp.

Finally, the DS14 questionnaire (16, 20), which comprises 14 items answered by the patients, enables detection of TDp. As it can be easily answered in minutes, this questionnaire could be implemented as a part of the initial assessment of patients with CSU, thereby enabling dermatologists to detect those at a higher risk of anxiety, depression and poor QoL. The implementation of screening for patients with TDp in specialized urticaria units could be useful for the early detection of patients at higher risk of developing anxiety and depression. This procedure would help improve holistic care for patients affected by this disease, with hardly any extra time required.

Limitations

The results of this study should be considered under the presence of methodological limitations: (*i*) the cross-sectional design of study that limits the causal inferences; (*ii*) reduced sample size; (*iii*) self-referred diagnosis of CSU for the online population, which may result in selection bias; (*iv*) presence of TDp could be a limiting factor in study participation, therefore leading to an underestimation of TDp prevalence; (*v*) possible selection bias due to over-representation of patients with a higher educational level, who are more likely to seek medical care and may be more likely to participate in studies.

Conclusion

Because TDp may represent a frequent personality type among individuals with CSU, it could serve as a marker of more psychologically vulnerable patients, probably related to dysfunctional coping strategies. Screening for this feature could be useful for detecting patients at higher risk of anxiety, depression and poor QoL.

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The authors have no conflicts of interest to declare.

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