Review paper

Depression and type D personality

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Abstract

The aims were to analyse reports on the correlation between depression (D) and type D personality (TDP) and the use of the Type D Measurement Scale (DS-14) in the diagnosis and treatment of patients with mood disorders (PMD). Studies have shown that the presence of TDP increases the risk of D, anxiety, alcohol dependence, job burnout, and experiencing loneliness. It has also been shown that the existence of TDP features in PMD is an adverse prognostic factor. However, some have questioned the possibility of identifying TDP in PMD, pointing to the possibility of overlapping features of TDP with D symptoms, as well as questioning whether TDP could be considered a factor in the development of D at all. TDP can be a useful additional tool in the evaluation of patients at risk for D and in PMD. More research is needed to better understand the correlations between TDP and D.

Introduction

Type D personality (TDP) is a concept created in 1995 by Johan Denollet during a search for personality risk factors for the onset and adverse course of cardiovascular disease. TDP, as defined by Denollet, consists of 2 main features: negative affectivity (NA) and social inhibition (SI) [1]. Characteristics of people with TDP include a tendency to worry, a low sense of security, pessimism, and a tendency to blame oneself [2]. The tool used to assess TDP traits is the Type D Personality Scale-14 (DS-14) [3], which has been adapted for use in many languages, including a Polish-validated version developed by Zygfryd Jurczynski and Nina Ogińska-Bulik [1, 4–6]. The prevalence of TDP is estimated to range between 21% [3] and 30% in the general population [7]. Several studies indicate that the presence of TDP is associated with an increased risk of cardiovascular disease [8], including ischemic heart disease [1, 9]. TDP, along with old age, was an independent risk factor for cancer development in patients with ischemic heart disease [10]. TDP increases the risk of inappropriate health habits, as well as the patient's belief that their condition is the result of random events [11]. The risk of finding TDP in patients with poorly controlled bronchial asthma was higher than in patients with partially controlled or well-controlled asthma, or in healthy subjects [2]. The correlation between mental disorders and TDP has also been studied. It has been indicated that TDP may be a risk factor for depression [12, 13]. A 2021 Chinese study found that male students with TDP traits coped worse with stress and exhibited more psychiatric symptoms than students without TDP traits [14]. Another study found that patients with TDP had an increased risk of clinically significant depression, paroxysmal anxiety, somatization, and alcohol abuse [15, 16]. It has also been shown that people with TDP are more likely to use psychotropic drugs [6]. However, it has also been argued in the literature that because the concept of TDP overlaps with depressive symptoms, it could be a specific measure of the disease rather than a personality characteristic [17]. The aim of this article was to look at literature reports on the correlation between depression and TDP and the potential use of the DS-14 scale in the treatment of patients with affective disorders.

Similarities and differences in the psychopathological description of depression, personality disorders, and TDP

Depression is a multifactorial and heterogeneous psychiatric disorder accurately described and classified as a mood disorder in all current systems of classification of diseases and health problems [18–22]. Depression is a common mental disorder that affects about 5% of the adult population [21, 23–25]. It is estimated to affect between 280 million and 350 million people worldwide [23, 21, 25]. The ICD-10 criteria allow the diagnosis of a depressive episode in a patient

Table 1. Diagnostic criteria for depressive episodes according to ICD-10 vs. ICD-11, personality disorder according to ICD-10 vs. ICD-11, dysthymia, and TDP

Parameter	Mood disorders			Personality disorders		TDP
	ICD-10 (18)	ICD-11 (29)	ICD-10 (18)	ICD-10	ICD-11	
Name	Depressive episode	Depressive disorder with a single episode	Dysthymia			Does not constitute a diagnosis of a mental disorder
Symptoms	**Minimum 2 out of:** 1) ↓ mood 2) anhedonia 3) ↑ fatigue **and a minimum 2 out of:** 4) ↓ concentration and attention 5) ↓ self-esteem and self-confidence 6) ↑ feeling of guilt and low self-esteem 7) pessimistic, black vision of the future 8) suicidal thoughts and acts 9) sleep disorders 10) ↓ appetite [18]	**Minimum 1 out of:** 1) ↓ mood 2) ↓ interest or anhedonia **and some of the following, so that the total number of symptoms ≥ 5** 3) ↓↑ body weight and appetite 4) ↓↑ drowsiness 5) ↓↑ psychomotor activity 6) ↓ energy 7) ↓ self-esteem or ↑ guilt 8) ↓ ability to think or concentrate or lack of decisiveness 9) recurrent thoughts of death, thoughts, plans, or suicide attempts 10) no hope for the future [21]	**Minimum 3 out of:** ↓ energy ↓ sleep ↓ faith in self ↓ concentration ↓ enjoyment of sex AND other pleasurable activities ↓↑ talkativeness ↑ crying ↑ helplessness ↑ pessimism ↑ inability to cope with daily chores ↑ social disruption [18]	**Variation in > 1 of the areas:** 1) cognitive processes (i.e. perceiving, and interpreting things, people, and events, and forming attitudes and perceptions toward self and others) 2) emotionality 3) controlling impulses and rewarding needs 3) relating to others and dealing with interpersonal situations [18]	1) disturbed functioning in the aspects of self (sense of identity, self-esteem, self-image, self-direction) **and/or** 2) problems in interpersonal functioning [22]	Determined using the DS-14 scale if the results on the negative affectivity and social inhibition scale are above 10 points [1]

ICD-10 – International Classification of Mental Disorders and Behavioural Disorders, revision 10; ICD-11 – International Classification of Mental and Behavioural Disorders, revision 11; DSM-V – Diagnostic and Statistical Manual of Mental Disorders Fifth edition. ↓ decrease, ↑ increase, TDP – type D personality, DS-14 – Scale to Measure Type D personality.

who, for the first time in their life, for a minimum of 2 weeks, presents no less than two of the main symptoms of depression such as depressed mood, anhedonia, increased fatigue, and at least two of the additional symptoms, a full list of which can be found in Table 1 [18]. When a depressive episode occurs once again in a patient's life, according to ICD-10 criteria, recurrent depressive disorder should be diagnosed [18]. Depressive episodes also occur in patients with bipolar affective disorder, who have manic or hypomanic periods in addition to episodes of depressed mood throughout their lives [18, 19]. The consistent occurrence of depressive mood over at least 2 years (1 year in children) that is not severe enough to be diagnosed as at least a mild depressive episode is diagnosed as dysthymia, according to both the ICD-10 and Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-V) [18, 19]. TDP by itself does not meet the definition of a mood disorder, but neither does it meet the criteria for a personality disorder diagnosis. The ICD-10 defines a personality disorder as a fixed pattern of behaviour and experience of emotions that differ significantly from what is expected in a given cultural background. Patients with a personality disorder show clinically significant differences in at least two areas of life, including interpersonal relationship functioning, emotional expression, perception (of self, others, and events), and impulse control [18, 19]. Table 2 provides a comparison of some data on depressive disorders, dysthymia, personality disorders, and TDP.

TDP should be considered as a description of the characteristics or condition of a person who is simultaneously diagnosed with NA and SI. NA presents as a constant feeling of psychological discomfort, frequent anger, anxiety, irritability, and emotional instability [26, 27]. NA is a trait found in neuroticism; people who exhibit NA tend to be reclusive [27]. SI is the tendency to not express emotions and to inhibit one's behaviour in the context of various social situations [28]. Suspected TDP based on the DS-14 scale thus describes certain personality traits but does not constitute a diagnosis. It is worth mentioning, however, that the new WHO ICD-11 classification for the diagnosis of personality disorders emphasizes the presence of patients' maladaptive characteristics, such as negative emotionality and detachment [21]. On the other hand, in the DSM-V for the diagnosis of personality disorders, in addition to abnormalities in the functioning of the personality in the "self" and interpersonal spheres, it is also necessary to establish at least one pathological personality trait, including NA and SI (detachment) [29–34].

Stability over time of the TDP construct and the problem of distinguishing TDP among patients with mood disorders

In a longitudinal study, the results of which were published in 2022, older patients with hearing loss

Table 2. Characteristics of selected factors characteristic of depressive disorders, dysthymia, personality disorders, and TDP

Parameter	Depressive disorders	Dysthymia	Personality disorders		TDP
	ICD-10, ICD-11, DSM-V	ICD-10; DSM-V	ICD-10	ICD-11	
Duration	Min. 2 weeks [18, 19]	2 years (1 year in children) [18, 19]	Stability and long duration [18]	Chronic (2 years according to some sources) [31]	Unspecified
Prevalence in the general population	~5% [21]	~0.5% [19]	6.1–16.4% [32]		~21% [3]
Onset of the disease	20–40 [21]	About 20–35 years old	Onset in late childhood or adolescence		Unspecified
Gender prevalence	F > M 2 : 1 [21]	F > M [30]	More often in M: Antisocial, schizoid More often in F: Histrionic, Dependent, Anxious M = F: Borderline [33]		Some studies suggest F > M [34]

ICD-10 – International Classification of Mental Disorders and Behavioural Disorders, revision 10; ICD-11 – International Classification of Mental and Behavioural Disorders, revision 11; DSM-V – Diagnostic and Statistical Manual of Mental Disorders fifth edition; TDP – type D personality, F – female, M – male.

were observed for changes in the presence of TDP. Crucially, 14 months after the cochlear implant, a statistically significant decrease ($p = 0.023$) was observed in the number of people classified as having TDP, while no such decrease was observed in the control group who did not receive a cochlear implant. This indicates the unstable nature of the TDP in this study group of patients. However, it is noteworthy that depressive symptoms before and after implantation were not assessed [35]. Similar conclusions were reached by Mertens *et al.*, who, in their international study 1 year after cochlear implant, observed a 20% decrease in the number of people who could be diagnosed with TDP, compared to a 13% decrease in the control group, i.e. in people who had not been implanted. Mertens *et al.*, however, considered symptoms of depression and anxiety using the Hospital Anxiety and Depression Scale and, interestingly, observed no statistically significant differences in the control or study group in terms of depression and anxiety. The authors of the study indicate, therefore, that a cochlear implant does not affect the incidence of depression and anxiety. Nevertheless, it did affect the components of TDP and, therefore, NA and SI [36].

TDP instability was also shown in dialysis patients, noting that TDP should be defined more in terms of a condition than a person's characteristics [37]. In counterpoint to this, there are data indicating stability over time of the DS-14 and its independence from the somatic state [4, 38]. It has been pointed out that despite psychotherapeutic intervention to reduce the SI and NA dimensions of TDP, 85% of patients undergoing intervention still exhibited TDP traits after the intervention ended [39]. Romppel *et al.*, in a paper published in 2012, demonstrated the stability of the factor structure of the DS-14 scale in a 6-year follow-up [40]. Martens *et al.* indicated in 2007, based on an 18-month follow-up, the stability of TDP and its independence of somatic illness severity and mood changes [38]. However, in 2015, Ossola *et al.* demonstrated the temporal instability of TDP and noted the overlap of NA and TDP with depressive symptoms as measured by the Hamilton Depression Scale [17]. Norwegian researchers came to similar conclusions about the overlap between NA and TDP symptoms in 2022 [41]. However, in 2023, Ossola *et al.* noted the possible role of TDP as a risk factor for the development of major depressive disorder and the strong association between alexithymia and negative affectivity in cardiac patients. However, the authors, considering the results of their previous studies, note that the concept of TDP and alexithymia may overlap with subthreshold depressive symptoms [42]. Nevertheless, it should be noted that many studies have identified people with depressive symptoms without TDP features while simultaneously identifying people with depression and TDP features. Examples of studies that featured patients with depression without TDP symptoms are shown in Table 3 [43–48].

Type D personality as a possible risk factor for the development and adverse course of depression

In the literature, it is argued that the presence of TDP traits can promote the development of de-

Table 3. Selection of studies that included patients with TDP and depressive disorders

Author	Year of publication	Number of people with depression in the study	% of people with depression with TDP in the study (*n*)	% of people with depression without TDP in the study (*n*)	Population
Laoufi MA *et al*. [43]	2022	318	55.3% (*n* = 176)	44.7% (*n* = 142)	318 people with a diagnosis of depression from Erasme Hospital Sleep Laboratory, Belgium
Lambertus F *et al*. [44]	2018	192	60.9% (*n* = 117)	39.1% (*n* = 75)	570 German cardiac patients, Germany
Al-Qezweny MN *et al*. [45]	2016	92	61% (*n* = 57)	9% (*n* = 35)	534 Danish patients after transcatheter coronary intervention, Denmark
Gupta S, Basak P [46]	2013	68	79.4% (*n* = 54)	20.6% (*n* = 14)	150 Medical students, India
Domagalska *et al*. [47]	2021	94	52.1% (*n* = 49)	6% (*n* = 6)	412 secondary school teachers, Poland
Darquennes G *et al*. [48]	2023	285	57.9% (*n* = 165)	42.1% (*n* = 120)	3969 patients Erasme Hospital Sleep Laboratory

TDP – type D personality, n – number of subjects.

pressive disorders [12]. For example, a German study found a higher prevalence of TDP traits in patients with depression than in the general German population [44]. TDP has been cited as one of the risk factors for the development of depression in patients undergoing coronary revascularization procedures, along with factors such as β-blocker therapy and specific modes of coping with stress [49], in patients undergoing percutaneous coronary intervention [45], and in dialysis patients [37]. TDP has also been cited as one of the risk factors for the development of depression in parents of children with leukaemia [50], high school graduates [51], healthcare workers during the SARS-COV2 pandemic [52], and soldiers [53]. The authors of the term TDP, Denollet *et al*., in a study published in 2016, indicated that people with TDP were more likely to both develop depressive disorders and experience depressive symptoms [10]. A Danish study found that patients with TDP had a higher risk of depression ($p < 0.001$) and anxiety ($p < 0.001$) [4]. Howard and Hughes found that people with TDP have an increased risk of responding with depression and anxiety to stressors [54]. However, due to the view raised in the literature and mentioned earlier, TDP may predispose cardiac patients to the development of depression. Marchesi *et al*. used the DS-14 scale on a group of cardiac patients at a hospital in Parma who had never been diagnosed with depression before, and the study was repeated after 1, 2, 4, and 6 months. The results showed that TDP could not predict the development of depression in cardiac patients who had never previously been diagnosed with depression [55].

The impact of the presence of TDP on the adverse course of depression has also been analysed. It has been shown that the presence of TDP traits may be a stronger risk factor for persistent depressive symptoms than the baseline Hamilton scale score [56]. In the aforementioned study of German cardiac patients, it was shown that patients with depression who exhibit features of TDP have a higher risk of psychiatric comorbidity (more than two psychiatric disorders co-occurring with depression) than depressed patients without features of TDP [44]. Patients with TDP were more likely to suffer from dysthymia and to struggle with social phobia and other anxiety disorders, as well as have a higher risk of being diagnosed with Type C personality disorder (according to DSM-V) [44]. While the mere presence of Type C personality disorder co-occurring with depression does not appear to be a factor for a negative prognosis [57, 58], the co-occurrence of psychiatric disorders is a factor for a worse prognosis in depression, as it is associated with the severity and chronicity of the course of a depressive episode [59]. TDP is associated with a propensity for alcohol abuse [60–62], especially in women who have experienced trauma in their youth [63] and in adolescents with excessive involvement in internet use [64]. The presence of NA has a more negative effect on depression than other psychosocial factors in women with diabetes [65].

In 2010, Matthias *et al*. were the first to point out that TDP, as well as independently occurring depersonalization, is associated with an increased risk of suicidal ideation [66]. In a 2014 study of patients with a major depressive episode, the presence of TDP was associated with an increased risk of suicide, even when the severity of the depressive episode as measured by validated scales did not differ. Crucially, in this study, the SI scale score was statistically significantly higher in patients with a history of attempted suicide ($p = 0.033$) [67]. Data published in 2022 from a Belgian study also show a statistically significant association (OR = 1.76 [95% CI: 1.02 to 3.01], $p = 0.041$) between the presence of TDP and suicidal ideation in patients treated for a major depressive episode [43]. It was shown that the NA component of TDP, together with anhedonia, were independent factors in the occurrence of suicidal ideation [68].

Common aetiology of depression and TDP – biological, psychological, and social correlates

The aetiology of depressive disorders is complex and still not fully understood. Biological, psychological, and social factors seem to play a role in the development of depression [21].

Among the factors believed to be important in the development of depression is anxiety, often secondary to a variety of stressors. The set of characteristics that determines an organism's ability to cope with stressful situations can be referred to as resilience, so the susceptibility to developing depression is greater in patients with low resilience [21, 69]. It has been shown that low resilience is a risk factor for the development of depression [21, 51]. Students with TDP present lower resilience and sense of coherence [70], and lower resilience and health-seeking behaviour [71]. Furthermore, the prevalence of TDP traits in adolescents is negatively correlated with resilience and positively correlated with the risk of developing post-traumatic stress disorder (PTSD) [72]. The same conclusions were reached by researchers in a group of adults [73]. An association has also been observed between the presence of TDP and a reduction in resilience and an increase in feelings of hopelessness in patients with heart failure [74].

Patients with TDP also experience lower levels of social support and greater loneliness [75], which is associated with a higher risk of developing depression [76]. TDP promotes occupational burnout and the perception of one's professional work as a stressful place [77, 78]. Depression and loneliness promote inefficiency at work and increase absenteeism at work [79]. People with TDP are more likely to exhibit an avoidant attitude, giving in to difficult life situations [61]. Mommersteeg *et al*. point to the important role of depression in mediating between TDP and work-related health problems [80]. Neuroticism is also a temperamental factor that increases the risk of developing depression [19], mainly after exposure to stressful events. Neuroticism was positively correlated with both NA and SI [81].

Anhedonia is one of the main symptoms of depression. A statistically significant correlation was found between the presence of anhedonia and SI [82].

One of the hypotheses explaining the formation of depressive disorders is the inflammatory concept. A significant elevation of pro-inflammatory cytokines is observed in depression [21, 83]. There is also evidence of an effect of inflammation on the development of depression through the pro-inflammatory cytokine-mediated overactivation of indole-2,3-dioxygenase (IDO), an enzyme that converts tryptophan to the neurotoxic kynurenine, thereby reducing the amount of substrate needed for serotonin synthesis [84]. Moreover, it has been proven that people with depressive disorders show an increased inflammatory response to stress [85]. Also, TDP is associated with activation of inflammation [86]. In a 2022 study, TDP was associated with an increase in the pro-inflammatory cytokines TNF-α and IL-6 in patients with coronary artery disease. The study also pointed to a potential role of inflammatory activation as a mediator between TDP and the susceptibility of the plaque to *rupture* [87]. Similarly, a 2015 study indicated an association between TDP and inflammation and endothelial dysfunction [3]. It has also been indicated that men with chronic systolic heart failure and TDP have higher concentrations of TNF-α and its soluble receptors [88]. In a Romanian study, the presence of pro-inflammatory markers in patients with major depressive disorder and TDP was associated with higher rates of somatic anxiety ($p = 0.005$) [89]. Major depressive disorder patients who experienced stress in childhood showed exaggerated production of IL-6 in response to psychological stress [82, 85]. People who adapt well to difficult life situations (high resilience) have a different immunophenotype from people who are more susceptible to stress [90].

The adverse effects of chronic hypercortisolaemia and dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis triggered by chronic stress, which occurs in depression, have been widely reported [91–93]. Chronic hypercortisolaemia has neurotoxic effects on areas in the brain rich in glucocorticosteroid receptors, such as the amygdala and hippocampus, as well as the prefrontal cortex [83, 93–95]. The presence of NA as one of the two components of TDP is associated with elevated cortisol levels in healthy individuals [96]. A possible correlation between TDP and HPA axis regulation has been suggested [83].

The monoamine theory of mood disorders links the onset of depressive symptoms to dysfunction of monoamine neurotransmission in the brain [21]. Based on the monoamine theory, antidepressants that increase the reuptake of monoamines, such as

serotonin, dopamine, and norepinephrine, are successfully used as a treatment of choice for depressive disorders. It has been indicated that a 20 mg/day dose of the selective serotonin reuptake inhibitor (SSRI) paroxetine can reduce NA, a component of TDP, and the effect in this regard is dependent on the serum concentration of the drug [97]. A potential benefit of SSRIs in depressed patients with expressed NA has also been described [98].

Practical implications

In several studies, the DS-14 has served as one of the tools for assessing the health status of patients with chronic obstructive pulmonary disease [99], teachers [78], doctors [52, 77], and soldiers [53], highlighting the mental health problems of specific social groups. Thus, it seems reasonable that TDP should be included in prevention and screening studies [1, 61] because it may facilitate the identification of those at risk for depression [12], although further research is needed in this area. If features of TDP are found in a patient, consideration should be given to deepening the diagnosis for mood disorders. However, the need to identify TDP in cardiac patients is most often raised in the literature [100, 101].

Due to the risk of the adverse course of depression in people with TDP found in numerous studies, the wider use of the DS-14 scale in patients diagnosed with depression has been advocated [43]. The literature points to the possibility of identifying people with TDP as an aid in assessing the risk of suicidal thoughts and behaviours [61, 43, 67]. A 2019 meta-analysis, which studied 107,206 patients with depressive disorders, indicated that determining personality traits is useful in the diagnosis, treatment, and prognosis of patients with mental disorders [102]. It is also noted that lower levels of NA may promote the alleviation of PTSD symptoms in patients after myocardial infarction [103], so the identification of patients with TDP should also be considered in patients with PTSD.

Due to the ease of use of the DS-14 questionnaire and the availability of validated versions of the questionnaire in different languages, this tool can be helpful in daily clinical practice and research [1]. Recently, an avatar has been used to study TDP, indicating that it can be used to determine the avoidance strategies of patients with TDP [34].

The presence of TDP features in patients with affective disorders can also indicate the direction of possible additional therapeutic interventions. It has been reported that the prevalence of maladaptive coping in people with TDP may warrant psychosocial coaching and behavioural interventions [104]. A 2022 study on a small group of subjects showed the effectiveness of group cognitive therapy in reducing TDP features in patients with coronary artery disease [105]. It has also been shown to reduce the dimensions of SI and NA TDP by conducting 8 weeks of mindfulness-based stress reduction [39]. Improvements in quality of life have also been shown in TDP patients using expressive writing [106]. However, it should be emphasised that further studies of TDP treatment are needed in a larger population of TDP patients because current data are very poor.

Conclusions

It seems that the DS-14 scale for identifying patients with TDP can be an interesting and helpful auxiliary tool to identify risk groups for depressive disorders. Furthermore, in patients with a diagnosis of depressive disorders, it can be an additional aid in assessing the prognosis of the severity of the disease course. However, due to the controversy present in the literature regarding the possibility of overlapping features of TDP – especially its NA component – with depressive symptoms, it seems necessary to undertake further studies on the application of the DS-14 scale in patients with depression.

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