

Does Type-D Personality Impact Risk of Adverse Behavioural Changes in Patients with Intracranial Tumours?

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Abstract

In this study, conducted to assess the influence of the type-D personality of patients with intracranial tumours on their behavioural changes, a prospective design was undertaken. Patients were enrolled before surgery or any definitive treatment (pre-treatment) and were followed up for behavioural symptoms at one month and six months after surgery. Using purposive sampling, 150 patients who were treated and followed up in Neurosurgery outpatient department at a tertiary care centre of North India, DS14 questionnaire and Neuropsychiatric inventory were used to measure type-D personality and behavioural symptoms. The type-D personality of the patients was assessed before surgery or initiating any definitive treatment (pre-treatment), and behavioural symptoms were assessed at pre-treatment, and at one month and six months after surgery or any definitive treatment. Patients of intracranial tumours with and without type-D personality were comparable regarding demographic and clinical variables. The patients with type-D personality had a significantly higher number and severity of behavioural symptoms at first assessment before treatment, first follow-up at one month and second follow-up at six months. It was concluded that Type-D personality may adversely affect the behaviour of patients with intracranial tumours. Nurses must incorporate appropriate behavioural interventions to the patients of the intracranial tumour with a type-D personality to overcome their behavioural changes and associated burden.

Patients of intracranial tumours (ICT) show persistence of behavioural changes even after treatment of the tumour. Nurses play a major role in identifying the patients who are at risk for developing behavioural symptoms and taking appropriate interventions to equip the patients and their caregivers to cope with these changes. The Type-D (distressed) personality profile identifies individuals who are particularly vulnerable to the adverse effect of general distress. Patients of various clinical conditions with type-D personality are reported to have comparatively higher distress and adverse effects. It is important to identify the possible link of Type-D personality with distress or behavioural changes among patients of ICT.

Intracranial tumours are one of the common causes of mortality and morbidity worldwide (Lamperti et al, 2012). About 60 to 90 percent of patients with intracranial tumours face cognitive impairments and behavioural changes since the diagnosis of a tumour or its treatment (Dhandapani et al, 2015; Dutta et al, 2016), which may complicate care. Behavioural changes are probably the most difficult changes for both the patient

and family and the ones most often overlooked by professionals. Common behavioural symptoms reported in patients of intracranial tumours include anxiety, agitation/aggression, euphoria, disinhibition, irritability/lability, sleep disturbance, and appetite disorder (Gregg et al, 2014; Dhandapani et al, 2017). They affect the functional status and quality of life of patients as well as caregivers. But adequate attention is not given to either identify or treat the behavioural symptoms of these patients.

Review of Literature

A study in Italy (Poggi et al, 2005) on 76 patients diagnosed with a brain tumour verified the presence of cognitive and psychological disorders using a standardised battery of age-matched cognitive and psychological tests in a group of children and adolescents diagnosed with a brain tumour before age 18 years. Findings revealed that all three groups presented with cognitive and psychological-behavioural disorders. Their frequency varies according to the age of onset and is strongly associated with time since diagnosis. The performance intelligence quotient was more impaired than verbal IQ. Internalising problems, withdrawal, and social problems were the most frequent psychological disorders. Correlations were found between cognitive impairment and the onset of the psychological and behavioural disorders.

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Dhandapani et al (2017) assessed the neuropsychological symptoms in patients with intracranial tumours who were availing treatment. Neuropsychiatric Inventory Questionnaire (NPI-Q), which identifies 12 behavioural disturbances, was used to assess behavioural symptoms at baseline and later at one month and six months after treatment and scored as symptom severity as well as symptom scores. The commonest neuropsychological symptoms at baseline were anxiety (82%), agitation (75%), irritability (74%), depression (74%), and sleep disturbances (70%). The neuropsychological symptoms persistent at six months were anxiety (33%), depression (33%), sleep disturbances (33%), agitation (25%), irritability (25%), and disinhibition (25%). There was substantial neuropsychological burden among patients with intracranial tumours.

Aqarius et al (2007) examined 150 patients to see whether individual differences in personality predict impaired quality of life (QOL) and depression above and beyond peripheral artery disease (PAD) severity. Results showed that type-D personality predicted poor physical health, decreased level of independence, and poor overall QOL. Type-D personality also independently predicted increased risk of depressive symptoms (odds ratio, 8.55; 95% confidence interval, 3.01-24.25; $p < 0.01$).

Need for the Study

Though patients with intracranial tumours may present with varying degree of behavioural symptoms, there could be an underlying trait factor that predisposes patients to chronic distress (Paris, 2000; Denolett, 1993). Type-D individuals frequently experience negative emotions (negative affectivity) and inhibit self-expression in social interaction (social inhibition) (Mols & Denolett, 2010). Poor prognosis is reported in patients with cardiac disorders due to behavioural distress in association with type-D personality (Ruberman et al 2013; Denolett et al 1996; Denolett, 1997). The prevalence of Type-D personality in patients with stress cardiomyopathy and myocardial infarction is also reported (Compare et al, 2013). Negative emotions have been related to adverse cardiac events, but a general propensity to psychological distress may also affect cardiovascular outcomes (Mols & Denolett, 2010). The influence of type-D personality on various outcome measures in neurological and neurosurgical population is not yet explored. If it is proven to have any influence on patients' prognosis, nurses can identify the patients at risk and intervene with appropriate interventions.

Objective

The present study was undertaken to assess the influence of the type-D personality of patients with

intracranial tumours on their behavioural changes. The aim of the study was formulated based on the assumption that patients of intracranial tumours with type D personality may have more behavioral changes during treatment.

Methodology

It was a prospective study to assess the influence of the type-D personality of patients with intracranial tumours on their behavioural changes. Patients were enrolled before surgery or any definitive treatment (pre-treatment), and followed up for behavioural symptoms at one month and six months after surgery.

Sample: Using consecutive sampling, 150 consecutive patients of intracranial tumours admitted in preoperative neurosurgery ward at a tertiary care center of North India were assessed for eligibility. All adult conscious patients (Glasgow Coma Score: E4V5M6) who were radiologically diagnosed to have an intracranial tumour, but without any major co-morbidity were included. The patients were enrolled on the diagnosis of an intracranial tumour, but before initiating any definitive treatment.

Ethical clearance was obtained from the Institute Ethics Committee. Patient, as well as family caregiver information sheet, were given and informed written consent was taken from both patients and caregivers. The patients were enrolled from 2016 to 2017 from a tertiary care centre in North India. The type-D personality of the patients was assessed before surgery or initiating any definitive treatment (pre-treatment), and behavioural symptoms were assessed at pre-treatment, and at one month and six months after surgery or any definitive treatment.

Tools: Type-D personality scale (DS14 questionnaire) was used to measure type-D personality in patients (Denolett, 2005). Neuropsychiatric Inventory Questionnaire (NPI-Q) was used to assess the behavioural symptoms in patients. The DS14 questionnaire, a standardised tool with 14 items, is the most accepted and widely used diagnostic instrument for the assessment of the type-D pattern. It is a brief, psychometrically sound measure of negative affectivity (NA) and social inhibition (SI). The NA scale covers seven items related to dysphoria, worry, and irritability; the SI scale covers seven items related to discomfort in social interactions, reticence, and lack of social poise. The total score ranges from 0 to 22. The individual is considered to be of type-D personality when the independent score on both NA and SI are more than 10. Both NA and SI have good internal consistency ($\alpha = 0.88/0.86$) and high test-retest reliability ($r = 0.72/0.82$) (Denolett, 2005). DS-14 was translated to Hindi using the translation / back-translation method. Test-retest reliability

(r) of Hindi questionnaire for NA and SI were 0.96 and 0.93 respectively. The type-D personality of the patients was assessed at the first visit in the study.

The NPI-Q is a standardised tool to assess the neuropsychiatric symptomatology in clinical practice settings, including patients with neurological diseases. In present study, neuropsychiatric behavioural changes in patients of intracranial tumours were assessed using NPI-Q, which identifies 12 behavioural disturbances occurring in patients such as delusions, hallucinations, dysphoria, anxiety, agitation/aggression, euphoria, disinhibition, irritability/lability, apathy, motor activity, sleep disturbance and appetite disorder. Both the frequency and severity of each behaviour are determined. NPI-Q is reported to have high reliability, sensitivity, and validity (Cummings et al, 1994).

Data analysis: Appropriate descriptive and inferential statistics were used for data analysis. The statistical package of social sciences (SPSS) version 21 was used for statistical analysis. Independent 't' test was used to compare the NPI-Q symptom core as well as the severity of behavioural changes in patients of intracranial tumours with and without type D personality.

Results

As shown in Figure 1, out of 150 patients of ICT enrolled, 71 (47%) were identified as having type-D personality based on DS-14 questionnaire. Table 1 shows that patients of ICT with Type-D personality and non-type-D personality were comparable regarding demographic and clinical profile. More than half of the patients in both groups were male. Majority of the patients in both groups were diagnosed with supra-tentorial and axial tumours. More than half the patients were having benign tumours. A maximum number of patients in both groups had under gone surgical intervention.

The number of behavioural symptoms based on the NPI-Q symptom score in patients of intracranial tumours is shown in Figure 2. On initial assess-

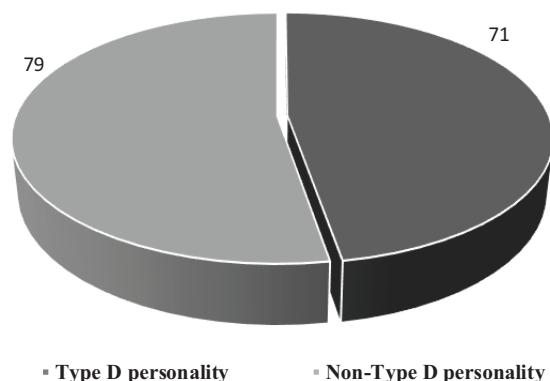


Fig 1: Proportion of patients of the intracranial tumour with type-D personality.

ment before initiating any treatment (pre-treatment), median symptom score of 8(4) in patients of ICT with type-D personality was significantly higher ($p<0.001$) as compared to 6(4.5) in patients who are not type-D personality. Similarly, on first follow-up at one month, significantly higher ($p=0.003$) median symptom score was reported in patients with type-D personality, i.e., 6(5) as compared to 4(5) in patients who are not type-D personality. Again, on assessment at six months, significantly higher ($p=0.002$) median symptom score was found in patients with type-D personality, i.e. 4(4) as compared to 2(5) in patients who are not type-D personality.

The severity of behavioural symptoms in patients of intracranial tumours with and without type-D personality is shown in Figure 3. On first assessment before initiating any treatment (pre-treatment), the median score of behavioural symptom severity of 17(10) in patients of intracranial tumours with Type-D personality was significantly higher ($p=0.004$) as compared to 12(11) in patients who are not Type-D personality. Similarly, on first follow-up at one month, significantly higher ($p=0.015$) median score of behavioural symptom severity was reported in patients with type-D personality, i.e., 10(9) as compared to 7(9) in patients who are not type-D personality. Again, on second follow up at six months, significantly higher ($p=0.003$) median score of behavioural symptom severity was found in patients with type-D personality, i.e., 5.5(6) as compared to 2(6) in patients who do not have type 'D' personality.

Discussion

Type-D personality affects the health status of patients with various disease conditions and general population (Moles & Denolett, 2010). The present study has assessed the prevalence of Type-D personality among patients with ICT and its influence on their behavioural symptoms. Patients were assessed before initiating any treatment, at one month and six months follow-up.

The present study identified that 47 percent of patients with intracranial tumours had the trait of Type-D personality in terms of negative affectivity and social inhibition. The proportion of Type-D personality among the general population is approximately 35 percent (Lukoseviciute & Smigelskas, 2016). It is reported that the proportion of patients with Type-D personality among cardiac patients varies from 21 to 54 percent (Morys et al, 2015; Denolett & Conraads, 2011). Relatively high prevalence of Type-D personality in patients of various disease population warns their willingness to adopt a healthy life style. In the present study, it was found that the number of behavioural symptoms and their severity was reduced from pre-treatment to one month and to six months in patients of ICT

Table 1: Profile of patients with intracranial tumours

Sociodemographic variable		Type-D n1=71 f (%)	Non-type-D n2=79 f (%)
Age (years)		44.4±13.58	42.26±13.6
Gender	Male	45 (64)	47 (59)
	Female	26 (36)	32 (41)
Marital status	Married	64 (90)	70 (88)
	Unmarried	6 (9)	9 (12)
	Divorced	1 (1)	
Tumour location	Supratentorial	57 (80)	58 (74)
	Infratentorial	11 (16)	21 (26)
	Multiple	3 (4)	
Tumour type	Axial	51 (73)	47 (59)
	Extra-axial	19 (27)	33 (42)
Treatment modality	Surgery	60 (84)	66 (84)
	Radiotherapy	34 (46)	24 (30)
	Chemotherapy	7 (10)	5 (6)

who are having type-D personality and non-type-D personality. Thus it indicated that behavioural symptoms of patients of intracranial tumours improve after surgery and other treatment modalities (Dhandapani et al, 2017; Dhandapani et al, 2016). However, the present study showed that the number and severity of behavioral symptoms were significantly higher in patients who possessed type-D personality pre-treatment, at one month and six months. Thus, identifying the patients who are having type-D personality will help the nurse or health worker to anticipate a higher number and severity of behavioural symptoms.

Type-D personality is reportedly to be associated with poor physical health status and more somatic complaints among the general population and patients with cardiovascular disorders. Majority of the

studies have reported a high prevalence of adverse effects in terms of poor mental health and poor outcome among patients of peripheral arterial disease (Aquarius et al, 2007) and cardiovascular diseases with Type-D personality. The type-D personality of patients with cardiovascular disease is associated with anxiety, depression, fatigue, poor health and post-traumatic stress. Poor physical, as well as mental health status and poor self-management, is reported in patients of type-D personality with chronic pain, asthma, tinnitus, sleep apnea, primary care patients, vulvovaginal candidiasis, mild traumatic brain injury, vertigo, melanoma, and diabetic foot syndrome (Mols & Denolett, 2011).

Individuals with type-D personality significantly adopt fewer health-related behaviours such as seeking appropriate medical check-up, follow-up and compliance with the medical care that could result in poor physical and mental health. A higher number of behavioural symptoms also can influence their poor adoption of health-related behaviour (Schiffer et al, 2007; Martens et al, 2007). Type-D personality may also be associated with health-related problems in the occupational setting and result in a higher number of absenteeism, exhaustion, stress disorder, burnout, job satisfaction, and a lower sense of personal accomplishment (Mols & Denolett, 2011). The exact mechanism of their poor behavioural adaptability is not clear, but individuals with type-D personality have shown decreased activity in the amygdala and inadequate emotion-processing in the brain in response to fearful expressions (De Gelder et al, 2008). Cardiac patients with Type-D personality is also associated with elevated levels of stress hormone cortisol (Molloy et al, 2012). There could also be some genetic component that explains the co-occurrence of disease and type-D personality and predispose people to both physical and psychological distress. Clinical research in cardiac populations confirmed that type-D personality was independently associated with cardiovascular reactivity such as reduced heart rate recovery (Von Kanel et al, 2009). Clinical research point towards neuroendocrine and immunological pathways that may explain the adverse health outcomes associated with type-D personality (Dhandapani et al, 2012; Mols & Denollet, 2012).

This is the first report on patients with intracranial tumours where patients with Type-D personality are reported to have increased number and severity of behavioural symptoms pre-treatment, on first follow-up at one month and second follow-up at six months post-surgery. Along with various other factors, type-D personality, along with the impact of the tumour may further disturb the emotional stability of individuals and results in more

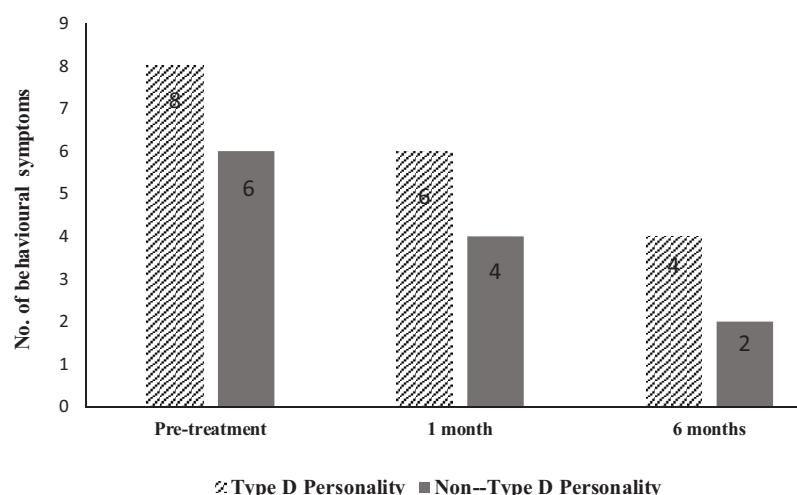


Fig 2: Number of behavioural symptoms in patients of ICT with and without Type-D personality.

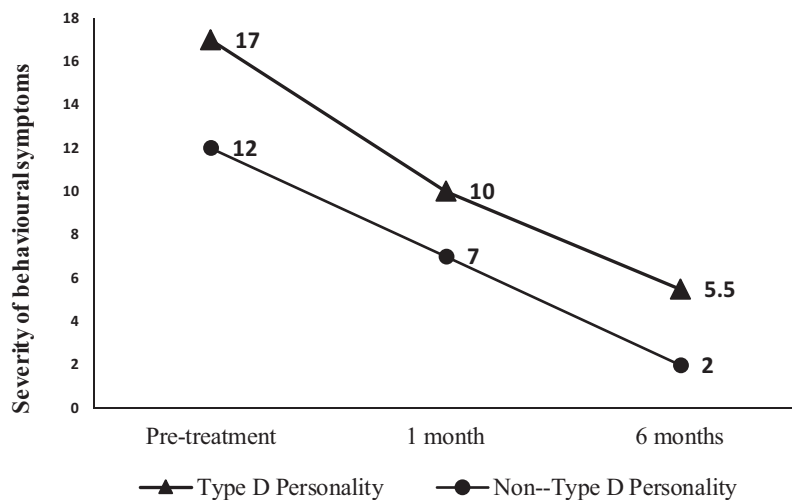


Fig 3: Severity of behavioural symptoms in patients of ICT with and without Type-D personality.

behavioral symptoms in the patients of intracranial tumours. These behavioral symptoms may increase the task of care giving by the health and family care provider. Hence, the burden on the caregiver population of patients with type-D personality also needs to be explored. As proven by various literature, patients with type-D personality have a limited ability to cope adequately with stressful life events (Doering et al, 2012) and for this reason, they may benefit from various psychological interventions that are developed towards improving their coping skills. Various psychological and behavioural interventions may help the patients to cope better with the disease process, temporal variation of manifestations (Zohar, 2016) and help them to adopt positive health behaviour. Future experimental studies are required to explore their ability to improve coping strategies, medication adherence (Wu et al, 2015) and increase their mental and somatic health status among patients with type-D personality. A high prevalence of type-D personality in patients of ICT and the increased behavioural symptoms present in these patients warn the nurses to flag the high-risk patients that may benefit from a more personalised care approach.

Limitations

In the present study, DS14 was administered to hospitalised patients that would have resulted in a higher proportion of patients with type-D personality. DS14 is reported to have temporal variation. Data can also be triangulated from caregivers too or at a different period to confirm Type-D personality in patients. However, DS-14 is proven as a valid tool to identify type-D personality. We have not used any tool to assess various dimensions of individual behavioural symptoms in patients. The impact of type D personality on specific behavioural symptoms in patients of intracranial tumours can be addressed in future studies.

Implications

Our findings show that type-D personality might have an unfavourable impact on behavioural symptoms of patients with intracranial tumour. Hence, nurses must give due importance to the assessment and management of behavioural symptoms of patients with intracranial tumours.

Recommendations

Further studies can be done to assess the individual behavioural symptoms in the patients of intracranial tumour with features of type-D personality. Considering the influence of type-D personality, nurses must take strategies to assess the type-D personality in patients. A tool such as DS-14 can be used at the bedside. Both patients and caregivers can be given brief counselling on how to identify and manage behavioural symptoms, on documentation of Type D personality in patients. Caregivers also may require added training on coping with caregiver burden. However, further evidence will be necessary to refine and further elaborate on our findings. Effectiveness of various interventions on managing behavioural symptoms can be developed and tested. Studies can be conducted on caregivers to estimate the impact of behavioural symptoms in type D personality.

Conclusion

Type-D personality may adversely affect the behaviour of patients with intracranial tumours. Nurses must incorporate appropriate behavioural interventions to the patients of the intracranial tumour with a type-D personality to overcome their behavioural changes and associated burden. Appropriate behavioural interventions based on further research can be implemented to overcome the possible link between Type-D personality and the adverse effect on the patients and caregivers.

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