Original Article

Unveiling the Role of Pain Catastrophising as a Predictor of Fear of Personal Death amongst Brain Tumour Patients

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ABSTRACT

Objectives: According to the National Health Portal, brain cancer is witnessing an upward curve in India. The reports by medical professionals suggest that brain tumours will become the second most common cancer by 2030. Any life-threatening illness not only impacts the physical well-being of the patient but also affects the mental well-being of the patient. As an interdisciplinary field, psychology aims to understand the psychosocial components of an illness that goes beyond the realm of medical treatments. Hence, the present study focused on two psychological constructs, namely Pain Catastrophising and Fear of Personal Death. The present research aims to evaluate the relationship between Pain Catastrophising and Fear of Personal Death as well as assess the predictive role of Pain Catastrophising for Fear of Personal Death.

Materials and Methods: A correlational design was adopted for the present study. The sample consisted of 180 patients who were diagnosed with a brain tumour and were scheduled for surgery for the removal of the tumour. A purposive sampling technique was used for the selection of the sample. Data were collected on two psychological measures, namely the Pain Catastrophising Scale and the Fear of Personal Death Scale. Pearson's product-moment method and regression analysis were employed for statistical analysis.

Results: The findings highlight that there exists a positive association between the two components of Pain Catastrophising, namely Magnification ($r = 0.644$, $P < 0.01$) and Helplessness ($r = 0.456$, $P < 0.01$) with the Fear of Personal death. Rumination (0.026, $P > 0.05$) component exhibited no association with Fear of Personal Death. Linear regression analysis reveals that magnification ($R = 0.644$, $R2 = 0.414$, $F = 125.861$, $P < 0.01$) and helplessness ($R = 0.456$, $R2 = 0.208$, $F = 46.857$, $P < 0.01$) are significant predictors of Fear of Personal Death for the selected sample.

Conclusion: Pain Catastrophising tendencies and feelings of Fear of Personal Death are prevalent amongst the selected cohort. Pain-catastrophising components are significantly associated with fear of personal death (FPD) and are also significant predictors of FPD amongst brain tumour patients.

Keywords: Brain tumour, Psychosocial components, Pain Catastrophising, Rumination, Magnification, Helplessness, Fear of personal death

INTRODUCTION

A tumour is a rapid and abnormal growth of cells in any part of the body. Brain tumour is the development of abnormal cell growth in the central nervous system (CNS) of the body. According to the International Association of Cancer Registries, over 24,000 people die annually due to brain tumours. According to the World Health Organization, brain tumour incidence is increasing day by day. The National Health Portal of India reported that the incidence of CNS tumours in India ranges from 5 to 10/100,000 of the population with an increasing trend. According to Global Cancer Observatory 2020 estimates, brain and CNS cancer is a considerable part of the global burden of disease, ranking 19th amongst the most frequent malignancies (1.9% of all cancers) and 12th amongst the leading causes of cancer deaths (2.5% of all cancers). Based on the present statistics, it is evident that the incidence of brain tumours is increasing across the globe. Looking at the upward curve, the present study aimed at unveiling the psychological aspects of brain cancer. Two psychological constructs namely Pain Catastrophising and Fear of Personal Death have been studied in the context of brain tumour patients.

It is reported that 40–90% of cancer patients experience pain, with 30% of them reporting it to be of moderate-to-severe intensity (Snijders *et al.*, 2022).[1] The cancer population experiences pain after their diagnosis and during the treatment of cancer. Pain is at the centre of any cancer treatment. Pain is a psychological experience and its

meaning can only be understood through experience (Beecher, 1959). Cognitive behavioural theory of pain states that pain beliefs are the patient's thoughts and their evaluation of pain intensity. Negative beliefs about pain can hamper the overall well-being of the person and may lead to feelings of anxiety. According to the literature, psychosocial variables may elucidate these pain experiences amongst the cancer population (Mercadante *et al.*, 2024).[2] Based on the available literature, the present research utilised the Pain Catastrophising Scale (PCS) by Sullivan (2009), to understand the role of Pain Catastrophising tendencies in the brain tumour patient group through its 3 components. Pain catastrophising is defined as '*Catastrophising refers to an exaggerated negative mental set brought to bear during actual or anticipated painful experience.*' by Sullivan (2009). Pain catastrophising is measured through three components, namely Rumination (the continuous negative thinking of pain), Magnification (the exaggerated expression of pain experience) and Helplessness (the feelings of powerlessness and inability to cope with pain).

In addition, the study also aims to measure the Fear of Personal Death among brain tumour patients. The term fear of personal death is associated with fear of cessation of one's own life. Given the nature of the illness, fear of impending death or death-related thoughts are prevalent amongst brain tumour patients. Sarfaraz *et al.* (2022)[3] in their study on Cancer-Related Stigmatisation, Quality of Life and Fear of Death amongst Newly Diagnosed Cancer Patients reported that both men and women experience cancer-related stigmatisation, with women experiencing higher levels of stigmatisation, lower quality of life and higher fear of death than their male counterparts. Loughan *et al.* (2020)[4,5] have reported that the majority of primary brain tumour patients experience clinically significant death-related distress, particularly death anxiety. Based on a meta-analysis, one-third of the patients endorsed a fear of dying and this fear was positively associated with depression severity (Loughan *et al.*, 2021).[4,5] Thoughts about death have been prevalent amongst glioblastoma brain tumour patients and studies have highlighted that tumour recurrence and death are the prominent thought themes that brain tumour patients are grappled with Raju and Krishna Reddy, 2018. Brain tumour not only affects the patients, rather it has a devastating effect on their loved ones as well. Aldelbratt and Strang (2000)[6] reported that the kin of the primary brain tumour patients and the patients both experience emotional distress and are preoccupied with existential thoughts and thoughts about death and dying.

The effects of cancer diagnosis and treatment are not only limited to the patient but it also affects the entire family system in which the patient is embedded (Boccia, 2022);[7] similarly, the effects of diagnosis and treatment of brain tumours extend beyond the physical well-being of the

patient. It influences their other domains of life such as social life, personal life and professional endeavours.

However, there are a limited number of studies that delve into the pain catastrophising tendencies measured through its three components and fear of personal death with regard to pre-operative brain tumour patients. Therefore, this study aims to primarily investigate the relationship between the Rumination, Magnification and Helplessness domain of Pain Catastrophising with Fear of Personal Death. In addition, it also aims to analyse the role of the three components of Fear of Personal Death amongst the selected cohort.

MATERIALS AND METHODS

Rationale of the study

Cancer studies have been a focal point in psychological studies for a considerable period. Various psychological constructs have been studied extensively and reported in the past literature which are associated with cancer patients as well as their caregivers. However, only a few studies have been conducted that dive into understanding the human face of brain cancer. Therefore, looking at the sparse literature, the present study aims to discern and analyse Pain Catastrophising as well as Fear of Personal Death feelings amongst brain tumour patients who are scheduled for surgery.

Research aim

The main aim of the present research is to find the association between Pain Catastrophising Components (Rumination, Magnification and Helplessness) and Fear of Personal Death and second, to analyse the predictive role of Pain Catastrophising Components for Fear of Personal Death amongst pre-surgery brain tumour patients.

Research objectives

1. To analyse the association between Rumination, Magnification and Helplessness with Fear of Personal Death
2. To ascertain the predictive role of Pain Catastrophising Components for Fear of Personal Death amongst brain tumour patients.

Hypotheses

1. There will be a significant correlation between Pain Catastrophising Components (Rumination, Magnification and Helplessness) and Fear of Personal Death
2. Rumination will be a significant predictor of Fear of Personal Death among brain tumour patients
3. Magnification will be a significant predictor of Fear of Personal Death among brain tumour patients
4. Helplessness will be a significant predictor of Fear of Personal Death among brain tumour patients.

Variables

The below-mentioned variables were considered for the present research:

Independent variables

1. Gender
2. Scores on the three Pain Catastrophising Components, namely
   - Rumination
   - Magnification
   - Helplessness.

Dependent variables

1. Total scores on the fear of personal death scale.

Sample

The objective of this research is to assess the relationship between Pain Catastrophising Components and Fear of Personal Death amongst pre-surgery patients. Second, it also aims at unveiling the predictive role of Pain Catastrophising components for Fear of Personal Death. For this, a sample of 180 patients was selected, who were admitted to the various hospitals of Ahmedabad city only. The patients in the age range of 20–60 were chosen as the sample. The 'Purposive Sampling' technique was used to collect the data from the selected sample based on the Inclusion and Exclusion criteria.

Inclusion criteria

1. Patients who had been diagnosed with brain tumours for 6 or more months were included in the research
2. Only pre-operative brain tumour patients were included
3. The sample was collected from various cancer hospitals in Ahmedabad city only
4. Both males and females were included in the research.

Exclusion criteria

1. Post-operative patients were excluded
2. Patients diagnosed with any other types of cancer were excluded.

Procedure

The sample was collected from various hospitals in Ahmedabad City only. After clearance from the respective ethical committees of the hospitals, the researcher started with the procedure of data collection. A total of 220 patients were approached based on the inclusion and exclusion criteria specified for the research. However, only 180 patients consented to be a part of the study; therefore, the total sample size consisted of 180 consensual participants. All the identified respondents were briefed about the purpose of the research as well as their rights of withdrawal from the study at any given point and were ensured of the confidentiality of their data. Further, the participants were asked to respond to the respective self-report measures undertaken for the research.

Measures

The data were collected on two self-report measures, namely

1. PCS by Sullivan (2009)

The PCS was developed by Sullivan in 2009 to decipher the pain catastrophising tendencies amongst patients. The scale taps into a single construct consisting of 3 components, namely Rumination, Magnification and Helplessness. The aim of developing the tool was to understand how thoughts and cognitions affect the pain experiences of a person. The final version of the scale consists of 13 items on a 5-point scale. The scale possesses satisfactory psychometric properties. It has been validated across diverse populations, including Indian clinical and non-clinical populations. Hence, this tool was used for the present research to assess the Pain Catastrophising tendencies which encompass 3 components. The 3 components are described as follows:

Rumination: It is a perseverative form of cognition. It is a tendency to brood over a particular phenomenon or experience. In the PCS, 4 items measure the Rumination tendency. One example from the scale is

'I cannot seem to keep it out of my mind.'

Magnification: When an individual overemphasises the pain experience and expresses it exaggeratedly, it is known as Magnification. 3 items in the scale measure this component. The following is an example from the scale:

'I become afraid that the pain may get worse.'

Helplessness: It is understood as powerlessness felt by an individual while experiencing pain. There are a total of 6 items in the scale that measure this dimension. One of the examples from the scale is:

'I feel I cannot go on.'

2. Fear of personal death scale by Dr. Rajamanickam (1985)

The idea behind the conceptualisation of this scale was to assess the reasons as to why people dread or fear death. The scale consists of 7 components. According to the manual, the raw scores can be interpreted based on either the full-scale or the dimension-wise scores. For the present research, only the full-scale score was considered for analysing the levels of fear of personal death amongst the selected sample. There are a total of 40 items (37 positive items and 3 negative items) on the scale that measures the attitude towards death and related thoughts. The items are developed on a 5-point Likert scale where the maximum possible score is 200 and the minimum score is 40. The scale possesses robust psychometric properties.

Statistics

The quantitative data gathered were analysed using both descriptive and inferential statistical measures. The mean

and standard deviation values of the selected psychological constructs (Pain Catastrophising and Fear of Personal Death) were computed. Further, based on the objectives and hypotheses of the research, Pearson's Correlation and Linear Regression Analyses were performed. The correlational value between Gender and Fear of Personal Death was also investigated for exploratory analysis. All the calculations were carried out on the Statistical Package for the Social Sciences version 20.

RESULTS

Multiple Correlation and Linear Regression were performed to attain the objectives of the study. The results were tested at 0.05 and 0.01 significance levels. The findings of the study are reported in tabular form in the following manner.

Correlation coefficient (r) values for Pain Catastrophising Components and Fear of Personal Death are reported in Table 1. It was observed that Fear of Personal Death was significantly associated with Magnification (r = 0.644, $P < 0.01$, $n = 180$) as well as the Helplessness component (r = 0.456, $P < 0.01$, $n = 180$). There is a positive correlational value for both these components, whereas Rumination (r = 0.026, $P > 0.05$, $n = 180$) does not have any significant relation with Fear of Personal Death. It can be inferred that as Magnification and Helplessness tendencies increase, the feelings of fear of death also move in the same direction. Based on these findings, it can be concluded that the first hypothesis stating that *'there will be a significant association between Pain Catastrophising components (Rumination, Magnification & Helplessness) and Fear of Personal Death'* is accepted.

The summary of linear regression reveals that Rumination has a weak association with Fear of Personal Death (R = 0.026). According to the Table 2, it can be inferred that

Rumination does not introduce a significant variance in the dependent variable (R^2 = 0.001, F [1,178] = 0.211, $P > 0.05$). Thus, it can be inferred that the model is not significant enough to introduce variance and predict the dependent variable. Therefore, the second hypothesis *'Rumination will be a significant predictor of Fear of Personal Death amongst brain tumour patients'* is rejected for the present research.

Table 3 highlights that there exists a significant relationship between the explanatory and criterion variable (R = 0.644). This association value is positive in direction and moderate in strength. The emerged regression model denotes that 41.4% variance in the total Fear of Personal Death can be attributed to the tendencies of Magnification amongst the brain tumour patients (R^2 = 0.414, F [1,178] = 125.86, $P < 0.01$).

The unstandardised beta coefficient values (B = 7.651, SE = 0.682) depict that a 7.651 score will increase the Fear of Personal Death scale score with a single unit increase in the Magnification component of the PCS. The standardised β coefficient is 0.644 and the corresponding *t*-value (11.219, $P < 0.01$) highlights a significant moderate positive relationship between the two variables. The predicted value of Y is (Fear of Personal Death) = 50.974 + (7.651*Magnification score). In other words, it can be said that the participants' predicted score is equal to 50.974 (constant) and 7.651 (unstandardised beta coefficient) Magnification score.

By the findings, it can be said the fitted regression model is statistically significant in predicting the criterion variable for the present study (F [1,178] = 125.86, $P < 0.01$). Therefore, the third hypothesis *'Magnification will be a significant predictor of Fear of Personal Death amongst brain tumour patients'* is accepted for the present research.

The linear regression analysis (Enter method) reveals that there exists a positive correlation between Helplessness and Fear of Personal Death (R = 0.456). The regressor significantly contributes a 20.8% variance in the regressand score measured on the Fear of Personal Death scale (R^2 = 0.208, F [1,178] = 46.857, $P < 0.01$). It can be inferred from the results that feelings of Helplessness bring about a change in the attitude towards Death and related thoughts amongst the brain tumour patients of the present study.

Furthermore, the unstandardised beta coefficient value of Helplessness signifies that a 3.107 score will increase the overall Fear of Personal Death with every unit increase in

Table 1: The correlation between Rumination, Magnification and Helplessness and fear of personal death.

Variables	r	P	n
Rumination and fear of personal death	0.026^{NS}	0.729	180
Magnification and fear of personal death	0.644**	0.000	180
Helplessness and fear of personal death	0.456**	0.000	180
**Correlation is significant at 0.01 level. NS: Not significant			

Table 2: Summary of linear regression (enter method) for fear of personal death from rumination.

Predictor	Model summary			P	Unstandardised coefficients		Standardised coefficients		P
	R	R²	F		B	SE	β	t	
Model	0.026	0.001	0.211	0.72					
(Constant)					114.256	20.736		5.607	0.000
Rumination					0.449	1.292	0.026	0.348	0.729
Dependent variable: Fear of personal death. Predictor (constant): Rumination									

Table 3: Summary of linear regression (enter method) for fear of personal death from magnification.

Predictor	Model summary			P	Unstandardised coefficients		Standardised coefficients		P
	R	R²	F		B	SE	β	t	
Model	0.644	0.414	125.86	0.00					
(Constant)					50.974	6.364		8.009	0.000
Magnification					7.651	0.682	0.644	11.219	0.000

Dependent variable: Fear of personal death, Predictor (constant): Magnification

Table 4: Summary of linear regression (enter method) for fear of personal death from Helplessness.

Predictor	Model summary			P	Unstandardised coefficients		Standardised coefficients		P
	R	R²	F		B	SE	β	t	
Model	0.456	0.208	46.857	0.00					
(Constant)					65.466	8.257		7.928	0.000
Helplessness					3.107	0.454	0.456	6.845	0.000

Dependent variable: Fear of personal death. Predictor (constant): Helplessness

Table 5: The correlation between gender and fear of personal death.

Variables	R	P	n
Gender and fear of personal death	−0.045[NS]	0.548	180

NS: Not significant

the Helplessness domain. The standardised β coefficient value of 0.456 and the corresponding t value (6.845, $P < 0.01$) indicate that there is a positive relationship between the Helplessness component and Fear of Personal Death. The predicted value of Y is (Fear of Personal Death) = 65.466 + (3.107*Helplessness score). In other words, it can be said that the participants' predicted score is equal to 50.974 (constant) and 3.107 (unstandardised beta coefficient) Helplessness score [Table 4].

The findings indicate that the emerged regression model is statistically significant in predicting the criterion variable. Therefore, the fourth hypothesis '*Helplessness will be a significant predictor of Fear of Personal Death amongst brain tumour patients*' is accepted for the present research.

The objective of the present research is to examine the relationship between Pain Catastrophising Components, namely Rumination, Magnification, Helplessness and Fear of Personal Death. The results indicate that there is a positive association between Magnification (r = 0.644, $P < 0.01$) and Helplessness (r = 0.595, $P < 0.01$) with fear of Personal Death. However, no statistical association was reported between rumination and Fear of Personal Death. Second, the predictive role of Pain Catastrophising is also analysed in the present research, with Magnification (R = 0.644, R² = 0.414, F [1,178] = 125.86, $P < 0.01$, B = 7.651, standard error (SE) = 0.682, β = 0.644, t = 11.219, $P < 0.01$) and Helplessness

(R = 0.456, R² = 0.208, F [1,178] = 46.857, $P < 0.01$, B = 3.107, SE = 0.454, β = 0.456, t = 6.845, $P < 0.01$) being significant predictors of the Fear of Personal Death. However, Rumination (R = 0.26, R² = 0.001, F [1,178] = 0.211, $P > 0.05$, B = 0.449, SE = 1.292, β = 0.026, t = 0.348, $P > 0.05$) is not statistically significant to predict the Fear of Personal Death. After analysing the relation and predictive association between the Pain Catastrophising Components and Fear of Personal Death, the correlation between Gender and Fear of Personal Death was also investigated for exploratory purposes. The results of the correlation between gender and Fear of Personal Death have been reported in Table 5.

The relationship between Gender and Fear of Personal Death was examined as an exploratory analysis. The analysis revealed that there is a weak non-significant association between the two variables (r = −0.045, $P = 0.548$, n = 180).

DISCUSSION

As a multidisciplinary field, psychology has reported several studies on cancer patients, cancer survivors and their caregivers. These studies unveil the human face of cancer by delving into the psychological aspects of cancer diagnosis, treatment and its debilitating effects on the mental and physical well-being of the patients as well as their caregivers. However, there is scant literature available on the two measures, namely Pain catastrophising and Fear of Personal Death amongst brain tumour patients. Loughan *et al.* (2020)[4,5] reported that Primary Brain Tumour Patients are disproportionately excluded from studies of death-related distress. The feelings of death and related thoughts are prevalent among brain tumour patients but based on the systematic review of the literature, there are a few studies that report death-related distress among primary brain tumour patients (Loughan *et al.*, 2021).[4] Sterckx *et al.* (2015)[8] in

their qualitative study on patients living with a high-grade glioma highlighted that patients report feelings of uncertainty about life, shock, grief, denial and disregard.

The present research has focused on the relationship between the psychological constructs and also analysed the predictive role of Pain Catastrophising components for the Fear of Personal Death Amongst brain tumour patients. The results of the present study signify that there is a positive correlation between Magnification and Fear of Personal Death. This implies that the tendency to overemphasise pain and related thoughts has a significant relationship with the feelings and attitude towards Death and related thoughts of personal death. Furthermore, Magnification is significant in predicting Fear of Personal Death. Similar results have been found in cancer patients with 80 participants in Pathanamthitta district, Kerala. It was reported that Rumination, Magnification and Helplessness have a significant positive correlation with death anxiety and that all three components of pain catastrophising are significant predictors of death anxiety amongst the cancer population (Wilson and Soumya Starlet, 2023). These results align partially with the present study.

The research on cancer populations has shown similar results regarding the association between pain-catastrophising components and other psychological constructs such as depression and anxiety (Inci *et al.*, 2020).[9] In this study, the depression and anxiety levels of cancer patients were assessed and the relationship between depression, anxiety and Pain catastrophising subscales was reported. The study reported that magnification was significantly higher amongst cancer patients with anxiety. Similarly, Rumination and Helplessness tendencies were higher amongst cancer patients who scored higher on depression and anxiety scales.

Furthermore, helplessness and fear of personal death are significantly positively associated in the present study. Moreover, helplessness is significant to introduce variance in the attitude towards fear of personal death. Literature examining specifically these constructs is limited. However, some researchers have assessed the interplay of various other measures in the context of cancer patients. In a qualitative study conducted on 10 patients with advanced cancer in Bengaluru (Wajid, 2021),[10] the thematic analysis results revealed the following themes that were prevalent among the patients: Financial instability, hopelessness, family anguish, self-blame, helplessness, anger, stress and suicidal thoughts. Helplessness and worry about death were expressed in the semi-structured interviews. Pain catastrophising tendencies have been associated with higher emotional distress among breast cancer patients (Bishop and Warr, 2003).[11] In a longitudinal study on cancer patients (Wilson *et al.*, 2022),[12] it was reported that pain catastrophising was uniquely associated with pain severity and pain interference over time. In a qualitative study on the Perspectives of Glibostoma Patients on Death and Dying (Raju and Krishna Reddy,

2018), it was reported that very few studies have been conducted, especially in the Indian Context to understand the debilitating factors associated with these patients.[13] The study also reported prevalent themes such as coping with the fear of death and dying, personal views on death and dying along two other themes.

With the diagnosis and the ongoing treatment of brain tumours, patients are bound to go through feelings of uncertainty about life, financial burden, feelings of hopelessness, depression, anxiety, helplessness, deteriorating quality of life, etc. These variables have been studied over time in the context of brain tumour patients as well as other cancer populations. However, there are few studies to verify the research results of the present study based on the variables undertaken for the present study. Thus, based on the available literature, it can be concluded that brain tumour patients have yet to be extensively studied in psychology and psycho-oncology, highlighting the need for future research in this domain to understand the unique psychological challenges faced by this patient population.

Limitations and suggestions

The present study is not free from limitations. First, the sample was selected from Ahmedabad city only, and thus, it cannot be generalised to the population at large. Second, due to time constraints, only pre-surgery patients were included in the study. Future studies can take up a pre-post design to examine the psychological constructs amongst the selected sample for the study. This is a quantitative study, wherein data on 2 psychological measures were considered. Further studies can take up a mixed-method approach to unveil the psychological effects of brain tumour patients. Furthermore, the study has analysed the relation between gender and fear of personal death which is reported to be non-significant. Future researchers might explore whether other demographic or contextual characteristics interact with gender to influence the responses to the fear of personal death construct. Finally, other moderating and mediating variables can be considered as a part of future studies.

Implications

Brain tumour patients have not been studied extensively, especially in the Indian context.[14] The results of the present study will help to fill the research gap and contribute to psycho-oncological studies. The study highlights that there is a significant association between Pain catastrophising tendencies and fear of personal death. Therefore, the results of the study will help Psycho-oncologists and Health psychologists to develop screening tools, especially for brain tumour patients who are prone to engage in these maladaptive cognitions and help them overcome them effectively through treatment and intervention programmes. The study can help caregivers understand the psychological aspect of brain tumours and navigate their conversations about these issues accordingly.[15-22]

Ethical considerations

1. Ethical clearance was obtained from the respective hospital authorities
2. Every participant was debriefed about the purpose of the study
3. Consent was obtained from each participant
4. The participants were informed about their withdrawal rights from the study
5. Each participant was ensured of the confidentiality of the data
6. The results of the study have been reported and communicated without manipulation.

CONCLUSION

The current study assesses the association between Pain Catastrophising Components and Fear of Personal death amongst pre-surgery brain tumour patients. The results also highlight the predictive role of Magnification and the Helplessness component for Fear of Personal Death. Furthermore, the study has analysed the relation between gender and fear of personal death which is reported to be non-significant. Future researchers might explore whether other demographic or contextual characteristics interact with gender to influence the responses on the fear of personal death scale. This study is a step forward in filling the research gap around the sparse literature available on brain tumour patients, especially in the Indian context. Consequently, further research is essential in this regard so that mental healthcare professionals are better equipped to assist patients in managing the psychological aspects of this ailment.

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