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The aim of this study was to identify the psychological characteristics associated with post-treatment physical status and quality of life (QoL) in patients with brain tumors undergoing RT.

Two psychological tests—the Eysenck Personality Questionnaire and the State-Trait Anxiety Inventory—were administered prior to RT. Physical parameters before and after RT were also assessed through the following tests: hand grip strength, Timed Up and Go test, 6 Min Walk Test, and Functional Independence Measure. The Functional Assessment of Cancer Therapy-General (FACT-G) was used to assess QoL. The Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT- F) was administered to assess fatigue.



Characteristic	Participants (n = 29) n (%) or Mean ± SD
Age, years	52.8 ± 14.1
Sex	
Female	10 (34.5)
Male	19 (65.5)
Type of tumor	
GBM	26 (89.7)
Oligodendroglioma	2 (6.9)
Ependymoma	1 (3.5)
Total resection	
Yes	12 (41.4)
No	17 (58.6)
Chemotherapy	
Yes	23 (79.3)
No	6 (20.7)

## Conclusions

The findings of this study show that personality traits (especially neuroticism and psychoticism) and anxiety levels are associated with physical fitness and subjective QoL before and after radiation therapy in patients with brain tumor. Our preliminary results suggest that patients with high levels of neuroticism may have a worse tolerance for RT in terms of physical functioning and QoL. By contrast, patients with high levels of psychoticism appear to present a lower risk of suffering a decline in physical functioning after RT treatment. These outcomes suggest that personality traits should be considered when developing personalized radiation therapy treatments. In particular, patients with brain tumors with certain personality types may require additional rehabilitation during RT treatment. Our results indicate the necessity of further research in the area of personality relationship with RT tolerance in patients with brain tumors. Subsequent studies should be on a larger study sample, and with a longer observation period, using statistical modeling, so that their results can be generalized to the entire population



Parameters Median (Range)	Before RT	After RT	<i>p</i> -Value
HGS (kg)	28 (11.3–53)	30 (13–4.5)	0.659
TUG (s)	8.38 (5.28–12.95)	8 (5.12–13.76)	0.331
6MWT (m)	405 (267–670)	431 (243–703)	0.666
FIM (points)	126 (7–126)	126 (5–126)	0.683
FACT-G PWB (points)	22 (10–28)	21 (10–28)	0.201
FACT-G SWB (points)	24 (9–28)	24 (2–28)	0.332
FACT-G EWB (points)	15 (0–24)	15 (0–24)	0.550
FACT-G FWB (points)	19 (2–28)	19 (4–28)	0.984
FACT-G total (points)	79.3 (43–105)	77.5 (43–98)	0.648
FACIT-F (points)	38 (11–52)	33 (14–50)	0.040

Abbreviations: RT—radiotherapy; HGS—hand grip strength; 6MWT—6 Min Walk Test; FIM—Functional Independence Measure; FACT-G—Functional Assessment of Cancer Therapy—General; PWB—Physical Well-Being; SWB—Social Well-Being; EWB—Emotional Well-Being; FWB—Functional Well-Being; FACIT-F—Functional Assessment of Chronic Illness Therapy—Fatigue.

Difference in Measurements before and after RT	Extraversion		Neuroticism		Psychoticism		Lie	
	r	p-Value	r	p-Value	r	p-Value	r	p-Value
HGS	0.178	0.38	-0.227	0.27	-0.282	0.16	0.288	0.15
TUG	0.275	0.17	-0.056	0.79	0.001	0.99	-0.238	0.24
6MWT	0.059	0.78	-0.132	0.53	0.446	0.03	0.126	0.55
FIM	-0.031	0.89	-0.047	0.82	-0.159	0.44	-0.102	0.62
FACT-G PWB	-0.007	0.97	-0.009	0.97	0.399	0.04	-0.172	0.40
FACT-G SWB	-0.021	0.92	0.197	0.34	0.466	0.02	0.165	0.43
FACT-G EWB	-0.141	0.49	-0.070	0.73	-0.133	0.52	-0.019	0.94
FACT-G FWB	-0.196	0.34	-0.071	0.73	0.341	0.09	-0.031	0.88
FACT-G total	-0.156	0.45	-0.035	0.87	0.412	0.04	-0.093	0.65
FACT-F	0.172	0.41	-0.062	0.79	0.311	0.13	-0.280	0.18

Correlations between differences in outcomes before and after RT and anxiety level.

Difference in Measurements before and after RT	STAI Trait		STAI State	
	r	p-Value	r	p-Value
HGS	-0.142	0.49	-0.195	0.34
TUG	0.060	0.77	0.132	0.52
6MWT	-0.102	0.63	-0.183	0.38
FIM	0.083	0.69	-0.042	0.84
FACT-G PWB	0.048	0.82	0.090	0.66
FACT-G SWB	0.082	0.69	0.054	0.79
FACT-G EWB	0.044	0.83	-0.041	0.84
FACT-G FWB	-0.154	0.45	-0.257	0.21
FACT-G total	-0.002	0.99	-0.117	0.57
FACIT-F	0.043	0.85	0.071	0.74

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