Poster # 49

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Knowledge that will change your world

Correlates and predictors of health-related quality of life (HRQOL) in metastatic brain cancer

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Abstract

PURPOSE: Neurocognitive functioning (NCF), mood disturbances, physical functioning, and social support all share a relationship with health-related quality of life (HRQOL). However, a characterization of these relationships in persons with brain metastases (BM) have yet to be identified.

METHODS: Ninety-three newly diagnosed persons with BM were administered a cognitive battery to assess neurocognitive functioning, mood disturbances, physical functioning, and social support. The Functional Assessment of Cancer Treatment (FACT) scale was used to measure HRQOL.

RESULTS: Mood and physical function correlated with lower HRQOL in every measured domain. Verbal learning and memory correlated with every FACT subscale except emotional quality of life. Social support also correlated with several HRQOL domains. Stepwise linear regressions revealed that mood was the predominate predictor of HRQOL. Social support, physical functioning, verbal learning, and memory also contribute to HRQOL, but to a lesser extent.

CONCLUSION: HRQOL is a complex construct affected by mood, physical functioning, and learning and memory. Mood is a domain-independent predictor of HRQOL, while non-mood variables predict HRQOL in domain-specific ways. Thus, multifactorial baseline assessments of persons with BM are encouraged to help mitigate the impact of BM on HRQOL.

Methods

93 patients newly diagnosed with brain metastases at the UAB O'Neal Comprehensive Cancer Center were administered a cognitive battery and surveys to evaluate the following variables:

Cognition	Mood	Health	Quality of Life
1. Attention • Digital Span	1. Anxiety & Depression • Hospital Anxiety and Depression Scales (HADS)	1. Mental & Physical • Medical Outcomes Study Short Form-12 (SF12)	1. Health-related (HRQOL) • Functional Assessment of Cancer Therapy (FACT)
2. Verbal learning • Hopkins Verbal Learning Tests	2. Psychological Stress • Distress thermometer	2. Social Support • Medical Outcomes Study Social Support Scale (MOS-SSS)	
3. Processing speed • Trail Making Test A • Digital Symbol Coding			
4. Executive function • Trail Making Test B			
5. Verbal fluency • Controlled Oral Word Association Tests			

Supplement 1. Multi-faceted assessment of four domains. Participants were administered several tests and surveys common within neuropsychology and listed above. These surveys were broadly placed into one of four categories to identify any associations.

Results

Measure	N	Mean	Range	Clinically Significant Impairment (%)	FACT Scale Correlations† General	Physical	Social	Emotional	Functional	Brain
Cognitive Function§										
Attention										
Digit Span	84	-0.35(0.75)	-2.05-2.05	7.1%	0.13	0.16	**0.24***	0.06	0.08	**0.22***
Verbal Learning and Memory										
HVLT-R Total Recall	91	-1.23(1.21)	-3.00-1.34	49.5%	**0.23***	0.20	**0.32****	0.004	**0.24***	**0.34****
HVLT-R Delayed Recall	90	-1.19(1.26)	-3.00-1.41	50.0%	0.16	0.14	0.18	0.02	0.17	**0.28****
HVLT-R Recognition/Discrimination	89	-0.56(1.18)	-3.00-1.01	22.5%	**0.30****	**0.26***	**0.34****	0.07	**0.26***	**0.41****
Processing Speed										
Digit Symbol	79	-0.90(1.02)	-2.33-1.34	35.4%	0.19	0.16	0.21	-0.002	0.20	**0.28***
Trail Making Test - A	84	-0.34(1.21)	-3.67-2.33	13.1%	-0.10	-0.04	0.007	-0.18	-0.07	0.03
Executive Function										
Trail Making Test – B	79	-0.87(1.22)	-4.00-1.75	30.4%	0.08	0.10	0.19	-0.06	0.10	0.19
Verbal Fluency										
Animal Fluency	88	-0.46(1.13)	-2.70-3.93	18.2%	0.12	0.07	**0.23***	-0.10	0.16	0.21
COWA-CFL	87	-1.07(1.09)	-2.33-2.33	47.1%	0.04	0.01	0.16	-0.10	0.11	0.17
CTB Composite	75	0.53(3.17)	-2.39-16.68	44.2%	N/A	N/A	N/A	N/A	N/A	N/A
Mood¶										
HADS Anxiety	57	7.02(4.43)	0.00-17.00	40.4%	**-0.67****	**-0.55****	**-0.51****	**-0.58****	**-0.50****	**-0.59****
HADS Depression	57	5.70(4.02)	0.00-17.00	28.1%	**-0.73****	**-0.62****	**-0.53****	**-0.44****	**-0.67****	**-0.72****
Distress Thermometer	53	4.17(2.71)	0.00-10.00	N/A	**-0.44****	**-0.32***	**-0.39****	**-0.56****	**-0.28***	**-0.43****
SF-12 – Mental Health Score	53	18.68(4.45)	9.00-27.00	N/A	**0.74****	**0.62****	**0.54****	**0.56****	**0.58****	**0.71****
Physical Health¶										
SF-12 – Physical Health Score	54	12.17(3.05)	6.00-19.00	N/A	**0.57****	**0.60****	**0.34***	**0.35****	**0.56****	**0.61****
Social Support¶										
MOS	59	80.53(25.45)	0.00-100.00	N/A	**0.33***	**0.30***	**0.37****	0.18	0.24	**0.33***

Table 1. Correlation between FACT scales, cognition, mood, physical health, and social support. The mean, range, and degree of clinical significance of any impairment were obtained for factors such as cognition and mood/distress. Correlation was then assessed between these factors and FACT scales representing six quality of life (QOL) domains. (*p<0.05; **p<0.01).

Table 2. Significant predictors of FACT scales. Health-related quality of life (HRQOL) was categorized by utilizing FACT scales for 4 domains:

1) General
2) Physical
3) Emotional
4) Neurocognitive

Multiple stepwise linear regressions were conducted to determine any significant predictors of HRQOL in these domains based upon the appropriate neurocognitive assessment or survey as indicated in Supplement 1 and Table 1.

FACT SCALE	Significant predictor(s)	Unstandardized B	Standard Error B	Standardized β	p-value	Adjusted R^2
General	**SF-12 Mental Health**	0.117	0.022	0.458	**<0.001**	**0.677**
	HADS Depression	-0.131	0.026	-0.438	**<0.001**	
Physical	**SF-12 Mental Health**	0.116	0.042	0.399	**0.008**	**0.500**
	HADS Depression	-0.124	0.046	-0.381	**0.011**	
Emotional	**SF-12 Mental Health**	-0.113	0.030	-0.435	**<0.001**	**0.573**
	HADS Depression	-0.181	0.049	-0.428	**0.001**	
Neurocognitive	**HADS Depression**	-0.214	0.028	-0.736	**<0.001**	**0.532**

Conclusions

- Quality of life **in** persons with brain metastases correlates with mood disturbances, and to a lesser degree, physical symptoms (Table 1)
- Reduced quality of life was associated with:
  1. **Increased:** anxiety, depression, and distress
  2. **Reduced:** mental health and physical function
- Stepwise linear regressions revealed that mood factors **were predictive of general well-being and** many other FACT **subscales**, including physical, emotional and neurocognitive well-being (Table 2).

Discussion

Overall, and in the context of previously existing literature on HRQOL in other cancers, we can discuss our work as such:

Similarities	Our results are **consistent with previous studies conducted in patients with primary brain tumors**, which have found that higher levels of anxiety and depression were predictors of quality of life.
Strength	Compared to a prior study conducted in patients with metastatic brain cancer, **we found more and stronger associations between mood and quality of life**. This is likely a result of our less restrictive exclusion criteria, which we feel is more representative of the brain metastases patient population.
Interventions	**Treatment interventions** (surgery, radiation, whole brain radiation, chemotherapy, and anti-epileptic drugs) for the patient's primary brain tumors had **less impact than social support and functional ability.** This underscores the importance of referrals to counseling, social support groups and physical therapy.
Predictors	Of our six final regression models predicting quality of life, all six included the HADS subscale as a significant predictor. Thus, **clinicians must broaden conceptualizations of physical health to include components of mood and mood-related assessments** in patients with brain metastases.

Supplement 2. Project context. As prior literature on HRQOL has not specifically focused on patients with BM, it is important to contextualize our findings within the field.

Summary + Future Directions

- Mood is the predominate predictor of QOL in patients with newly diagnosed brain metastases
- Clinical strategies aimed at improving mental health and reducing anxiety, depression, and distress in these patients may improve HRQOL.

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