Antrocom Online Journal of Anthropology vol. 19. n. 2 (2023) 291-299 – ISSN 1973 – 2880

Antrocom Journal of Anthropology

journal homepage: http://www.antrocom.net

Effects of anxiety and depression on the quality of life of elderly brain tumor patients

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KEYWORDS

Anxiety, Depression and QoL in elderly brain tumor patients

ABSTRACT

Mental health plays a crucial role in well-being and quality of life. The diagnosis of a brain tumor and subsequent surgery can have a significant impact on a patient's well-being, especially in the natural course of aging. The uncertainty of the diagnosis, the potential impact on daily life and the after-effects of surgery can lead to psychological problems such as anxiety and depression in older people. The aim of the present study is to investigate the impact of depression and anxiety on the quality of life of older people who have undergone brain tumor resection. The study suggests that psychological and physical factors should be considered in the assessment and treatment of older people who have undergone brain tumor resection. The results could help rehabilitation professionals, physicians as well as caregivers of post-operative patients to understand their psychological well-being and take appropriate measures to help them recover quickly.

Introduction

Anxiety and depression can play an important role in the quality of life of people undergoing tumor resection (Naser Y.A., Hameed A.N., Mustafa N., *et al*., 2021). Brain tumor resection is a major surgical procedure in which part of the brain affected by a tumor is removed. The operation can have a physical, cognitive and emotional impact on the patient, which can affect their quality of life (UCSF Health. 2021).

The physical effects of a brain tumor resection can include pain, fatigue and difficulties with movement and coordination. These physical symptoms can be very distressing and contribute to feelings of anxiety and depression. Patients may also experience emotional changes, including changes in mood, personality and coping skills, which can contribute to feelings of anxiety and depression (Naser Y.A., Hameed A.N., Mustafa N., *et al*., 2021).

The cognitive effects of brain tumor resection can include difficulties with learning, memory, attention and executive functions. These changes can be particularly challenging for patients as they can affect their ability to carry out everyday activities and their overall quality of life (Dadario N.B., Brahimaj B., Yeung J., *et al*., 2021).

Anxiety and depression can also have a negative effect on recovery after surgery. Patients suffering from anxiety and depression may be less motivated to participate in physical therapy or other aspects of their recovery plan, which can lead to a longer recovery time and poorer outcomes.[4] Studies show that

Please cite this article as: Baby B., Ajilal P., Nair A. G., Bharathan V., Effects of anxiety and depression on the quality of life of elderly brain tumor patients. - *Antrocom J. of Anthropology 19-2 (2023) pp. 291-299.*

the prevalence of depression and anxiety in cancer patients is 56.7% and 64.7% respectively. The high prevalence of depression and anxiety in cancer patients emphasises the importance of routine screening and treatment of these mental illnesses (Naser Y.A., Hameed A.N., Mustafa N., *et al*., 2021).

It was found that a significant proportion of patients reported symptoms of anxiety and depression both before and after surgery. Anxiety symptoms were more common than depression symptoms (Sveinsdóttir H, Zoëga S, Ingadóttir B, *et al.,* 2021).

Despite the extensive literature, there is a lack of studies specifically examining the impact of anxiety and depression on the quality of life of older people undergoing brain tumor resection. In India, the number of elderly people is expected to reach 340 million by 2050, highlighting the need for more research in this area (Bashkaran N. 2021). This is an important area of research as the elderly population is growing and brain tumors are more common in older age groups. According to a study published in the Journal of Geriatric Oncology in 2022, there is a significant lack of research on the impact of cancer and its treatment on the quality of life of older people in India (Webb T, Verduzco-Aguirre HC, Rao AR, *et al*., 2022). Investigating the impact of depression and anxiety on quality of life in older people who have undergone brain tumor resection is important for several reasons, including improving patient outcomes, enhancing quality of life, intervening early, and ensuring the most effective holistic treatment. Therefore, it is important to treat anxiety and depression in patients undergoing brain tumor resection. It all starts with accepting the diagnosis and moving on. Patients who require in-depth interventions should be prioritized. Treatment may include a combination of medication, therapy and other supportive measures to address both the physical and emotional aspects of recovery. By addressing these aspects, older patients can better cope with the challenges of recovery and improve their overall quality of life.

Method

The study is based on a descriptive research design with convenience sampling technique and includes a sample size of 50 patients aged 55-75 years (N=50, 25 males and 25 females, mean age 64 years) who were diagnosed with brain tumor and underwent surgical treatment, which is the first line of treatment. The data were collected in a private outpatient clinic, not in an institution. Therefore, a cognitive debriefing was conducted and informed consent was obtained from each patient and each observer (as a witness) to conduct the study.

Inclusion criteria

Patients were recruited for the study if they had been diagnosed with a brain tumor and were between 55and 75 years old. Patients who have undergone surgical treatment and who reside in the state of Kerala are included in the study.

Exclusion criteria

Patients with a history of psychiatric disorders or other medical conditions, who had undergone surgery several months after diagnosis, who had undergone other tumor treatment methods (e.g. radiotherapy and chemotherapy instead of surgical treatment), patients with recurrent tumors and also patients previously diagnosed with other neurological disorders such as epilepsy, stroke, multiple sclerosis, dementia, motor disorders, etc. were excluded from participation in the study.

Instruments used

1. WHOQOL-BREF- The WHOQOL-BREF is a shorter version of the WHOQOL-100, both of which were developed by the World Health Organisation (WHO) and published in 1995. The WHOQOL-BREF is a self-administered questionnaire containing 26 questions on individual perceptions of health and well-being over the past two weeks. The questions are answered on a Likert

scale from 1 to 5, where 1 means "disagree" or "strongly disagree" and 5 means "strongly agree" or "extremely agree". The WHOQOL-BREF instrument consists of four domains: physical health (7 items), mental health (6 items), social relationships (3 items) and environmental health (8 items); it also includes items on quality of life and general health. The Malayalam version of the instrument was created by Sreedevi *et al*. in 2015. The translated version of the WHOQOL-BREF was found to be internally consistent (Cronbach's α = .86) and showed discriminant and construct validity (Sreedevi A, Cherkil S, Soman Kuttikattu D, *et al*. 2015).

2. Hospital Anxiety and Depression Scale (HADS)- The Hospital Anxiety and Depression Scale (HADS) is a self-assessment scale that was developed and has proven to be a reliable tool for assessing depression and anxiety in a hospital outpatient setting. It was originally developed by Zigmond & Snaith (1983). The instrument was validated in Malayalam by Thomas *et al*. (2015). It is a scale with 14 items; the Cronbach's alpha was found to be 0.81 for the HADS anxiety subscale, 0.71 for the HADS depression subscale and 0.85 for the HADS tool (Thomas B., Devi N, Saritha GP, *et al*., 2005).
3. Socio-demographic scale - Information such as age, marital status, family type, financial status, educational qualifications and type of employment is recorded using this form.

Procedure of the study

The sample for the study was selected according to the inclusion and exclusion criteria. They were invited to a personal interview (online or offline), during which the purpose of the study was explained to them in detail. The questions were answered. After they had given their written consent, the questionnaires were distributed.

Statistical analysis

The statistical analysis was performed with IBM SPSS (version 21). Descriptive statistics were used to determine the mean and standard deviation of the sample selected for the study. ANOVA and correlation analysis were performed to examine the relationship between the variables.

Results

After sorting and filtering the data, skewed and incomplete data were removed to obtain a normal distribution. The collected data was then analyzed and the following results were obtained.

Correlation analysis

Below is the Pearson correlation matrix showing the correlations between different variables in a sample of 50 cases (Table No. 1).

The Pearson correlation analysis indicates that anxiety is negatively correlated with the total quality of life score of elderly patients who underwent brain tumor surgery (r = -.458, p = .001). This means that the quality of life of elderly patients tends to decrease when anxiety increases.

The results indicate that no statistically significant relationship (r = -.210) was found between depression and quality of life in older people who have undergone brain tumor surgery.

Anxiety is negatively correlated with physical health (r=0.554, p=.001), psychological constructs (r=0.393, p=.001), environmental context (r=0.507, p=.001) and general health (r=0.330, p=.005). This means that participants who experience higher levels of anxiety may have poorer physical and mental health. They might be more sensitive to their environment and also have poorer overall health after brain tumor resection. We found that depression is negatively correlated with social relationships (r=0.397,

p.001), meaning that low mood or depressive tendencies may affect an individual's social relationships and interactions. The overall QoL score correlated positively with all subdomains of quality of life such as physical health (r=0.720, p=.001), mental health (r=0.871, p=.001), social relationships (r=0.759, p=.001), environmental health (r=0.876, p=.001) and general health (r=0.685, p=.001).

ANOVA

The quality of life in the groups with high, medium and low anxiety and depression was assessed using ANOVA. Using descriptive statistics, the mean anxiety score was 12.90 with a standard deviation of 3.57 and the mean depression score was 10.16 with a standard deviation of 2.802. Three groups were formed based on the severity of anxiety or depression scores.

For anxiety scores

- Low anxiety group: Scores less than one standard deviation below the mean (score < 9.33)
- Moderate anxiety group: Scores within one standard deviation of the mean (9.33 ≤ score < 16.27)
- High anxiety group: Scores greater than one standard deviation above the mean (score ≥ 16.27)

For depression scores:

- Low depression group: Scores less than one standard deviation below the mean (score < 7.36)
- Moderate depression group: Scores within one standard deviation of the mean (7.36 ≤ score < 13.92)
- High depression group: Scores greater than one standard deviation above the mean (score ≥ 13.92) (Table no.2).

The ANOVA table indicates that there is a significant difference in anxiety levels between the three quality of life groups, as shown by the significant F-statistics for physical health (F=8.740, p=.001), environmental health (F=7.656, p=.001) and general quality of life (F=5.655, p=.006). This means that at least one of the mean values of the anxiety scores in the three groups differs from the others.

However, for psychological health, social relationships, and general health, the F-statistics are not found to be significant (p>.05), indicating that there is no significant difference in anxiety levels across the groups for these variables.

Post hoc tests

The post hoc tests were conducted to examine which groups differed significantly from each other in terms of significant one-way ANOVA results for physical health, environmental health and overall quality of life. (Table No.3).

The post-hoc Duncan test compared the mean scores of the three anxiety groups (high, medium and low) in terms of physical health. The results show that the mean score of the "low anxiety" group was significantly higher than the mean score of the "high anxiety" and "moderate anxiety" groups. The groups with high and moderate anxiety did not differ statistically from each other. With p-values less than.05, the differences between the groups were statistically significant. These results suggest that the level of anxiety may have an impact on physical health, with lower levels of anxiety being associated with better physical health.

With regard to environmental health, the results of the post-hoc analysis show that the mean score for the low anxiety group was significantly higher than the mean score for the high and medium anxiety groups. The groups with high and medium anxiety did not differ significantly from each other. The differences between the groups were statistically significant with p-values of less than .05. These results suggest that the level of anxiety is related to environmental health, where lower levels of anxiety may be associated with better environmental health outcomes for the individual.

There was a statistically significant difference in mean scores between the three levels of anxiety and quality of life. Participants with high levels of anxiety reported a significantly poorer quality of life than participants with medium or low levels of anxiety. This also means that people with a low level of anxiety had significantly higher quality of life scores than people with a medium level of anxiety (Table No. 4).

In the ANOVA, no significant difference was found between the different quality of life groups in terms of depression, as all p-values are greater than the typical alpha level of 0.05. Therefore, no further post hoc test was performed.

Discussion

Anxiety and depression are common emotional reactions to a cancer diagnosis in everyone. They can have a significant impact on quality of life, especially in older people. The need to undergo further surgery, radiotherapy and chemotherapy can exacerbate the emotional turmoil in these people. Consistent with the existing literature, the correlation analysis, ANOVA and post-hoc tests of the present study show a significant negative relationship between anxiety and quality of life. This suggests that an increase in anxiety has an impact on overall quality of life, which can be explained by a number of factors. In particular, anxiety can lead to physical symptoms such as sleep disturbances, fatigue and gastrointestinal problems, all of which can affect quality of life (Naser Y.A., Hameed A.N., Mustafa N., *et al*. 2021). Secondly, anxiety can impair cognitive performance, memory and attention, all of which are essential factors in older people's ability to maintain their independence and social engagement (Dadario N.B., Brahimaj B., Yeung J., *et al*. 2021). Thirdly, anxiety can lead to social isolation, which can further impair quality of lifeWilkialis L., Rodrigues N.B., Cha D.S., *et al*. 2021). It is important to understand that anxiety is a treatable condition, and there are numerous therapeutic techniques that can help older people control their anxiety symptoms. Treating anxiety in older people who have had brain tumor surgery can improve their quality of life and help them cope with the challenges of their condition.

The significant differences between the groups in terms of physical health, environmental health and overall quality of life suggest that these factors are important predictors of anxiety. This finding is consistent with previous research that has shown that physical and environmental factors can have a significant impact on mental health and well-being. For example, studies have shown that people who are in better physical condition or live in a conducive environment tend to suffer less from anxiety and other mental health problems (Harandi TF, Mohammad Taghinasab M, Dehghan Nayeri T. 2017).

The study shows that there is no significant correlation between depression and quality of life in older people who have undergone tumor resection. This means that the level of depression experienced by these individuals does not appear to be strongly associated with their overall quality of life. In contrast to this finding, there are several studies that show the relationship between depression and quality of life (Alvi A. S., Safdar S. 2017). In this study, depression was found to have a lower impact on quality of life than anxiety. However, it is important to note that this does not necessarily mean that depression has no impact on quality of life at all. Other factors such as anxiety or physical health may play a more important role in determining the quality of life of these people. Further research may be needed to better understand the relationship between depression and quality of life in this population and to identify possible interventions or treatments that could improve the overall quality of life of older people after brain tumor surgery.

The negative correlation between depression and the 'social relationships' subset of quality of life in older people who have undergone brain tumor resection suggests that addressing depression and its impact on social relationships may be an important part of improving overall quality of life in this population.

People who suffer more from depression may have poorer social relationships and have difficulty

maintaining meaningful relationships with others after resection of a brain tumor. Depression can lead to feelings of isolation and social withdrawal, making it more difficult for those affected to maintain close relationships with other people. This is especially true for people who have undergone brain tumor resection, as they are already experiencing physical and cognitive changes that can affect their ability to interact with others. Depression can also lead to negative thought patterns and self-doubt, which can cause sufferers to feel like a burden to others or unworthy of close relationships. This can exacerbate feelings of social isolation and lead to less social support and connection. Finally, depression can also have physical symptoms that make it difficult for those affected to participate in social activities. For example, fatigue, loss of interest in activities and changes in appetite or sleep patterns can make it difficult to participate in social events or maintain relationships with other people.

Implications of the study

The results of the study were discussed with the caregivers, rehabilitation specialists and the attending physician. Elderly patients who needed support and attention were given appropriate help to adapt to recent physiological and cognitive changes. Caregivers were also psychologically trained regarding the patients' behavioural changes and the possible techniques to help them adapt in order to speed up the recovery process. Based on the results of the study, patients are also closely monitored in terms of psychological aspects.

Conclusion

The results of the study suggest that the degree of anxiety and general health status are important factors to consider when assessing the quality of life (QoL) of older people who have undergone brain tumor resection. The study found that high levels of anxiety were associated with lower QoL scores. Furthermore, the study suggests that an improvement in physical health, environmental health and therefore overall quality of life could lead to an improvement in anxiety scores in these people. These findings underscore the importance of considering both psychological and physical factors when assessing and treating the quality of life of older people who have undergone brain tumor resection. The study also found that higher levels of depression lead to a reduction in social relationships for these people. Improving social relationships and increasing opportunities for social participation can help reduce depressive features and also increase an individual's sense of belonging.

Limitations

- The study could have been comparative, as a comparison between the preoperative status and the postoperative status.
- The cognitive performance of the patients could also have been taken into account.
- The sample size could have been larger so that the results of the study could have been generalized.
- Tumor types and grades could have been considered.
- More psychological variables could have been considered, such as perceived support and care.
- A regular assessment of the psychological state of the patients would have provided a comprehensive picture of them and the intervening variables for such change.

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Tables

Table no.1 Pearson Matrix correlation for Anxiety, Depression, QoL and subdomains of QoL.

Correlations								
Variables	Anxiety	Depression	Physical health	Psychological health	Social relationship	Environmental health	General Health	QoL Total
Anxiety	()	-.202	-.554**	-.393**	-.114	-.507**	-.330*	-.458**
Depression		()	-.030	-.100	-.397**	-.214	.096	-.210
Physical health			()	.663**	.311*	.625**	.334*	.720**
Psychological health				()	.535**	.671**	.604**	.871**
Social relationship					()	.551**	.358*	.759**
Environmental health						()	.572**	.876**
General Health							()	.685**
QoL Total								()
***. Correlation is significant at the 0.01 level (2-tailed).*								
**. Correlation is significant at the 0.05 level (2-tailed)*								

The table shows the correlations between different psychological and health-related variables, including anxiety, depression, physical health, psychological and social constructs, environmental context, general health, and quality of life (QoL) total. The table also provides information on the statistical significance of each correlation, with significance levels marked by asterisks (for p < 0.05 and ** for p < 0.01)*

Table no. 2 Comparison of High, Medium, and Low Anxiety groups on QoL: Results of one-way ANOVA

Variable	Sum of squares		Mean of squares		F ratio	Sig.
	Between	Within	Between	Within		
Physical health	52.786	141.934	26.393	3.020	8.740	.001
Psychological health	32.229	254.191	16.114	5.408	2.980	.060
Social relationships	25.376	485.904	12.688	10.338	1.227	.302
Environmental health	95.064	291.816	47.532	6.209	7.656	.001
General health	10.404	130.316	5.202	2.773	1.879	.164
QoL total	878.862	3652.118	439.431	77.705	5.655	.006

Table no. 3 Post Hoc analysis for Anxiety groups on the physical health, environmental health and quality of life.

Sl no	Group	N	Mean	Group		
Physical health				1	2	3
1	Anxiety (High)	8	11.25	()	*	*
2	Anxiety (Moderate)	34	13.21		()	*
3	Anxiety (Low)	8	14.88			()
Environmental health				1	2	3
1	Anxiety (High)	8	12.88	()	*	*
2	Anxiety (Moderate)	34	15.32		()	*
3	Anxiety (Low)	8	17.75			()
Quality of life				1	2	3
1	Anxiety (High)	8	57	()	*	*
2	Anxiety (Moderate)	34	65.26		()	--
3	Anxiety (Low)	8	71.75			()

Table no.4 Comparison of High, Medium, and Low Depression groups on QoL: Results of one-way ANOVA

	Sum of Squares		Mean Square		F	Sig.
	Between	Within	Between	Within		
Physical health	3.352	191.368	1.676	4.072	.412	.665
Psychological health	20.149	266.271	10.075	5.665	1.778	.180
Social relationships	35.991	475.289	17.996	10.113	1.780	.180
Environmental health	17.857	369.023	8.928	7.852	1.137	.329
General Health	14.089	126.631	7.045	2.694	2.615	.084
QoL Total	257.138	4273.842	128.569	90.933	1.414	.253