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Level of Distress Experienced by Glioblastoma Multiforme Patients and Caregivers in Relation to their Medical Education Background: A Qualitative Study

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Abstract

BACKGROUND: Glioblastoma multiforme (GBM) is a primary brain tumor with extensive infiltration of surrounding brain tissue and a high rate of recurrence, with an average survival of 13–16 months. Due to the rapid course of the disease, multimodality treatment, and poor prognosis, both the patients and their caregivers will face significant psychological distress. Identification of the types and severity of distress is crucial to control morbidity during treatment.

AIM: This study aims to define the level of distress experienced by patients and their caregivers during the treatment period by considering their medical education background. At the time of publication, this type of study is unique and has never been done before.

MATERIALS AND METHODS: This study was conducted at the Neurosurgery Outpatient Department of Mochtar Riady Comprehensive Cancer Center Siloam Hospital Jakarta. Patients with GBM and their caregivers were recruited during the early stages of radiation treatment (T1) and the follow-up chemotherapy (T2) and were assessed using the distress thermometer (DT) and National Comprehensive Cancer Network (NCCN) problem checklist followed by in-depth interviews. Participants were divided into two groups based on medical education background. Significant distress is defined as DT score >4.

RESULTS: Data from four pairs of patient-caregivers are collected during the early stages of T1. Two pairs of Patient-Caregivers without medical educational background (P-C non-D) are included later during T2. From T1, patients and caregivers with medical education (P-D) are higher than those without medical education (P-D > P-non D; C-D > C-non D). Another comparison shows that P-D is higher than C-D. In contrast, P-non D is lower than C-non D. Based on the time data collected, it shows DT: P-non D T2 > P-non D T1, but there is no difference between T2 and T1 in the caregiver's group: C-non D T1 = C- non D T2. From the NCCN problem checklist, it is known that they attribute their distress mostly to physical problems.

CONCLUSION: The physical and mental changes experienced by patients cause distress for patients and their caregivers. Knowledge of disease and treatment possessed by patients or caregivers helps them deal with GBM and the entire course of treatment.

Introduction

Glioblastoma multiforme (GBM) is the most common (45.2%) of primary brain tumors. Treatment options such as tumor resection surgery and adjuvant radio-chemotherapy are not curative, but are aimed at prolonging patient survival to 13–16 months [1], [2], [3].

Gross total removal of the tumor is the gold standard initial therapy for GBM patients. Techniques improving maximal resection, such as awake surgery, neuromonitoring, and utilization of tumor cell staining using 5-ALA, are now routinely used. Current STUPP guidelines recommend that newly diagnosed GBM patients undergo tumor removal surgery, followed by radiotherapy combined with chemotherapy to prolong survival [4], [5].

Chemotherapy for GBM is affected by factors such as the blood–brain barrier, which does not permit intravenous chemotherapy to reach brain tissue, and the molecular heterogeneity and high mutability of GBM cells, which reduces the effectiveness of conventional DNA-damaging chemotherapy. Currently available chemotherapy options are temozolomide for newly diagnosed GBM and bevacizumab for recurrent GBM [2], [6].

Brain tumors have both physical and mental effects on a person, reducing the patient's independence in carrying out activities of daily living (ADL) and sometimes altering mood and thought processes. These effects make the patient experience a change in economic, social, and interpersonal relationships with family members, which impacts the quality of life of patients, their families, and their communities, causing psychological problems in about 74% of patients [7], [8]. Early diagnosis and treatment of psychological distress are crucial to provide the best medical care [9].

Distress can affect how patients cope with the diagnosis, treatment, and prognosis of their malignant disease. The malignant disease makes the patient undergo a troublesome period of psychological, social, spiritual, and physical nature during their lives. The range of complaints felt by patients when experiencing distress is vast, from common normal feelings of vulnerability, sadness, and fear to symptoms of mood disorders that impairs mental health [10]. Up to 58% of malignancy patients have depression, and 34% report symptoms of anxiety [11]. The National Comprehensive Cancer Network (NCCN) Distress Management Panel launched the distress thermometer (DT) to estimate the level of patient distress. The thermometer is a score range of 0–10, with higher scores indicating higher levels of distress [10]. More specific interpretation can describe the severity of distress >4 refers to significant distress, 5 is moderate distress, and 10 is very severe distress [12]. Another part of NCCN Distress Management Panel is a screening tool that includes a 39-item problem list, used to measure and identify sources of patient distress [10]. Patients' changes and disabilities during their illness force them to need support from familial caregivers [13], [14], [15]. Feelings of anxiety, depression, insomnia, agitation, fatigue, and decreased concentration experienced by familial caregivers during the patient's treatment process also lead to distress, where 85% of caregivers having higher distress scores than patients [16], [17]. The rate of distress increases in line with the patients' self-care and ADL problems during therapy [18].

The brief survival rate and lack of curative therapy make GBM has a poor prognosis. The goal of therapy is to improve the patient's quality of life by controlling non-tumor morbidity factors such as distress. Distress identification for the patient and the caregiver is very important. This study tries to describe the level of distress experienced by patients and their caregivers during the disease period by considering their medical education background.

Materials and Methods

Participants

Participants were selected by convenience sampling method between 2018 and 2019. Inclusion criteria were: patient with GBM; age >18 years old; and able to understand and give informed consent. Patients in palliative care were excluded. Acceptable types of patient-caregiver relationships were spouses, parents, children, or siblings. Samples were divided into 2 groups, which were patients or caregivers with medical education background, and without medical education.

Procedure

Patients diagnosed with GBM who presented to the Neurosurgery Outpatient Department, Mochtar Riady Comprehensive Cancer Center (MRCCC) Siloam Hospital Jakarta along with their caregivers were given a questionnaire-based survey and in-depth interviews.

The questionnaire contains the DT and the NCCN checklist to determine patients' and their caregivers' levels of distress. This section is accompanied by in-depth interviews conducted by a psychiatrist.

Data were collected at early-stage radiation treatment (T1) and the follow-up chemotherapy treatment (T2). The data collected were grouped based on medical education background.

DT was interpreted as distress level corresponding to the 0–10 scale, where 10 is the most stressful. Significant distress is said to be positive if the DT score is >4. The checklist tool developed by the NCCN Distress Management Panel includes a 39-item Problem List, which asks patients to identify their problems in five different categories: practical, family, emotional, spiritual/religious, and physical.

Additional data were collected from the medical record such as pathological and immunohistochemistry findings, stage of treatment, type of surgery, tumor location, and Karnofsky performance score (KPS).

Results

Characteristic of samples

Four patient-caregiver pairs were recruited at early-stage T1. Findings are listed below:

Case 1 has a GBM of the left thalamus extending to intraventricular space, classified as MGMT (−), epidermal growth factor receptor (EGFR) (−). Diagnosis was confirmed through stereotactic biopsy. The patient has no complaints, with KPS 100. The patient is a medical doctor (P-D), and the caregiver is also a doctor (C-D).

Case 2 has a GBM on the right parietal region, classified as MGMT (+), EGFR (+). Diagnosis was confirmed through stereotactic biopsy. The patient has minor complaints without any interference with daily life, with KPS 90. The patient is a medical doctor (P-D), and the caregiver is not (C- non-D).

Case 3 has a GBM on the right frontal region, classified as MGMT (+), EGFR (+). Diagnosis was confirmed through stereotactic biopsy. The patient has no complaints, with KPS 100. The patient is not a doctor (P- non-D), and the caregiver is a doctor (C-D).

Case 4 has a GBM on the right parietal region, classified as MGMT (−), EGFR (+). The patient has no complaints with KPS 100. This patient and caregiver are not medically educated (P-non D, C-non D).

2 patient-caregiver pairs were recruited at follow-up chemotherapy (T2). Findings are listed below.

Case 5 is case 4 with still follow-up until chemotherapy period and has a GBM on the right parietal region, classified as MGMT (−), EGFR (+). The patient has no complaints, with KPS 100. This patient and caregiver are not medically educated (P-non D, C-non D).

Case 6 has a GBM on the right frontal region, classified as MGMT (+), EGFR (+). Diagnosis was confirmed through craniotomy tumor removal. The patient has no complaints for along during surgery and radio-chemotherapy, with KPS 90. The patient and the caregiver is not a doctor (P- non D and C- non D).

We included these 2 cases to support an analytical view of this study. Case 5 and 6 have the same clinical condition with educational background is also the same. Both of the cases are pair of patients and caregivers without medical education background (P-non D, C-non D).

Distress level of patients and caregivers

The DT score of T1 patients with medical education (P-D) is higher than patients without medical education (P-non D). This result is similar to the caregiver's group, where those who have a medical education background have a higher DT score than those who do not have (C-D > C-non D). Addition analysis is performed to compare patients and caregivers. The result is that P-D is higher than C-D. In contrast, P-non D is lower than C-non D (Figure 1).

After cases 5 and 6 were assigned to T2, comparisons were made between P-non D T1 and P-non D T2. The distress experienced by patients without medical education at T2 was more severe than in patients from T1 (DT: P-non D T2 > P-non D T1). There was no difference between T2 and T1 in the caregiver's group (C-non D T1 = C-non D T2). Another part of the questionnaire is a list of physical problems, family problems, emotional/mental problems, and spiritual problems. In-depth interviews accompany this section, and the result shows that the patient who has medical education background feels that his knowledge is a contributing factor to distress and a positive supporter when dealing with illness and the course of therapy (Figure 2).

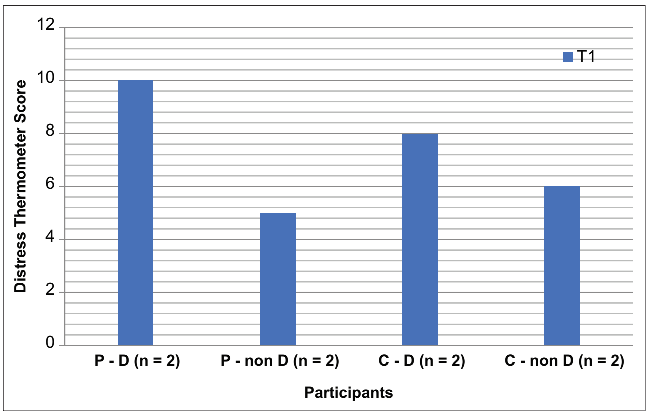

Figure 1: Comparison of distress thermometer score from T1. Note: Illustration of distress level based on distress thermometer with range 0–10 was taken in the early phase of radiotherapy (T1). The higher number indicates a higher level of distress

From the NCCN problem checklist in Table 1, it is known that they attribute their distress mostly to physical problems. This occurs in all groups, both patients and caregivers with or without medical education background. Other problems detected were very diverse, ranging from financial stressors, therapeutic decisions, interpersonal relationships, and emotional problems such as fear, anxiety, depression, and spiritual belief.

Table 1: The NCCN problem list of patient's physical problems

Problem list of physical problems						
Patient						
Variable	Case 1 P-D	Case 2 P-D	Case 3 P-non D	Case 4 P-non D	Case 5 P-non D	Case 6 P-non D
Appreance	V	X	V	X	X	V
Bathing/dressing	X	X	V	X	X	X
Breathing	X	X	X	X	X	X
Changes in urination	V	V	X	X	V	X
Constipation	V	V	V	V	V	V
Diarrhea	X	X	X	X	X	X
Eating	X	V	V	V	V	V
Fatigue	V	V	V	V	V	V
Feeling swollen	X	X	V	X	V	V
Fevers	X	X	X	X	X	X
Getting around	V	V	X	X	V	V
Indigestion	V	V	V	V	V	V
Memory/concentration	V	V	V	V	V	V
Mouth sores	X	X	X	V	X	X
Nausea	V	V	V	V	V	V
Nose dry/congested	X	X	X	X	X	X
Pain	V	V	V	V	V	V
Sexual	V	V	V	V	V	V
Skin dry/itchy	X	V	X	V	X	X
Sleep	V	V	V	V	V	V
Substance use	X	X	X	X	X	X
Tingling in hand/feet	X	X	V	V	V	X

X: No problem, V: Yes problem. NCCT: National Comprehensive Cancer Network.

Table 2: The NCCN problem list of patient's emotional problems

Problem list of emotional problems						
Variable	Depression	Fears	Nervousness	Sadness	Worry	Loss of interest in usual activities
Patients						
Case 1	V	V	V	V	V	V
Case 2	V	V	V	V	V	V
Case 3	V	X	V	V	X	V
Case 4	V	X	V	V	X	V
Case 5	V	V	V	V	V	V
Case 6	V	X	V	V	V	V
Caregivers						
Case 1	V	V	V	V	V	X
Case 2	V	V	V	V	V	X
Case 3	V	V	V	V	V	X
Case 4	V	V	V	V	V	X
Case 5	V	V	V	V	V	X
Case 6	V	V	V	V	V	X

X: No problem; V: Yes problem. NCCT: National Comprehensive Cancer Network.

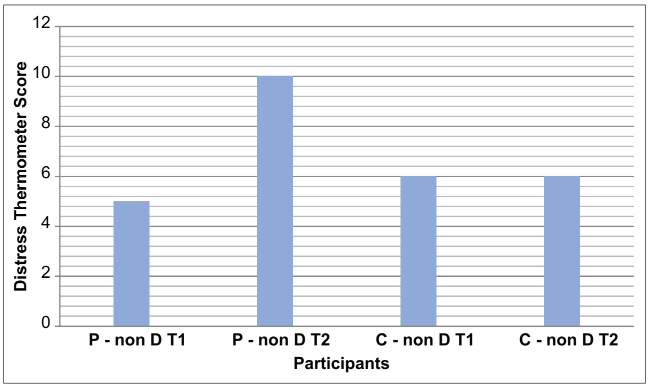

Figure 2: Comparison of distress thermometer score between T1 and T2. Note: Illustration of distress level based on distress thermometer with range 0–10 was taken in the early phase of radiotherapy (T1) and post chemotherapy phase (T2). The higher number indicates a higher level of distress

Discussion

A medical education background provides patients and caregivers with knowledge of their disease and is thought to reduce anxiety by understanding what is happening [19]. Increased knowledge of the disease and treatment phase usually reduces the incidence of depression and increasing adherence and understanding during therapy [20]. Our study shows that this is not always the case for patients and caregivers with medical education (Table 2).

DT score >4 indicates significant distress, and a study by Liu *et al*. states the prevalence of significant distress in GBM patients as 38.2% [21]. Other studies are using DT >6 to indicate significant distress [22]. In our study, 41.1% of patients have DT score >4, and 29.7% have a DT >6.

In our study, at the beginning of radiotherapy (T1), the average DT value for both patients and caregivers with medical educational backgrounds is 9. This score is interpreted as severe distress [12]. In contrast, patients and caregivers without a medical educational background have a DT score of 5, which starts to have significant distress.

Significant distress (DT >4) signifies that the patient will require additional treatment for their distress. Clinical interviews to screen for anxiety and depression by the oncology team may be reserved for mild distress (DT4). If necessary, the oncology team should refer to a psychologist, social worker, or spiritual counselor based on the cause of distress identified in the NCCN Problem List [12].

This study also tries to describe the distress experienced by the caregivers of patients with GBM. We classified the caregivers into two groups: with and without medical educational background. At the beginning of radiotherapy (T1), all caregivers feel significant distress. Caregivers with medical education background (C-D) have 8 points greater than C-non D. Studies assessing the distress felt by caregivers have been conducted with the results that up to 85% of participants have a DT score >4. This study was conducted in the setting of caregivers from patients with brain tumors; the mean DT scores were recorded to be higher than patients [16], [17]. In order to better understand the distress felt by the patient and their caregivers, two pairs of participant data were added later. Data collection for these two pairs was carried out in the post-chemotherapy phase (T2). Because both cases are patients and caregivers who do not have a medical education background, the comparison is only based on the time of collection. The patient's DT score (P-non D) is increasing 5 points from T1 to T2. Meanwhile, caregivers showed the same mean score was 6 between T1 and T2. Increasing the mean DT score from T1 to T2 may be related to the coping mechanism of the participants. This is based on the results of a study showing that the patient's distress is higher after passing 1-week post-diagnosis and continues to rise until the 4th week [23].

Participants who attended the interview indicated that stress screening is a form of comprehensive treatment that has positive benefits for the patient's physical and mental health. Knowledge of disease and treatment is an important factor in considering how to inform patients and caregivers. People with medical education backgrounds need data-based explanations. In addition, this knowledge not only helps patients deal with GBM but also increases the respondent's stress.

Conclusion

Patients with GBM have more than just a problem with their diagnosis. The physical and mental changes experienced by patients cause distress for patients and their caregivers. Knowledge of disease and treatment possessed by patients or caregivers helps them deal with GBM and the entire course of treatment. However, this is also a contributing factor to the severity of distress based on the DT score. Providing “wise” information for each patient and their caregiver is needed to achieve the therapeutic goal and optimally increase the patient’s quality of life.

Limitation

The sample for this study was small. Therefore, it is not possible to analyze distress levels associated with their age and other demographic data. A clearer picture of the stress levels of patients and caregivers with GBM would be better with a large sample size. The relationship between caregiver stress levels on medication and patients’ quality of life was also not analyzed in this study. Despite these limitations, research using medical education background as a differentiating factor and comparing distress levels between those who have and do not have a medical education background is still rarely done. Hence, the results of this study are expected to be a source of further research and provide a reference in determining better guidelines to support the mental health of patients with GBM and their caregivers.

Availability of Data and Materials

All data generated or analyzed during this study are included in this published article and its Additional files.

Author Contributions

All authors contributed to the conception and design or analysis and interpretation of the data and drafting or revising the articles. All authors approve the final version and agree to be responsible for all aspects of their work.

Ethics Approval and Consent to Participate

This research has obtained Ethical Clearance from the research ethics board of MRCCC Siloam Semanggi Hospital Jakarta.

Consent for Publication

All of the participants in this study have given informed consent for data collection and publication purpose.

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