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Article

# Impact of family support and mental resilience on benign tumor rehabilitation in Chinese patients

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**Abstract:** This research investigated the influence of mental resilience and emotional support of family members on the rehabilitation outcomes of patients with benign tumors in China. The study investigated 100 patients and separated them into (50 for the control group and 50 for the Experimental group) across many Chinese hospitals, with patients undergoing rehabilitation for benign tumors. The research employed SPSS analytical software, focusing on four key variables, including mental resilience, family emotional support, physical recuperation, and psychological wellness. The Connor-Davidson Resilience Scale (CD-RISC) was used to examine mental resilience, while the Family Support Scale was used to assess emotional support in the family. Physical recuperation was assessed using medical records and rehabilitation progress reports. The findings show substantial correlations between significant levels of mental resilience and higher physical recovery as well as psychological well-being. Similarly, significant family emotional support has been related to better physical and psychological outcomes. A regression analysis revealed that mental resilience and family emotional support collectively account for a significant portion of the variation in physical recovery and psychological well-being among patients. The outcomes affirms that psychological resilience and family emotional support contribute to the rehabilitation of benign tumor patients in China.

**Keywords:** benign tumor rehabilitation; mental resilience; family support; statistical analysis; China

## 1. Introduction

The entire family and social network are impacted by a cancer diagnosis and treatment, which causes psychological discomfort for caregivers who encounter pressures at various phases of the illness [1]. Cognitive, emotional, behavioural and physical deficits are frequent. A Tumor patient's functional status is the main source of stress, and more physical impairment is linked to a lower quality of psychological well-being [2,3]. Depending on how caregivers perceive social support, functional status has varying effects on their psychological health. The provided associations between functional impairment domains and caregiver's psychological well-being, as well as any potential moderating effects of social supports [4]. Patients with benign tumours must ensure a taxing rehabilitation producer that calls for strong mental and emotional fortitude in addition to full physical recovery. Even if they are not malignant, benign tumours might require surgery, which can be extremely stressful mentally because of the unknowns and the risks involved [5]. Returning to mental toughness and getting emotional support from family members are crucial steps in recovering in this instance.

Patients in rehabilitation must be mentally flexible, meaning they must be able to handle stress, trauma, and misfortune. It impairs their capacity to deal with the course of treatment, accept the diagnosis, and hold out hope for an immediate recovery [6,7]. Building mental strength is facilitated by several components, such as support for their surroundings, psychological support, and specific methods of coping. A vital part of these stimulating surroundings is family support [8]. Families and the general health of the group are highly valued, sometimes more than just personal freedom. The traditional setting emphasizes essential support from relatives is to the recovery process [9]. Family members' emotional encouragement could give patients the drive, confidence, and sense of security that are critical to psychological health. Family members usually help with everyday care, go with patients to doctor's visits, and provide comfort when situations are difficult [10]. Strong family support has been associated with investigations into better mental health outcomes and a quicker recovery for patients. By lowering stress, anxiety, and sadness, the support could improve every aspect of life [11]. Additionally, group strategies for coping can develop patients' endurance and provide a healing atmosphere. By recognizing and enhancing these factors, techniques for rehabilitation can be improved, improving patients' quality of life and treatment outcomes [12]. The identification and management of tumors, whether benign or malignant, entail considerable psychological issues for the patients, their careers, and their supporters. It shows that caregivers also feel distressed as they accompany the patients through the illness and develop several aspects, including cognitive-emotional-behavioral- physical [13–15]. The functional status of tumor patients impacts the psychological health of the caregivers, which in turn is determined by the support systems available. Patients with tumors need rehabilitation as it affects their physical, psychological, and emotional state. It intends to enhance the patient's functional status, their methods of dealing with their condition, and the encouragement of both the patient and the care provider [16]. Rehabilitation involves exercises, psychotherapy, and support that depend on the client's requirements. Such programs focus on helping patients with physical therapy, building their mental fortitude, and coping with a benign tumor.

There are severe psychological consequences associated with the diagnosis and treatment of tumors, including the benign ones, affecting not only the diseased person but also his or her family members and other related individuals [17]. The psychological impact of caregiving can be immense due to stress, which is evident in the stages of the illness, presenting with cognitive, emotional, behavioral, and physical problems. Another area of concern for tumor patients is functional status, which tends to reflect lower psychological well-being when the degree of physical disability is higher. In this case, the degree of social support available to the caregivers is critical in determining this impact on their psychological health [18]. This study aimed to address if rehabilitation of patients with benign tumors puts the patient through a rigorous process of reformation that demands a lot of physical, mental, and even emotional strength. It should, therefore, be understood that the presence of benign tumors does not negate the need for surgery, and thus, the potential for stress becomes significant enough to require adequate support and strength for rehabilitation to occur.

Stress, trauma, and uncertainty are learned experiences that patients in rehabilitation must overcome; therefore, mental resilience and support from family members are vital.

Objective of the study: This study intends to assess the impact of a rehabilitation patient maintenance program that integrates psycho-educational strategies with training in coping and communication skills on the subsequent results for patients' family caregivers who have benign tumors: psychological distress (Initial outcome), caregiving coping style, social support burden, and quality of life. The study will also include a qualitative component that will record family caregivers' perceptions of the experiment value and how it affected the experiment group's psychological discomfort.

The rest of the paper is divided into the following sections. The objective-based related works were demonstrated in section 2. The collection of material and methods were denoted in section 3. The result analysis was performed in section 4. The discussion of the paper is denoted in section 5. The paper was concluded in section 6.

## 2. Related works

Patients with primary brain tumors, both malignant and non-malignant, had their pre- and postoperative functions compared [19]. While the groups' functional condition and gait efficiency were comparable, there were greater incidences of paresis and paralysis in the group with malignant tumors. Patients with malignant tumors had poor ADL performance upon discharge, independence, and overall health. Rehabilitation or the length of hospital stay (LOS) was unaffected by worse functional results. According to the study, patients' expectations should be appropriately managed, particularly for those who have benign tumors. The study looked at adult patients' chances of oral rehabilitation indicating high chances of survival. According to the results, around the implanted fixtures, there was no discomfort, peri-implant infection, implant movement, or radiolucency. There was no bone resorption around the fasteners in the orthopantogramic and cone beam computed tomography (CBCT) images. Except for one patient who was dissatisfied in both practical and cosmetic aspects, all patients were happy with their face shape. The study comes to the great conclusion that one of the best methods for oral rehabilitation following cystic or tumor ablation is to put dental fittings in the lower jaw. The increased neurological degeneration, motor dysfunction, cognitive decline, emotional problems, headaches, and dysphagia associated with brain tumors are drawing attention in cancer rehabilitation [20]. Functional impairment must be treated with a customized interdisciplinary intervention. A patient with a left lateral ventricle tumor who was 21 years old complained of headaches, nausea, and blurred vision. The neurological state cleared up following surgery, and was admitted to the Neuromuscular Rehabilitation Central Division. Functional assessments revealed remitted aphasia and training in self-supporting walking. The symptoms and quality of life were enhanced by drug therapy, neurosurgical intervention, and customized rehabilitation programs. The evolution, ecology, and interactions of benign and malignant tumours are covered by the author, with special attention to the non-cancerous symptoms of these tumors and the effects of intra-temporal cell composition on the tumoral microenvironment. It implies that malignancy depends on an awareness of the distinctions and similarities between benign and malignant tumors.

Meningiomas were common primary intracranial tumors with different grades of dedifferentiation. Treatment options include radiological surveillance for low-grade asymptomatic meningiomas, surgical resection, adjuvant radiotherapy for grade III, and systemic treatments. Literature on clinical, radiological, and molecular characteristics, available treatment strategies, and clinical trials were reviewed [21,22]. They assessed the ability to differentiate between malignant and benign peripheral nerve sheath tumors using diffusion-weighted imaging and conventional magnetic resonance imaging. The tumor size, margin, and apparent diffusion coefficient (ADC) values varied significantly between the groups, according to the results; the split fat sign and ADC values worked well together. The investigation considered the application of micro vessel density (MVD), smart microvasular imaging (SMI), and radiology characteristics of identifying benign parotid glandular cancer. The results showed that the basic cell hyperplasia exhibited homogeneous internal echogenicity, with greater rate of identification for vascular classes 2 and 3. SMI provided low-velocity circulation measurements.

Investigators evaluated the gut the microbes of people with cancer in their breasts and benign tumours. Despite the combination was distinct, findings did not show an important difference in diversity [23]. There were larger concentrations of citrobacter and the metabolic system in the group with cancerous tumours. The results obtained demonstrate that an improved comprehension of the gut microbiota can help in the identification and therapy of malignant breast cancer. A large Para pharyngeal cancer had to be removed from three different people comfortably with minimal infiltration. During general anesthesia, the individual underwent Tran’s nasal intubation, transpolar manipulation, a 5-cm skin incision, and a lateral resection. The patients had been free of diseases for over a decade and exhibited no visible symptoms of illness, such as misalignment or facial weakness [24]. Large Para pharyngeal cancers might be eliminated in a less aggressive and potentially harmful manner due to these strategies. Breast cancer is the most widespread cancer in women internationally and one of the leading causes of death from illness. The right therapy depends on early detection. Many machine learning (ML) techniques for breast cancer prediction were examined using the Wisconsin Breast Cancer Dataset. With an accuracy of 96.5%, Random Forest (RF) and Support Vector Machine (SVM) beat the other models, indicating that they might be utilized to create an automated diagnostic system for early detection of breast cancer.

In the Radiotherapy Unit of the General Hospital of Mexico, radiotherapy (RT) works well for benign diseases, most often paragangliomas and keloid scars. According to the study, RT provides manageable toxicity, enhances quality of life, and produces a favorable response, which contribute to disease management. The majority of instances of acute and chronic toxicity were classes 1 and 2, with a mean dosage of 31.63 Gy. In 94.1 percent of cases, a disease response was attained. The findings point to the need for inflammatory pathology to be included in therapy. Typical symptoms were the most prevalent, followed by the pain. Of the 67 patients, 50 expressed a desire to alleviate their suffering. According to the study [25], it is critical to manage local discomfort following a late parotidectomy by educating patients and possible treatment options during pre- and postoperative counseling. A new method uses ultrasound images to differentiate, between benign and malignant breast cancers [26]. The technique extracts texture and morphological information, trains a support vector machine (SVM) classifier for texture features, and creates a naive Bayes (NB) classifier for morphological features. The method achieves 91.11% accuracy, 94.34% sensitivity, and 86.49% specificity, making it crucial for global women's health improvement. There are about 100 known types of cancer, making it a severe threat to humankind. There were two phases to it: benign and malignant. The former can be treated with surgery to remove the tumor, while the latter has to be advanced and treated with radiation or chemotherapy. A diagnosis becomes more complex as it moves from benign to malignant [27]. A comparative study demonstrates that the fractional strategy proposed in this work is more accurate than the other methods for benign area detection. The problem of recognizing and categorizing benign cancer cells was addressed by this technique.

The consequences of benign tumors for patients and their families are not only purely medical but are also associated with severe social and psychological implications. Different studies show that caretakers, especially close relatives, experience numerous difficulties in giving support to their close ones receiving treatment and receiving rehabilitation. Research has noted that caregivers of tumor patients suffer considerable psychological burdens. It is common for people to suffer from anxiety, depression, burden of care, communication difficulties, and lack of social support [28]. A study has further shown that caregivers of tumor patients suffer from high stress, anxiety, and depression levels due to the emotional burden of seeing their loved ones receive treatment and the demands of having to care for and console the patients. Other sources of stress for caregivers include communication difficulties, not only with other family members but also with healthcare providers. These communication barriers can arise because the patient and his or her family fail to understand aspects such as the disease, the treatment plan, or the prognosis, making them feel helpless [1,7].

Moreover, the social aspect of caring for tumor patients has also been described across different aspects of research. Several potential issues have been identified, and among them is the caregiver burden, which is the physical, emotional, and financial stress experienced by a person caring for a family member [6,10]. The effects of the caregiver burden on the general psycho-social health of the caregiver and the patient make it very important to develop multi-faceted and well-coordinated care structures [18]. Furthermore, the effectiveness of social support in reducing the adverse impact of caregiving has been well documented. Researchers have established that social support, or the ability of the caregiver and patient to tap support networks and resources to overcome caregiving challenges, can significantly reduce the burden and improve the quality of life of both the caregiver and patient. This can be professional support from doctors and other healthcare personnel and social support from friends, relatives, and other members of society. According to the literature, caregivers found it challenging to cope with the care of tumor patients and explained that social support and good communication are essential in handling the challenges. These accounts of the social context concerning caregiving for patients with benign tumors reveal why interdisciplinary and more extensive rehabilitation programs are required to address the needs of patients and their caregivers, not only from a medical perspective but from psychological, emotional, and social aspects as well [29].

## 3. Materials and methods

The methodology contains collecting the data and includes criteria for finding the exact data to assess how a patient support program for rehabilitation that combines psychoeducational techniques with coping and communication skills training affects the psychological distress (initial outcome), coping style, social support, caregiving burden, and quality of life of benign tumour patients with having family caregivers.

### 3.1. Dataset

This is a randomized controlled trial that is parallel-group, controlled, and single-blind. The Experiment will be provided to rehabilitation patients with benign tumours and entails six in-person meetings with the caregiver, as well as 15 days phone follow-ups following discharge. At baseline (B0), 28 days (B1), and 84 days (B2) following the Experiment, caregiver outcomes will be assessed. In this study, we collected 600 rehabilitation benign tumor patient data from various hospitals in China. The study data inclusion and Exclusion criteria of flow of randomized experiment control are shown in **Figure 1**.

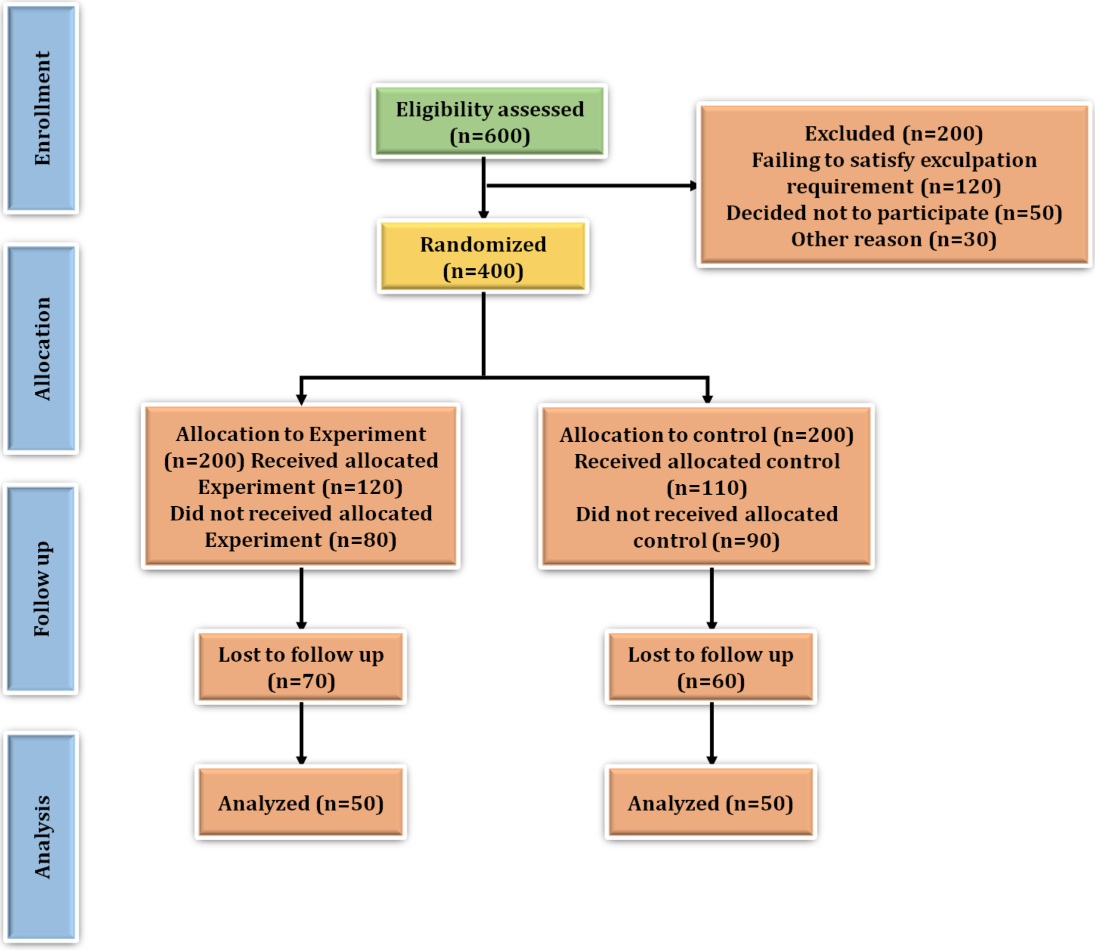

**Figure 1.** Study flow.

## 3.2. Splitting of data

Participants in the program are benign tumor patients with family caregivers who are at various phases of rehabilitation. The collected benign tumor patients included data that were split and excluded using some of the criteria.

Inclusion criteria: The inclusion criteria contain the group of 600 rehabilitated benign tumor patients and they are splitting into categories. The following are the inclusion requirements for family caregivers: (1) be 20 years of age or older; (2) be able to read and speak Chinese; (3) be able to give written informed permission; and (4) be acknowledged by patients as the major caregivers who will provide day-to-day assistance and emotional support throughout the patient's recovery.

Exclusion Criteria: This criterion that contains 500 patients excluded for some reason is shown below. The following criteria are used for exclusion: (1) caregivers receiving active treatment for benign tumors; (2) caregivers receiving similar support Experiment; and (3) Caregivers who had a professional or pecuniary interest in the outcomes of the study, including healthcare professionals directly involved in the treatment of the patients, were excluded to maintain independence and mitigate potential conflicts of interest.

Both the control group and the experimental group received care from caregivers, aligning with the inclusion criteria, which specify the active involvement of caregivers in providing day-to-day assistance and emotional support throughout the patient's recovery process. This consistency in caregiver involvement ensures that the study's design maintains comparability and enhances the validity of the results, as both groups received similar support from caregivers. Therefore, with this understanding, the study's findings would be robust and reflective of the intended focus on caregiver support for patients undergoing rehabilitation for benign tumors. Caregivers in the experimental group received comprehensive training to support benign tumor rehabilitator patients. The training included: 1. Psycho-Educational Strategies: Enhancing understanding of patients' psychological challenges and providing tailored emotional support. 2. Communication Skills Training: Improving communication with patients, healthcare professionals, and other caregivers. 3. Coping Strategies: Equipping caregivers with tools to manage emotional well-being. 4. Social Support Resources: Providing information on support networks and community resources. The training aimed to empower caregivers to provide holistic support and contribute to patients' well-being and rehabilitation outcomes.

## 3.3. Groups

The inclusion and exclusion criteria analysis were split into two groups: The control and Experiment group of rehabilitated benign tumor patients. After Allocation and follow-up are processed the control group contained ($n$ = 50) and the Experiment group contained ($n$ = 50) patients.

Control Group: The control group's participants will get standard treatment, which includes perioperative care, pain management, and exercise for rehabilitation. They will not get any further treatments beyond standard medical care, nor will they take part in the rehabilitative patient support program. This group is used as a benchmark to assess how well the experiment group's support system is working.

Experiment Group: Before the rehabilitation of patients with early-stage benign tumors, a multidisciplinary team of family caregivers, clinical nurses, thoracic surgeons, and psychologists created a patient support plan for rehabilitation. The program consists of two phone follow-up meetings every week and four in-person group meetings led by an oncology nurse. The goal of the experiment, which starts at admission and lasts for up to two weeks beyond hospital discharge, is to increase the quality of life, lessen psychological distress, and lessen caregiver burden while also improving caregivers' understanding of perioperative care and coping mechanisms. The main investigator will record how the experiment was modified to fit the requirements, engagement, and material comprehension of the caregivers. The length of sessions, extra contacts, and missed appointments will all be recorded to monitor the experiment dosage.

### 3.4. Randomization

Those who provide family care and fit the eligibility requirements are randomized to either the experiment or control group. To ensure balance in group sizes, the data will be grouped using block randomization with block sizes of four or six. The lead investigator, who is the intervener and the participants won't be blinded because of the nature of the experiment. To reduce bias, participants' group assignments will not be disclosed resulting in assessors who oversee the assessing results. By minimizing any biases that can affect the evaluation of the Experiment's efficacy on caregivers' outcomes, this strategy preserves the study's integrity.

### 3.5. Hiring

The staff and thoracic surgeons will collaborate to select suitable patients for admission every day. The primary investigator will determine whether patients are eligible by looking through the computerized patient data management system. After eligibility has been determined, the lead investigator will get in touch with the qualified patient's family caregivers, respond to inquiries, and gauge interest in participation. Informed consent will be looked for the caregiver's consent to enrolling. The online supplemental material includes a sample consent form. With informed permission, family caregivers will undergo a comprehensive baseline examination.

### 3.6. Statistical analysis

The study will employ the evaluation of the purpose of treatment. The significance level will be set at 0.05 for all analyses, which will be carried out with SPSS Statistics for Windows, version 26.0. The ranges, medians, means, Standard deviations (SDs), and Interquartile range (IQRs) will be used to summarize continuous data. The Mann-Whitney U Test will be employed to verify that the ranges are appropriate. Continuous statistics will be compared using the student's *t*-test. Further, use either Fisher's exact test or $\chi 2$ to compare categorical data. Three endpoints (B0, B1, and B2) will be utilized to assess the differences in variations in results between the control and experiment groups using a generalized estimating equation model. The overall CD-RISC was used and a score ($\text{range} = 0 - 100$) will be used to determine the sample size because distress is the initial outcome. 50 individuals in each group are needed for a $t$-test with two sides on the overall result CD-RISC score with 20% power to find a somewhat substantial variance with $\alpha = 0.06$. There will be 400 participants given the 80% loss of participation rate.

### 3.7. Ethical statement and approval

This study, approved by the ethical committee of Beijing Normal University, China (approval number IRB2022-2489-001), used participant data from individuals receiving therapy for benign tumors. Researchers ensured confidentiality and privacy protection for participants, following ethical guidelines. Explicit consent was obtained from all participants, and data integrity is maintained throughout and after the study.

## 4. Result analysis

The results evaluations for caregivers in the experiment and control groups will be gathered by a trained study worker who will be blinded to the selection of groups either in presence at baseline or over through telephone throughout the follow-ups. The primary periods for data collection are baseline (B0), 28 days (B1), and 84 days (B2) following the conclusion of the Experiment. The summary of research findings and Metrics specifics are displayed in **Table 1**. The initial step will involve gathering the caregivers' sociodemographic information to evaluate the similarity between the groupings and, consequently, the outside strength of the findings.

**Table 1.** Metrics specifics.

| Outcomes | Metrics | B0 Baseline | B1 28 days after the Experiment | B2 84 days after the Experiment |
|---|---|---|---|---|
| Initial outcome | | | | |
| Anxiety psychology | CD-RISC | - | - | - |
| Subsequent outcomes | | | | |
| standard of life | The Family Edition of Standard of Life | - | - | - |
| Social support | The scale of Social Support Rates | - | - | - |
| Coping mechanism | Coping Style Assessment | - | - | - |
| Public and patient participation | Interview about Zarit's caregiver burden | - | - | - |

### 4.1. Initial outcome

Anxiety psychological: The CD-RISC will be used as the main outcome measure in this study to assess the resilience of family caregivers. Each question graded on resistance is measured on a 25-item CD-RISC scale, which has a 5-point range from 0 to 4. Higher scores on the scale translate into stronger resilience. The overall score range is 0 to 100. This instrument is frequently used to measure anxiety, sadness, depression, aggressive and distress in a variety of populations with a range of medical illnesses as well as in the general public without a specific medical condition, such as family caregivers of benign tumors. Patients are divided into controlled and experiment groups. Regarding the anxiety and sadness subscales, caregivers of patients with benign tumors have demonstrated the validity and reliability of the Chinese versions of the CD-RISC. The experiment group achieved higher result when compared with the control group as shown in **Table 2** and **Figure 2**.

**Table 2.** Mental state of benign tumor patient.

| **Mental State** | **Value (%)** | |
|---|---|---|
| | **Control group** | **Experiment group** |
| Anxiety | 79 | 23 |
| Sadness | 67 | 25 |
| Depression | 72 | 30 |
| Aggressiveness | 58 | 28 |
| Distress | 68 | 29 |

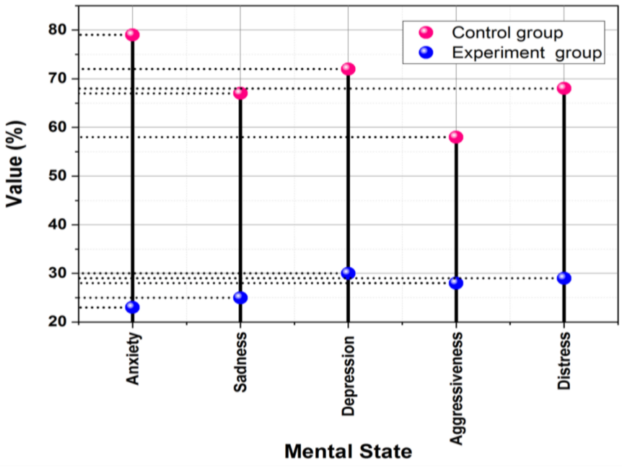

**Figure 2.** Mental state comparison.

## 4.2. Subsequent outcome

Standard of living: The caregivers of patients with rehabilitator tumour will have their Well-being assessed with the Quality of Life Family Edition. The instrument's Chinese version had four subscales that were categorized (physical, psychological, social, and spiritual health states). A scale with values from 0 (worst consequence) to 10 (best outcome) will be used to determine the score. The overall and subscale scores that have been used to evaluate the scale are shown in **Table 3** and **Figure 3**. A high score denotes a good standard of living. The scale has strong construct validity and reliability.

**Table 3.** Health state of benign tumor patient.

| **Health State** | **Value (%)** | |
|---|---|---|
| | **Control group** | **Experiment group** |
| Physical health | 61 | 87 |
| Psychological health | 60 | 86 |
| Social health | 65 | 75 |
| Spiritual health | 66 | 82 |

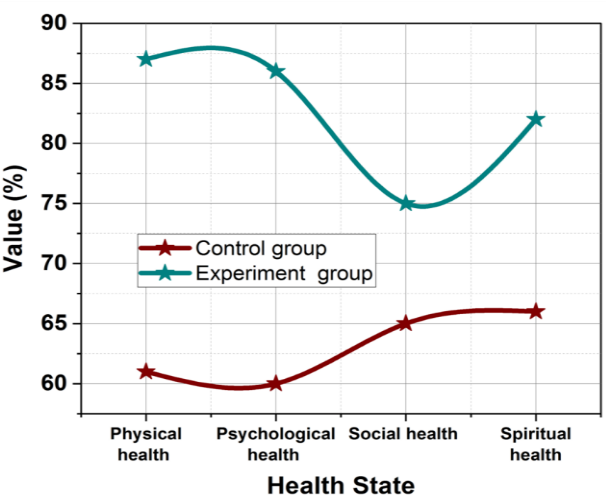

**Figure 3.** Health state comparison.

Social assistance for caregivers: The social support provided by caregivers will be assessed using the Social Support Rate Scale. Three aspects of social support are evaluated by this 10-item measure: use of support, objective support, and subjective support. The overall score, which might vary, that will be determined by adding each item to the total. High levels of perceived social support are indicated by a high score are shown in **Table 4**. **Figure 4** shows the comparison of the affectionate caregivers of women and men to the rehabilitee benign tumor patients.

**Table 4.** Aspects of social support.

| Social Support | Definition |
|---|---|
| Use of Support | Gauges the frequency which caregivers make use of the social support networks at their disposal. |
| Objective Support | Evaluates the material help that caregivers get from their social network, such as tools or practical support. |
| Subjective Support | Assesses how caregivers view the psychological and emotional assistance that comes from their social networks. |
| Overall Score | Calculated by summing the results of the Social Support Rate Scale's ten items. Higher ratings represent caregivers' perceived levels of social support. |

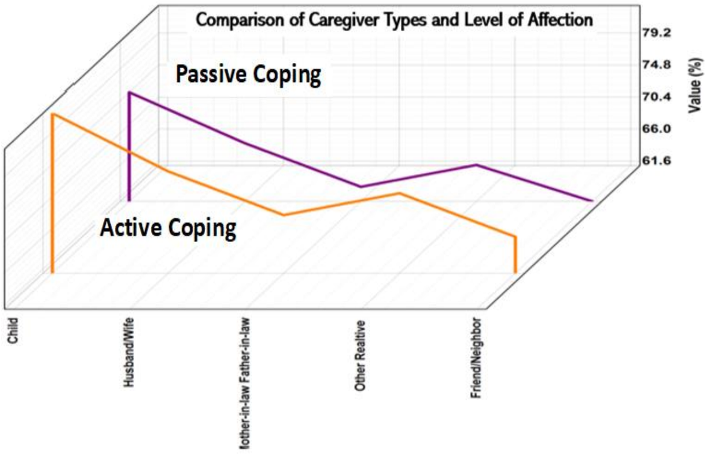

**Figure 4.** Comparison of affectionate of caregiver.

Caregivers' coping mechanisms: **Figure 4** compares caregivers' coping mechanisms using the Coping Style Questionnaire (CSQ), which assesses preferences for passive and active coping strategies. The figure categorizes responses into these two coping styles, each evaluated through a scale of 25 items that measure how frequently caregivers employ these strategies, rated on a 5-point Likert scale from 0 (never) to 4 (very often). It presents mean scores for both passive and active coping mechanisms, allowing for a comparison between the Experimental group, which may have received additional interventions, and the Control group. This visual representation highlights the differences in coping styles among caregivers, providing insights into their emotional support capabilities in the rehabilitation process. The mean score of each subscale will be intended; a higher score denotes a greater propensity to employ that specific coping mechanism. The passive and active coping subscales of the CSQ have demonstrated strong internal consistency, indicating the instrument's beneficial accuracy and dependability in the Chinese community. When *t*-test value was applied to the coping style preferences, calculated mean and SD for control and experiment groups are shown in **Table 5**.

**Table 5.** *T*-test value calculation.

| **Coping style** | **Group** | **Mean** | **SD** | ***T*-test value** | ***p*-value** |
|---|---|---|---|---|---|
| Active Coping | Control | 40 | 5 | 17.69 | < 0.0001 |
| | Experiment | 10 | 6 | | |
| Passive Coping | Control | 30 | 4 | 5.76 | 0.00000003 |
| | Experiment | 20 | 4.5 | | |

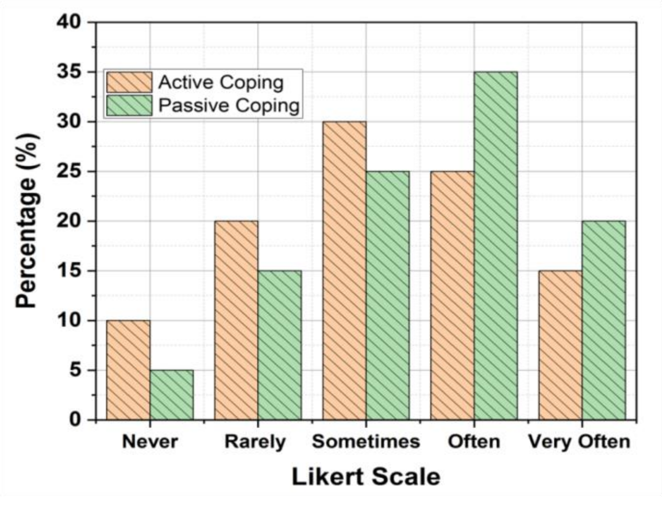

**Figure 5.** Comparison of 5-point likert scale.

Public and patient participation: The clinical nurses, thoracic surgeons, family caregivers, and psychologists of patients with early-stage rehabilitator benign tumor participated in focus groups throughout the development of trial elements for the previously described study. The Caregivers of families were asked to attend the rehabilitation support program's key sessions before the pilot study's launch to guarantee understanding and clarity. Following the navigator study, Caregivers will be asked for their opinions about the questionnaire. Each session's content, and the program's structure. The experiment will be further optimized for the next effectiveness assessment research using input from participants in the feasibility study. The lead investigator will conduct the focus group interviews with experiment group participants once the trial is completed to get their opinions on the acceptability and usefulness of the rehabilitation support program (**Figure 5**).

## 5. Discussion

Being their primary source of support, family caregivers are crucial to the care of patients with benign tumors. They disregard their health to care for a relative who has a tumor, though this burden upends their lives. To stay well and carry out their caregiving duties, family caregivers need to be given the tools, knowledge, and assistance they require. Nearing the end of their lives was the subject of most of the earlier caregiver research. There is a dearth of evidence on support programs designed especially for family caregivers following thoracic surgery. To offer specialized assistance to family caregivers of patients with benign tumors, the rehabilitation support program was created. In contrast to other Experiments, this one is specifically designed to meet the requirements of family caregivers of patients who have benign tumors. It is also provided throughout the rehabilitation phase, which emphasizes the needs of caregivers and combines psychoeducational techniques with training in coping and communication skills. It is predicted that family caregivers who get the experiment will experience a greater quality of life and less psychological distress and caregiver load than those in the control group. The findings of this study are consistent with prior research concerning the difficulties that caregivers of tumor patients experience and the importance of social support for lessening caregiver stress [11]. The current study focuses on the psychological and emotional aspects of patients with benign tumors and their caregivers to propose the necessity of incorporating these aspects into the rehabilitation process. Mental resilience, family emotional support, and positive rehabilitation outcomes establish significant correlations in our study that align with previous findings on these factors' well-being. Consequently, this study adds value to the existing research by explaining the exact pain points of caregiving for mortally ill patients, especially those with benign tumors, and the need to design an appropriate support system for them [11,18]. In this study, by describing the psychological distress, caregiving coping style, social support burden, and quality of life of the caregivers, we contribute to the understanding of a more complex picture of caregiver burden in this case. This adds to existing knowledge about the social and psychological effects of benign tumors on patients and their families and underlines the necessity of developing integrated rehabilitation programs that include not only medical treatments but also social and psychological rehabilitation of patients [4,5].

In addition, the results of the present study support the importance of communication and social support in reducing the burden on caregivers. Previous studies have emphasized the importance of communication difficulties and the advantages of social support in the caregiving setting, and the present research also supports these findings. The proposed study supports the effective and efficient use of effective communication, social support, and caregiver well-being in rehabilitation programs for patients and caregivers. Moreover, the present research enriches the current literature by offering real-life data regarding the critical predictors of the rehabilitation success of benign tumor patients: mental resilience and family emotional support [6–10]. The findings demonstrate the importance of social support in rehabilitating benign tumor patients and their caregivers.

## 6. Conclusion

The findings have demonstrated the impact of mental resilience and family emotional support on the rehabilitation of Chinese patients with benign tumors. It underscores the complexity of the difficulties experienced by caregivers and the centrality of social support in reducing caregiver stress. By identifying the relationships between mental health, family emotional support, and positive patterns of rehabilitation, this study makes an essential contribution to understanding the needs of the patients and their families in the context of benign tumors. In the future, more attention should be paid to teaching and implementing psycho-educational approaches and communication skills as a part of the rehabilitation programs for patients with benign tumors in healthcare services. Such interventions should entail physical rehabilitation and integrate effective coping strategies and propitious social support for the patient and their families and caregivers. These findings stress the necessity of investigating and managing the psychological, emotional, and social rehabilitation needs of patients. Thus, this study raises an argument for the need to recognize individuals' mental resilience, family support, and communication in the rehabilitation process to advocate for a comprehensive approach to rehabilitation instead of strictly medical-focused solutions for clients with benign tumors. By targeting these areas, healthcare practitioners and support networks can improve the quality of care and support extended to patients and their caregivers, making the rehabilitation of patients with benign tumors more valuable and effective.

**Author contributions:** Conceptualization, QZ and CG; methodology, CG; software, QZ; validation, QZ, CG and SY; formal analysis, QZ; investigation, CG; resources, SY; data curation, CG; writing—original draft preparation, QZ; writing—review and editing, CG; visualization, SY; supervision, CG; project administration, CG. All authors have read and agreed to the published version of the manuscript.

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**Ethics approval:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the ethical committee of Beijing Normal University, China (approval number IRB2022-2489-001), used participant data from individuals receiving therapy for benign tumors. Researchers ensured confidentiality and privacy protection for participants, following ethical guidelines. Explicit consent was obtained from all participants, and data integrity is maintained throughout and after the study.

**Availability of data and materials:** The data contains sensitive information about patients and healthcare providers and sharing it could pose significant privacy risks. Primary health care corporation (PHCC) is the data set owner. PHCC organizational policies allow for the release of data for research purposes only and do not permit publication of the raw data. Therefore, in compliance with these regulations and to uphold the highest standards of ethical conduct, the data cannot be made publicly available.

**Conflict of interest:** The authors declare no conflict of interest.

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