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Study on the Status and Influencing Factors of Caregiver Burden of Bone Cancer Patients: A Cross-Sectional Survey

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Abstract

Purpose: While caregivers of cancer patients generally bear a heavy burden, there are relatively few studies on the caregiver burden of bone cancer patients. This study aimed to describe the current situation of the care burden of caregivers of bone cancer patients and explore the influencing factors. **Methods:** A cross-sectional survey was conducted. By employing a convenient sampling method, a total of 154 caregivers of patients with bone cancer hospitalized in the Department of Bone and Soft Tissue of a grade A hospital in Guangzhou from July to December 2023 were selected as the study objects. The general data questionnaire, Caregiver Burden Inventory, and the Kessler psychological distress scale-10 were utilized, and data were analyzed using SPSS 25.0. **Results:** The total score of caregiver burden for bone cancer patients was (50.79 ± 14.16). Multivariate analysis results showed that patients' self-care ability, caregivers' age, daily care time, health status, and psychological distress were the influencing factors of caregiver burden. **Conclusion:** Most caregivers of bone cancer patients had a moderate or above care burden. Lower patient self-care ability, older caregiver age, longer daily care time, and poorer physical and psychological status led to a heavier care burden. Nurses should pay attention to caregivers' burden experience, strengthen health education, and provide appropriate help for caregivers to reduce the level of care burden.

Keywords

Bone Cancer, Caregiver Burden, Psychological Distress

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1. Introduction

Bone cancer occurs in bone and its attached tissues and presents in diverse forms, including primary and secondary cancers. The incidence of bone cancers is on the rise with changes in lifestyle and environmental pollution [1]. Bone cancer is characterized by insidious onset, rapid growth, easy metastasis, and high mortality [2]. Due to the high malignancy of bone cancer, chemotherapy combined with surgery is often required, and some patients may also need radiotherapy and targeted therapy [3]. The treatment cycle is long, accompanied by significant adverse reactions, and most patients have limited mobility, which exposes caregivers to the risk of physiological, psychological, and economic burdens.

Caregivers, who are family members of patients, take care of patients' daily lives from diagnosis to the end of treatment. Although patients receive assistance from nurses during hospitalization for surgery, they also need other treatments such as chemotherapy on an outpatient basis, which lasts for several months. Caring for patients is a long and arduous task. Caregivers typically spend a great deal of time and energy, and thus are highly likely to experience physical health problems and psychological issues such as anxiety and depression [4]. This can affect the ability of caregivers to actively care for patients and have adverse consequences for the prognosis of patients.

Caregiver burden is a sense of stress and negative evaluation arising from difficulties in caring for patients [5], and it can be divided into subjective burden and objective burden [6]. Psychological distress and care burden are common among caregivers of cancer patients and are simultaneously harmful [7]. Studies have shown that 17.7% of caregivers of cancer patients have suicidal thoughts, and 2.8% have attempted suicide [8]. These results are caused by excessive care burden and are undoubtedly a negative stress for the entire family. Therefore, paying attention to the burden experience of caregivers of cancer patients in long-term care is of great significance for caregivers themselves and society [9].

Caregivers of individuals with bone tumors face multifaceted challenges that significantly impact their psychological well-being and financial stability. These challenges are compounded by the unique demands of managing mobility limitations, chronic pain, and high risks of pathological fractures in patients, which may exacerbate emotional exhaustion and role strain [10]. Economically, caregivers often face direct and indirect financial burdens. Direct costs include out-of-pocket expenses for medical treatments, rehabilitation, and assistive devices, while indirect costs arise from reduced work hours, job loss, or premature retirement to accommodate caregiving duties. Studies indicate that cancer-related caregiving disproportionately affects low-income households, with caregivers reporting increased debt and diminished savings [11]. At present, there are few studies on the caregiver burden of patients with bone tumors, and there is no relatively mature measure to reduce the burden on caregivers. This study aims to investigate the current situation of the caregiver burden of patients with bone cancers and explore its influencing factors to provide a reference for promoting the physical and mental health of caregivers and improving the quality of patient care.

2. Methods

2.1. Study Design

A cross-sectional study was designed to investigate the care burden of caregivers of patients with bone cancer.

2.2. Study Objects

Using a convenient sampling method, the main caregivers of patients with bone cancers who were hospitalized in the Department of Bone and Soft Tissue of a tertiary hospital in Guangdong Province from July to December 2023 were selected. Patients were required to be diagnosed with bone tumor or osteosarcoma by pathology. Caregiver inclusion criteria: 1) Not only a patient's family member but also a long-term primary caregiver; 2) Age ≥ 18 years old; 3) Voluntarily participate in this study and have a normal understanding of the questionnaire content. Exclusion criteria: 1) Paid caregivers such as nannies and nurses; 2) Having other severe physical and mental diseases.

2.3. Survey Tools

2.3.1. General Information Questionnaire

The questionnaire was designed after consulting relevant literature. It consists of two parts. The first part contains the general information of patients with bone cancers, including gender, age, lesion location, course of disease, treatment stage, educational level, marital status, employment situation, payment method, drainage tube, past medical history, and self-care ability. The second part includes the general information of the main caregivers, such as age, gender, place of residence, understanding level of the disease, educational level, employment situation, monthly family income, relationship with patients, daily care time, care experience, and health status.

2.3.2. Caregiver Burden Inventory

The Caregiver Burden Inventory (CBI), compiled by Novak and Guest [12], is one of the most commonly used tools to study caregiver burden. It comprises five dimensions and a total of 24 items, namely time-dependent burden (1 - 5), development-limited burden (6 - 10), physical burden (11 - 14), social burden (15 - 18), and emotional burden (19 - 24). Each item is graded using the Likert 5-point rating method. A score of 0 indicates very dissenting, and a score of 4 indicates very agreeable. The total score ranges from 0 to 96. The higher the score, the heavier the burden. Scores of 0 - 32 represent mild burden, 33 - 64 represent moderate burden, and 65 - 96 represent severe burden [13]. In 2006, Chinese scholar Yue translated the scale into Chinese [14]. The Cronbach's α coefficient was 0.92, and in this study, the Cronbach's α coefficient was 0.922.

2.3.3. Kessler Psychological Distress Scale

The Kessler Psychological distress scale-10 (K10), developed by Kessler [15], is used to assess the frequency of non-specific mental health-related symptoms such as anxiety and stress experienced in the past four weeks. The scale consists of 10 items and

uses the Likert 5-point rating method. A score of 1 represents "almost no," and a score of 5 represents "all the time." The total score ranges from 10 to 50. The higher the score, the greater the psychological distress [16]. Scores of 10 - 15 indicate almost no psychological distress, 16 - 21 indicate mild psychological distress, 22 - 29 indicate moderate psychological distress, and 30 - 50 indicate severe psychological distress. In 2008, Zhou translated K10 into Chinese [17]. The Cronbach's α coefficient was 0.80, indicating that the Chinese version of K10 has good reliability.

2.4. Sample Size Calculation

This study is a cross-sectional survey. According to the principle that the sample size is 5 - 10 times the number of variables, as the Caregiver Burden Inventory has 25 items, at least 125 cases should be investigated. Considering a 20% loss rate, at least 150 cases were finally required.

2.5. Investigation Method

An investigation group was set up to train investigators in a unified way regarding the introduction of the questionnaire. The study was conducted in accordance with a certain process, and patients and caregivers signed written informed consent to participate. The consent forms were kept in the Bone and Soft Tissue Department, and ethical approval was obtained from the ethics committee of Sun Yat-sen University Cancer Center in accordance with the ICH-GCP principle (Ethical Code: B2024-006-01). After obtaining the consent of the caregivers, unified guidance was used to explain the purpose of the survey and the method of questionnaire filling, and confidentiality was promised. Questionnaires were retrieved on the spot and checked for integrity. Those who could not complete the questionnaire independently were assisted, and questionable items were explained.

2.6. Statistical Analysis

Data were entered into EXCEL and checked by two people, then analyzed using SPSS 25.0. Quantitative data were described by mean ± standard deviation. T-test and variance analysis were used to compare score differences within each group for single factor analysis. Spearman correlation analysis was used to analyze the correlation between care burden and psychological distress. Multiple linear regression analysis was used to explore the influencing factors of care burden. $P < 0.05$ indicated a statistical difference.

3. Results

3.1. The Care Burden and Psychological Distress among Caregivers of Bone Cancer Patients

In the present study, a comprehensive investigation was carried out to explore the care burden and psychological distress status of caregivers looking after bone cancer patients. A total of 160 questionnaires were disseminated, and a gratifyingly high number of 154 were retrieved, yielding an effective recovery rate of 96.25%, which provided a solid foundation for subsequent data analysis.

The scores pertaining to the care burden and psychological distress of caregivers of bone tumor patients are meticulously presented in Table 1. The overall care burden score, calculated as (50.79 ± 14.16) points, indicated a moderate level of burden. When further dissected, it was revealed that 17 cases, accounting for 11%, experienced a mild burden; 109 cases, constituting 70.8%, bore a moderate burden; and 28 cases, making up 18.2%, shouldered a severe burden. Among the various items contributing to the care burden, the top three with the highest scores were "I am compelled to keep a vigilant watch over patients at all times", "I must assist patients in accomplishing a multitude of basic activities", and "The majority of patients' daily life routines necessitate my help for completion". Across all dimensions, the time-dependent burden and the development-limited burden were found to be the most pronounced, posing significant challenges to the caregivers. In parallel, the overall psychological distress level was also assessed to be moderate, with a score of (22.73 ± 10.40) points. Delving deeper into the data, it was observed that 62 cases, equivalent to 40.2%, exhibited almost no psychological distress; 34 cases, or 22.1%, had mild psychological distress; 24 cases, accounting for 15.6%, suffered from moderate psychological distress; and 34 cases, again 22.1%, endured severe psychological distress. The three items scoring the highest in terms of psychological distress were "nervousness", "depression", and "uneasiness or irritability", vividly reflecting the emotional turmoil experienced by the caregivers.

Table 1. The scores of care burden and psychological distress of caregivers of patients with bone tumor.

Dimension	Items	Score range	Average score
Time-dependent burden	5	5 - 25	15.13 ± 4.63
Development-Limited burden	5	5 - 25	12.88 ± 5.04
Physical burden	4	4 - 18	8.82 ± 3.41
Social burden	4	4 - 16	6.60 ± 2.74
Emotional burden	6	6 - 18	7.36 ± 2.48
Total score of caregiver burden	24	24 - 83	50.79 ± 14.16
Total score of psychological distress	10	10 - 50	20.73 ± 10.40

3.2. Single-Factor Analysis of the Care Burden of Caregivers of Bone Cancer Patients

To understand the factors influencing the care burden, two separate investigations were conducted. Table 2 showcases the impact of the demographic data of bone cancer patients on the caregivers' burden, while Table 3 illustrates the influence of the demographic data of the caregivers themselves. The results were quite revealing, as it was clearly demonstrated that multiple factors, including patients' age, marital status, treatment stage, self-care ability, as well as caregivers' age, gender, educational level, employment situation, family per capita monthly income, daily care time, and their own health status, all had a significant impact on the care burden, with statistical significance indicated by $P < 0.05$.

Table 2. Single factor analysis of the influence of different demographic data on caregiver burden in patients with bone cancer.

Project	Category	Case	Score	Statistical value (t/F)	P value
Gender	Male	79	50.14 ± 14.25	−0.580	0.563
	Female	75	51.47 ± 14.12		
Age	<18 years old	53	55.53 ± 12.43	4.768	0.010
	18 - 59 years old	71	48.42 ± 14.62		
	≥60 years old	30	48.00 ± 14.22		
Educational level	Junior high school and below	84	50.39 ± 13.53	2.142	0.121
	Senior high school	42	54.05 ± 14.84		
	Bachelor degree and above	28	47.07 ± 14.39		
Marital status	Unmarried	64	54.45 ± 12.88	−2.769	0.006
	Married	90	48.18 ± 14.51		
Employment situation	Employed	30	47.73 ± 14.97	−1.319	0.189
	Out of work	124	51.52 ± 13.92		
Employment situation	Self-paying	21	50.48 ± 13.32	0.489	0.691
	Free medical treatment	7	47.57 ± 8.28		
	Medical insurance for residents	74	49.92 ± 14.87		
	The new rural cooperative medical insurance	52	52.58 ± 14.19		
Treatment stage	Preoperative chemotherapy	24	53.54 ± 14.13	7.014	0.001
	Perioperative period	98	47.83 ± 13.37		
	Postoperative chemotherapy	32	57.78 ± 14.05		
Lesion location	Upper limb	38	47.79 ± 13.98	1.597	0.193
	Lower limb	62	53.18 ± 13.98		
	Pelvis	28	52.14 ± 14.49		
	Spine	26	48.00 ± 14.01		
Course of disease	<1 month	16	55.56 ± 16.78	2.104	0.102
	1 - 6 months	70	51.34 ± 13.76		
	7 - 12 months	25	53.16 ± 14.28		
	>12 months	43	46.72 ± 13.14		
Drainage tube	No	80	51.15 ± 14.99	−0.331	0.741
	Exist	74	50.39 ± 13.29		
Self-care ability	Fully self-care	42	45.14 ± 12.11	6.491	0.002
	Partly self-care	88	51.70 ± 14.31		
	Can't self-care	24	57.29 ± 13.85		
Past medical history	No	115	51.28 ± 14.53	−0.740	0.460
	Exist	39	49.33 ± 13.05		

Table 3. Single factor analysis of the influence of different demographic data on caregiver burden of caregivers of bone cancer patients.

Project	Category	Case	Score	Statistical value (*t*/*F*)	*P* value
Relationship with patients	Spouse	41	50.34 ± 15.15	1.557	0.189
	Parents	50	54.60 ± 12.33		
	Offspring	49	47.82 ± 14.39		
	Brothers and sisters	7	49.71 ± 13.34		
	Other	7	48.00 ± 17.31		
Gender	Male	65	48.09 ± 13.87	−2.038	0.043
	Female	89	52.75 ± 14.12		
Age	18 - 39 years old	92	48.48 ± 13.55	3.167	0.045
	40 - 59 years old	55	54.02 ± 14.67		
	≥60 years old	7	55.71 ± 13.59		
Education level	Junior high school and below	48	55.46 ± 15.04	6.280	0.002
	Senior high school	48	51.75 ± 14.27		
	Bachelor degree and above	58	46.12 ± 11.92		
Marital status	Unmarried	23	46.78 ± 13.81	1.476	0.142
	Married	131	51.49 ± 14.15		
Employment situation	Employed	68	47.00 ± 12.87	−3.029	0.003
	Out of work	86	53.78 ± 14.48		
Place of residence	Village	81	51.17 ± 13.57	−0.356	0.722
	City and town	73	50.36 ± 14.87		
Understanding level of the disease	Know little	6	61.17 ± 18.93	2.015	0.137
	Know a little	87	49.60 ± 13.14		
	Know a lot	61	51.46 ± 14.84		
Monthly family per capita income	Below ¥1000	30	57.63 ± 13.21	4.662	0.011
	¥1000 - 5000	86	49.49 ± 14.32		
	Above ¥5000	38	48.32 ± 13.16		
Daily care time	<8h	40	43.23 ± 11.18	−4.126	0.000
	≥8h	114	53.44 ± 14.18		
Health status	Good	111	47.76 ± 13.47	−4.530	0.000
	General	43	58.60 ± 12.98		
Care experience	Exist	83	50.13 ± 14.68	−0.618	0.538
	No	71	51.55 ± 13.59		

3.3. Correlation Analysis between Care Burden and Psychological Distress in Caregivers of Bone Cancer Patients

The relationship between the care burden and psychological distress was meticulously examined, as presented in Table 4. The outcome unequivocally showed that

there was a positive correlation between the two variables (r = 0.532, $P < 0.05$). In essence, this implies that as the care burden on the caregivers grew heavier, the degree of their psychological distress concomitantly increased, highlighting the intertwined nature of these two aspects of their caregiving experience.

Table 4. Correlation analysis between care burden and psychological distress in caregivers of bone cancer patients.

Dimension	*r*	*P*
Time-dependent burden	0.246	0.002
Development-Limited burden	0.535	0.000
Physical burden	0.589	0.000
Social burden	0.407	0.000
Emotional burden	0.326	0.000
Total score of caregiver burden	0.532	0.000

3.4. Multivariate Analysis of the Care Burden of Caregivers of Bone Cancer Patients

Table 5. Influence factor assignment.

Object	Variable	Assignment
Patient	Age	<18 years old = 1; 18 - 59 years old = 2; ≥60 years old = 3
	Marital status	married = 1; unmarried = 2
	Treatment stage	preoperative chemotherapy = 1; perioperative period = 2; postoperative chemotherapy = 3
	Self-care ability	fully self-care = 1; partly self-care = 2; can't self-care = 3
Caregiver	Age	18 - 39 years old = 1; 40 - 59 years old = 2; ≥60 years old = 3
	Gender	male = 1; female = 2
	Education level	junior high school and below = 1; senior high school = 2; bachelor degree and above = 3
	Employment situation	employed = 1; out of work = 2
	Monthly family per capita income	below ¥1000 = 1; ¥1000 - 5000 = 2; above ¥5000 = 3
	Daily care time	<8 h = 1; ≥8 h = 2
	Health status	good = 1; general = 2
	Psychological distress	almost no psychological distress = 1; mild psychological distress = 2; moderate psychological distress = 3; severe psychological distress = 4

With the caregivers' care burden designated as the dependent variable, and variables that exhibited statistical differences in the single-factor analysis, along with psychological distress, serving as the independent variables (as detailed in Table 5), a multiple linear regression analysis was executed. The results, presented in Table 6, conclusively identified that patients' self-care ability, caregivers' daily

care time, their health status, and psychological distress were the principal influencing factors contributing to the caregivers' burden, all with $P < 0.05$. These findings not only shed light on the complex dynamics at play but also offer valuable insights for devising targeted interventions and support systems to alleviate the challenges faced by caregivers of bone cancer patients.

Table 6. Multivariate analysis of the care burden of caregivers of bone cancer patients.

Variable	β	SE	β'	t	P
Constant	4.936	11.108	-	0.444	0.657
Age of patients	−0.560	1.926	−0.029	−0.291	0.772
Marital status of patients	0.095	2.784	0.003	0.034	0.973
Treatment stage of patients	1.601	1.475	0.068	1.085	0.280
Self-care ability of patients	3.856	1.405	0.176	2.745	0.007
Age of caregivers	4.162	1.544	0.172	2.696	0.008
Gender of caregivers	0.723	1.907	0.025	0.379	0.705
Education level of caregivers	−0.315	1.357	−0.018	−0.232	0.817
Employment situation of caregivers	0.575	2.062	0.020	0.279	0.781
Monthly family per capita income of caregivers	−0.950	1.638	−0.045	−0.580	0.563
Daily care time of caregivers	7.223	2.142	0.224	3.372	0.001
Health status of caregivers	5.312	2.122	0.169	2.504	0.013
Psychological distress of caregivers	5.184	0.777	0.435	6.668	0.000

4. Discussion

4.1. Status of Care Burden among Bone Cancer Patient Caregivers

A comprehensive investigation was conducted, focusing on a cohort of 154 caregivers of bone cancer patients. The findings painted a vivid picture of their caregiving experience. The overall care burden was ascertained to be at a moderate level, with a total score averaging (50.79 ± 14.16). Alarmingly, over 89% of the caregivers bore a moderate to severe burden, a statistic that dovetailed with the conclusions drawn by Chen and Li [18]. However, when compared to the caregivers of stroke patients [13], the score was marginally higher. A plausible explanation for this disparity lies in the fact that nearly a third of the bone cancer patients were adolescents. This demographic composition invariably heightened the psychological strain on parents, as they fretted over the uncertain future of their children, compounding the already hefty caregiving responsibilities.

The care burden manifested itself in multifarious ways. Primarily, caregivers were constantly engaged in facilitating patients' completion of basic daily activities, maintaining round-the-clock vigilance, and being perpetually preoccupied with the patients' prognosis. Compounding these challenges were the caregivers' own limitations, such as a dearth of care knowledge, exorbitant economic pres-

sures, and the juggling act of managing busy work schedules [2]. Bone cancer patients' heavy dependence, feeble self-care capabilities, and protracted recovery periods necessitated that caregivers remain tethered to the ward for extended durations, often exceeding eight hours a day. This not only disrupted their personal lives and work routines but also curtailed their leisure time and derailed their long-term plans. Moreover, the long-term caregiving ordeal took a toll on their physical well-being, manifesting as muscle pain, sleep deprivation, and waning physical strength [19].

When the burden dimensions were dissected and ranked based on scores, the time-dependent burden and development-limited burden topped the list, trailed by the physical, emotional, and social burdens. Unlike prolonged conditions such as Alzheimer's disease, bone tumor treatment often requires intensive medical interventions, compelling caregivers to engage in high-intensity daily care, which severely restricts their personal time (time-dependence burden) [10]. In contrast, chronic disease care involves relatively stable conditions and greater patient autonomy, resulting in milder burdens. Studies indicate that the functional dependency of bone tumor patients and the unpredictability of treatment outcomes exacerbate these burdens, necessitating interventions through personalized care plans and enhanced social support systems [11]. Intriguingly, the social burden emerged as the least pronounced. This could be attributed to the deep-seated influence of traditional Chinese culture, where the virtue of filial piety prevails. As a result, other relatives were more than willing to rally around and join the caregiving fray or extend their support and concern through virtual means, thereby alleviating the emotional and social pressures on the primary caregivers.

4.2. Analysis of Influencing Factors on Care Burden

4.2.1. Patients' Self-Care Ability

The postoperative self-care acumen of patients was found to be inextricably linked to the caregivers' burden. In line with the conclusions of Lin and Lu [20], as patients' self-care capabilities waned, the caregiving load grew exponentially. Bone cancer surgeries often left patients with restricted mobility, limb weakness, or hampered self-care abilities due to factors like wound drainage tubes and pain. This rendered them entirely reliant on caregivers for even the most rudimentary of daily tasks. Notably, patients under 18, unmarried, and those undergoing postoperative chemotherapy presented higher caregiver burden scores. The youthful demographic is more susceptible to bone tumors, yet their life experience is scant, and the added burden of illness further erodes their self-sufficiency. Postoperative chemotherapy patients, with their specific requirements for surgical site care and enforced bed rest, were also ill-equipped to manage their own affairs. In contrast, stroke survivors, despite initial severe disability, often regain partial self-care ability through rehabilitation, moderating long-term caregiver strain [11]. Additionally, patients with lesions in the lower limbs, pelvis, or spine, accounting for 75.3% in our study, demanded more intensive care due to significant surgical trauma,

delayed ground mobility, and protracted functional recovery timelines. This arduous care process fatigued and frazzled caregivers, amplifying their burden. Nursing staff, in this context, could play a pivotal role by galvanizing patients' motivation for early functional exercise and fostering family cooperation, thereby lightening the caregiving load. Targeted interventions, such as adaptive rehabilitation programs and respite care, are critical to mitigate this interdependence, particularly in resource-limited settings.

4.2.2. Daily Care Time of Caregivers

There was a direct correlation between the length of care time and the magnitude of the care burden. Zhong and Shi's [21] research on orthopedic surgery caregivers corroborated this, revealing that those with daily care stints exceeding eight hours bore a heavier burden than their counterparts with shorter hours. Bone tumors often require prolonged, intensive care (e.g., wound management, mobility assistance) due to treatment side effects (e.g., post-chemotherapy weakness) and high fracture risks, leading to extended daily care hours. Studies show caregivers spend 6 - 8 hours/day on direct care, compared to 2 - 3 hours for stable chronic illnesses, correlating with higher time-dependence burden [10]. The simple arithmetic of time dictates that when caregiving encroaches beyond normal working hours, the caregivers' rest and recreation time is severely truncated, leading to mounting stress levels and an exacerbated burden. Prolonged care hours have been shown to precipitate sleep disturbances and anxiety among caregivers [22]. In our study, the pandemic-induced restrictions on accompanying persons meant that most patients had a single caregiver, typically an immediate family member like a parent, spouse, or child, who had to shoulder the full-time caregiving mantle. Some studies suggest that enhanced family and social support can mitigate the burden on caregivers of rectal cancer patients [23]. Thus, nurses could step in to assist with patient care, impart self-relaxation training to caregivers, and advocate for additional accompanying persons during discharge, sharing the caregiving responsibilities and alleviating the strain [24].

4.2.3. Age and Health Status of Caregivers

Physical fitness, which is intertwined with age and health, serves as a linchpin for quality caregiving. Zhang [25] noted that caregivers of gynecologic cancer patients with robust health had a lighter burden. In our study, caregivers over 60 years old, with an average care burden score of (55.71 ± 13.59), fared worse than their younger counterparts. Similarly, those with average health reported a score of (58.60 ± 12.98). The elderly, with their relatively fragile health, diminished physical activity, and reduced information absorption capabilities, were not only burdened with patient care but also had to grapple with their own self-care needs, compounding the overall strain. In situations where families lack young members due to unforeseen circumstances, the elderly caregivers find themselves in a rather precarious position, compromising both the quality of care and their own well-being. Medical staff, therefore, ought to extend a helping hand to caregivers with average

health, providing patient education, enhancing their disease knowledge, and honing their care skills to mitigate the burden.

4.2.4. Psychological Distress of Caregivers

The bidirectional relationship between psychological distress in bone tumor patients and caregiver burden is uniquely severe compared to other cancers or chronic diseases. Bone tumors' aggressive nature, high disability rates (e.g., post-amputation dysfunction), and recurrence risk exacerbate patient anxiety and depression, intensifying caregivers' emotional and physical strain. Studies show bone tumor patients report higher distress than stable solid tumor patients, correlating with elevated caregiver burden [10]. The psychological distress among caregivers hovered at a moderate level, with a total score of (22.73 ± 10.40). A staggering 60% of them grappled with psychological distress, with tension, uneasiness, and depression being the most conspicuous manifestations. The root causes were manifold. Firstly, the fact that around 64% of the patients had undergone surgical treatment, and caregivers, bereft of prior relevant experience, were consumed by anxiety regarding surgery success and post-operative quality of life. Secondly, a significant 60.4% of caregivers had limited awareness of the patients' condition, compounded by average family finances and the hefty costs of tumor treatment, all of which contributed to heightened psychological turmoil. Our research, in tandem with Xu [26], established a positive correlation between care burden and psychological distress ($r = 0.532$, $P < 0.001$). The long and arduous treatment cycle of bone tumors, coupled with patients' restricted mobility, bred negative experiences among caregivers, culminating in a vicious cycle of escalating burden and psychological distress [27]. To break this cycle, nursing staff could conduct targeted disease and nursing lectures, offer professional guidance, bolster family and social support, provide top-notch medical services, and organize mental care workshops, inviting rehabilitated patients to share their experiences, thereby assuaging the psychological distress and care burden [28].

4.3. Strengths and Limitations of the Study

This study's strengths were manifold. By zeroing in on the care burden of bone cancer patient caregivers, it provided invaluable insights into the influencing factors, serving as a guiding light for oncology nurses in clinical practice. Moreover, the investigators underwent meticulous training prior to data collection, and a dual-check mechanism was instituted post-data entry to ensure accuracy. However, it was not without its limitations. Firstly, the subjects were sourced from a single geographical location, potentially limiting the generalizability of the findings. Secondly, caregivers with lower educational attainment might have misconstrued the questionnaire items, introducing a degree of measurement error. Thirdly, the patient cohort encompassed a wide age range, from children to the elderly, and the caregivers' attitudes and responses could vary significantly across these age groups, warranting further in-depth exploration.

4.4. Clinical Implications

The care burden borne by bone cancer patient caregivers is a critical concern, not only impinging on their own health but also undermining the quality of patient care. Nurses, being in close proximity to both patients and caregivers during the care process, are uniquely positioned to make a difference. They could initiate conversations with caregivers, impart care skills, and share success stories to boost confidence. For elderly caregivers, providing hands-on assistance and ensuring they get adequate rest is crucial. Additionally, nudging patients towards rehabilitation exercises can enhance their self-care capabilities, thereby reducing the caregivers' burden.

5. Conclusion

Bone cancer patients' inherent limitations in self-care, along with their protracted recovery trajectories, translate into a ubiquitous and predominantly moderate-to-high care burden for their caregivers. Concurrently, psychological distress plagues these caregivers. The confluence of patients' self-care ability, caregivers' age, daily care time, health status, and psychological distress shapes the care burden landscape. This hefty burden has far-reaching implications for the quality of life of both patients and caregivers. As frontline clinical nursing workers, we must be attuned to these challenges, understand the caregivers' predicaments, and implement measures such as knowledge dissemination, continuous nursing support, and information management. Future research should pivot towards multi-center, large-sample studies to unearth more nuanced influencing factors and devise comprehensive interventions to alleviate the care burden, ultimately enhancing the caregiving experience and patient outcomes.

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Conflicts of Interest

All authors declared that there was no conflict of interest.

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