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ORIGINAL RESEARCH

The Current Status of Social Isolation and the Caregiver Compassion Fatigue in Elderly COPD Patients

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Background: Chronic obstructive pulmonary disease (COPD) significantly affects elderly individuals, often leading to social isolation and impacting quality of life. Family caregivers play a crucial role but may experience compassion fatigue (CF), potentially exacerbating patient outcomes. This study investigates social isolation in elderly COPD patients and examines the impact of caregiver compassion fatigue.

Methods: We conducted a retrospective analysis of 200 elderly COPD patients from January 2018 to December 2022 at West China Hospital of Sichuan University. Participants were divided into poor prognosis (n = 109) and good prognosis (n = 91) groups based on outcomes within 90 days of admission. Caregiver compassion fatigue was assessed using the Professional Quality of Life Scale (ProQOL), categorizing patients into low (n = 125) and high (n = 75) caregiver fatigue groups. Social isolation was measured using the Generalized Alienation Scale (GAS) and the Multidimensional Scale of Perceived Social Support (MSPSS). Patient outcomes included pulmonary function tests, the 6-Minute Walk Test (6MWT), and psychological assessments using the Hospital Anxiety and Depression Scale (HADS), Connor-Davidson Resilience Scale (CD-RISC), and the Satisfaction with Life Scale (SWLS).

Results: No significant demographic differences were observed between GP and PP groups. The PP group exhibited higher GAS scores ($P = 0.017$) and lower MSPSS scores ($P = 0.045$), indicating greater social isolation. Caregivers of PP patients reported higher compassion fatigue and burnout levels ($P = 0.007$; $P = 0.003$). Elevated caregiver compassion fatigue correlated with poorer patient outcomes, including decreased exercise tolerance ($P = 0.021$) and increased anxiety and depression ($P = 0.008$ and $P = 0.045$, respectively). Lower resilience and life satisfaction scores were observed in patients with caregivers experiencing high compassion fatigue, highlighting the impact on psychological well-being.

Conclusion: Elderly COPD patients often experience significant social isolation, exacerbated by high levels of caregiver compassion fatigue.

Keywords: chronic obstructive pulmonary disease, social isolation, compassion fatigue, caregiver burnout, elderly patients, psychosocial outcomes

Introduction

Chronic obstructive pulmonary disease (COPD) remains a pervasive challenge in global health, prominently affecting the elderly population. It was characterized by persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities.[1] COPD primarily results from significant exposure to noxious particles or gases and encompasses a complex interplay of genetic predisposition and environmental factors, such as smoking and air pollution.[2,3] Social isolation was broadly defined as a lack of social connections or interactions with others, and it was associated with detrimental health outcomes, including increased morbidity and mortality.[4] Notably, the psychological effects of social

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isolation may manifest as increased anxiety, depression, and a sense of alienation, further deteriorating patients' quality of life.[5]

The caregiving role was another critical element in the COPD patient experience, often dictated by the emotional, physical, and logistical demands of managing a chronic disease.[6] Ora et al[7] explored the positive effects of supportive care for patients and caregivers in COPD, and concluded through semi-structured interviews with six healthcare professionals that embedding nurse-led supportive care into respiratory and palliative care services can meet patients' biological, psychological, social and spiritual needs. It's also good for nurses. Family caregivers provide essential support, ranging from daily living assistance to emotional companionship, which was indispensable for patient adherence to treatment regimens and overall well-being.[8] However, the caregiving role can lead to compassion fatigue, characterized by emotional and physical exhaustion that diminishes the caregivers' capacity to empathize or maintain a caring attitude. This condition stems from the chronic stress associated with caregiving duties and directly impacts the quality of care delivered.[9] Margolis et al[10] studied the relationship between depression and adherence to major medications among caregivers of children with asthma, and found that for every 1 percentage point increase in caregiver depression symptoms, Children with pharmacy records were 5% less likely to comply with childhood asthma medications (odds ratio = 0.95; p = 0.012).

Caregiver compassion fatigue was a significant, often under-recognized issue, particularly in managing chronic illnesses such as COPD, where the demands were continuous and evolving with patients' declining functionality.[11] It involves symptoms of burnout, secondary traumatic stress, and reduced compassion satisfaction, adversely affecting both caregivers' and patients' psychological health.[12,13] Studies have shown that compassion fatigue in caregivers abates only when sickness care is no longer carried out. Mino et al[14] performed a statistical analysis of work stress and compassion fatigue among psychiatrists and caregivers during the COVID-19 pandemic and post-pandemic. Professional Quality of Life Scale (ProQoL) data from 102 mental health workers showed that compassion satisfaction among all health care workers increased significantly after the pandemic (p=0.002), while compassion fatigue decreased relatively. The intricate link between social isolation and caregiver fatigue can create a vicious cycle, wherein increased caregiver stress and fatigue can lead to suboptimal patient care,[12] further fostering social isolation and diminishing the therapeutic milieu surrounding the patient.[13] This bidirectional influence underlines the potential reciprocal relationship between caregiver well-being and patient quality of life, necessitating targeted interventions to mitigate adverse effects.[14] Existing studies highlight the individual impacts of social isolation and compassion fatigue but often fail to articulate the synergistic interactions that exacerbate health outcomes for both patients and caregivers.[15] The primary aim of this study was to elucidate the current status of social isolation among elderly COPD patients and examine how caregiver compassion fatigue influences this dynamic.

Materials and Methods

Study Design

A retrospective analysis was performed on 200 elderly patients diagnosed with COPD who were admitted to our hospital from January 2018 to December 2022 at West China Hospital of Sichuan University. These patients were categorized based on their outcomes into two groups: the poor prognosis (PP) group, which included those who either experienced a recurrence of symptoms or died within 90 days of admission (n = 109), and the good prognosis (GP) group, which comprised those who did not encounter such events during the same time frame (n = 91).

Ethics Statement, Inclusion and Exclusion Criteria

This study was reviewed by West China Hospital of Sichuan University and approved by the Ethics Committee of this hospital. The approval certificate number is 2024-HX-428. The requirement for informed consent was waived due to the retrospective nature of the study, which involved only de-identified patient data and posed no risk or impact on patient care. This waiver was granted in compliance with regulatory and ethical guidelines applicable to retrospective research.

Ethics Statement

The study was approved by the Ethics Committee of West China Hospital of Sichuan University (2024-HX-428). This study was consistent with the Declaration of Helsinki.

Inclusion Criteria: Participants were eligible for inclusion if they met the defined diagnostic criteria for COPD (goldrule), the pulmonary function examination showed incomplete airflow limitation, FEV1/FVC < 0.7 after bronchodilator inhalation[16], were 60 years of age or older, had a hospital stay of at least 90 days, had acute exacerbation due to COPD, and had a family caregiver who completed the ProQOL evaluation. Furthermore, patients needed to have comprehensive and accessible medical records pertinent to their diagnosis and treatment.

Exclusion Criteria: Patients were excluded from the study if they had respiratory or other infectious diseases, were diagnosed with malignant tumors, suffered from significant organ dysfunction, or had autoimmune deficiency disorders. Additionally, patients who were unconscious or exhibited abnormal mental status or cognitive function were not included in the study.

Data Collection

Patient data were gathered from the medical record system, encompassing demographic characteristics, the Generalized Alienation Scale (GAS) score, the Multidimensional Scale of Perceived Social Support (MSPSS) score, the caregiver ProQOL score, pulmonary function assessments, the 6-Minute Walk Test (6MWT), the Hospital Anxiety and Depression Scale (HADS) score, the Connor-Davidson Resilience Scale (CD-RISC) score, and the Satisfaction with Life Scale (SWLS) score. Pulmonary function was measured using a spirometer (model MSA99, Wuhan Konbeino Medical Equipment Co., Ltd., China), with specific assessments including forced expiratory volume in one second (FEV1) and forced vital capacity (FVC), from which the FEV1/FVC ratio was computed. The 6MWT, following the guidelines established by the American Thoracic Society (ATS)[17], was employed to evaluate patients' cardiopulmonary function and exercise endurance. Patients were instructed to walk as quickly as possible, refraining from running or jogging, and were permitted to stop if needed, with encouragement to resume walking promptly. The distance covered within the 6-minute interval was documented.

Assessment of the Current Status of Social Isolation in Elderly COPD Patients

The GAS was employed to evaluate the patients' sense of alienation. This scale comprises 15 items, distributed across four dimensions: alienation from others (5 items), powerlessness (4 items), self-estrangement (3 items), and meaninglessness (3 items). Each item was rated on a 4-point Likert scale, with options ranging from 1 (Strongly Disagree) to 4 (Strongly Agree). The total possible score ranges from 15 to 60, with higher scores signifying a greater degree of alienation. The scale demonstrated good internal consistency, with a Cronbach's α of 0.801.[18]

The MSPSS was used to assess the level of social support perceived by the patients. This scale includes 12 items, categorized into three sources of support: family, friends, and significant others. Each item was rated on a 7-point Likert scale, from 1 (Very Strongly Disagree) to 7 (Very Strongly Agree). The total score can range from 12 to 84, with higher scores indicating greater levels of perceived social support. The MSPSS demonstrated excellent internal consistency, evidenced by a Cronbach's α of 0.950.[19]

Assessment of the Impact of Caregiver Compassion Fatigue on Elderly COPD Patients

We further stratified the patients based on the level of compassion fatigue experienced by their family caregivers. To evaluate the severity of this condition, the Professional Quality of Life Scale (ProQOL) was employed. ProQOL was a tool for assessing work-related stress and emotional experiences for caregivers, psychologists, and social workers, including stress, empathy, and perceived fatigue. The ProQOL was composed of 30 items and was divided into three subscales: Compassion Satisfaction, Burnout, and Secondary Traumatic Stress, each containing 10 items. The scale uses a 5-point Likert system, ranging from 1 (Never) to 5 (Very Often). The scores for each subscale range from 10 to 50, where 10–22 indicates a low level, 23–41 a moderate level, and 42–50 a high level of the specific construct, with higher scores reflecting greater severity of compassion fatigue. The Cronbach's α values for the Compassion Satisfaction, Burnout, and Secondary Traumatic Stress subscales were 0.864, 0.569, and 0.742, respectively.[20] Using the ProQOL scores, patients were grouped into two categories: those whose caregivers had a ProQOL score of 22 or lower on at least two of the three subscales were classified into the low compassion fatigue group (n = 125), while those with caregiver scores above 22 were classified into the high compassion fatigue group (n = 75).

The HADS was employed to screen patients with physical illnesses for symptoms of anxiety and depression. This scale was composed of 14 items, equally divided into two subscales: one measures anxiety (7 items), and the other measures depression (7 items). Each item was assessed using a 4-point Likert scale, ranging from 0 to 3. The total score for each subscale can range from 0 to 21, with a score of 8 or higher suggesting the presence of anxiety or depression. The HADS demonstrated excellent internal consistency, with a Cronbach's α of 0.944.[21]

The CD-RISC was employed to measure the psychological resilience of patients. This scale consists of 25 items that assess three dimensions: tenacity, strength, and optimism. Each item was scored on a 5-point Likert scale, ranging from 0 (Not True at All) to 4 (True Nearly All the Time). The total score ranges from 0 to 100, with higher scores reflecting greater levels of psychological resilience. The CD-RISC demonstrated excellent internal consistency, as indicated by a Cronbach's α of 0.970.[22]

The SWLS was utilized to evaluate patients' overall life satisfaction. This scale includes five items, each rated on a 7-point Likert scale, from 1 (Very Dissatisfied) to 7 (Very Satisfied). The total score ranges from 5 to 35, with higher scores reflecting greater life satisfaction. Scores were categorized as follows: 31–35 indicates very satisfied, 26–30 indicates satisfied, 21–25 indicates slightly satisfied, 20 represents neutral, 15–19 indicates slightly dissatisfied, 10–14 indicates dissatisfied, and 5–9 indicates very dissatisfied. The mean score of the five items represents the participants' life satisfaction. In this study, the SWLS exhibited good internal consistency, with a Cronbach's α of 0.79.[23]

Statistical Analysis

Data were analyzed using SPSS 29.0 statistical software (SPSS Inc., Chicago, IL, USA). Categorical data were expressed as [n (%)] and analyzed using the chi-square test when the sample size was ≥40 and the theoretical frequency (T) was ≥5, with χ^2 representing the test statistic. When the sample size was ≥40 but the theoretical frequency was between 1 and 5, an adjusted chi-square test was applied using a correction formula. For sample sizes < 40 or when the theoretical frequency was < 1, Fisher's exact test was utilized for statistical analysis. Continuous variables were first tested for normal distribution using the Shapiro–Wilk test. Non-normally distributed data were analyzed using the Wilcoxon rank-sum test and expressed as [median (25th percentile, 75th percentile)]. A p-value of < 0.05 was considered statistically significant. To identify key factors influencing self-neglect behaviors in elderly patients with coronary artery disease, correlation analysis, univariate analysis, and multivariate analysis were conducted. Pearson correlation analysis was used for continuous variables, while Spearman correlation analysis was applied to categorical variables.

Results

Demographic Characteristics

In this study, we examined the demographic characteristics of elderly COPD patients receiving good prognosis (GP) and poor prognosis (PP) care (Table 1). The mean age was 71.55 ± 5.26 years for the GP group and 71.32 ± 5.72 years for the PP group ($P = 0.763$). No significant difference was observed in the age first diagnosed with COPD (GP: 60.24 ± 8.53 years, PP: 60.78 ± 7.11 years, $P = 0.628$) or in body mass index (BMI), which was 27.46 ± 4.27 kg/m² for GP patients and 26.68 ± 6.29 kg/m² for PP patients ($P = 0.301$). Gender distribution was similar, with females comprising 46.15% of the GP group and 52.29% of the PP group ($P = 0.387$). History of smoking and drinking, incidences of hypertension, diabetes, arthritis, heart disease, asthma, as well as marital status and living conditions, were also comparable between groups ($P > 0.05$) confirming no significant differences. Overall, demographic factors in COPD patients did not differ significantly between the two care groups, providing a consistent baseline to evaluate the impact of caregiver compassion fatigue on social isolation.

Table 1 Comparison of Demographic Characteristics Between Two Groups

Parameters	GP Group (n = 91)	PP Group (n = 109)	t/χ^2	P
Age (years)	71.55 ± 5.26	71.32 ± 5.72	0.303	0.763
Age first diagnosed with COPD (years)	60.24 ± 8.53	60.78 ± 7.11	0.485	0.628
BMI (kg/m²)	27.46 ± 4.27	26.68 ± 6.29	1.037	0.301
Female/Male	42 (46.15%) / 49 (53.85%)	57 (52.29%) / 52 (47.71%)	0.748	0.387
Smoking history (Yes/No)	60 (65.93%)	74 (67.89%)	0.086	0.770
Drinking history (Yes/No)	18 (19.78%)	25 (22.94%)	0.293	0.589
Hypertension (Yes/No)	33 (36.26%)	43 (39.45%)	0.214	0.644
Diabetes (Yes/No)	14 (15.38%)	14 (12.84%)	0.266	0.606
Arthritis (Yes/No)	33 (36.26%)	41 (37.61%)	0.039	0.844
Heart disease (Yes/No)	12 (13.19%)	15 (13.76%)	0.014	0.906
Asthma (Yes/No)	21 (23.08%)	29 (26.61%)	0.329	0.566
Marital Status (Married/Unmarried or Divorced)	51 (56.04%) / 40 (43.96%)	56 (51.38%) / 53 (48.62%)	0.434	0.510
Living condition (Live alone / Live with family members)	40 (43.96%) / 51 (56.04%)	40 (36.7%) / 69 (63.3%)	1.089	0.297

Abbreviation: BMI, Body Mass Index.

The Current Status of Social Isolation in Elderly COPD Patients

The total GAS score was significantly higher in the PP group (41.66 ± 2.68) compared to the GP group (40.76 ± 2.52) (P = 0.017) (Table 2). When examining individual domains, the PP group exhibited significantly higher levels of alienation from others (14.11 ± 1.18 vs 13.55 ± 1.63, P = 0.007), powerlessness (11.07 ± 1.12 vs 10.63 ± 1.25, P = 0.009), self-estrangement (8.53 ± 0.92 vs 8.15 ± 0.84, P = 0.002), and meaninglessness (8.26 ± 0.89 vs 7.94 ± 0.95, P = 0.014). These results indicate that elderly COPD patients in the PP group experienced greater feelings of social isolation and related psychological distress compared to those in the GP group.

The total MSPSS score was significantly higher in the GP group (56.13 ± 6.56) compared to the PP group (54.14 ± 7.24), with a P value of 0.045 (Figure 1). Specifically, the GP group exhibited significantly higher scores on the friend subscale (18.46 ± 4.63 vs 16.37 ± 4.89, P = 0.002), family subscale (18.52 ± 3.67 vs 17.32 ± 3.48, P = 0.018), and significant others subscale (22.15 ± 3.77 vs 20.33 ± 3.9, P = 0.001). These findings suggest that elderly COPD patients receiving GP care perceive greater social support from friends, family, and significant others compared to those in the PP group.

Compassion Fatigue Among Family Caregivers of Elderly COPD Patients

Caregivers of patients in the PP group reported higher levels of compassion satisfaction (23.87 ± 7.66) compared to those in the GP group (21.06 ± 7.78) (P = 0.011) (Figure 2). Similarly, compassion fatigue scores were significantly higher in the PP group (23.44 ± 6.49) than in the GP group (20.98 ± 6.15) (P = 0.007). Furthermore, caregivers in the PP group experienced greater burnout (23.59 ± 5.57) compared to those in the GP group (21.31 ± 5.26) (P = 0.003). These findings suggest that caregivers of elderly COPD patients in the PP group experience increased compassion satisfaction, compassion fatigue, and burnout compared to those in the GP group.

Table 2 Comparison of GAS Score Between Two Groups

Parameters	GP Group (n = 91)	PP Group (n = 109)	t	P
Total GAS	40.76 ± 2.52	41.66 ± 2.68	2.412	0.017
Alienation from others	13.55 ± 1.63	14.11 ± 1.18	2.730	0.007
Powerlessness	10.63 ± 1.25	11.07 ± 1.12	2.652	0.009
Self-estrangement	8.15 ± 0.84	8.53 ± 0.92	3.086	0.002
Meaninglessness	7.94 ± 0.95	8.26 ± 0.89	2.474	0.014

Abbreviation: GAS, Generalized Alienation Scale.

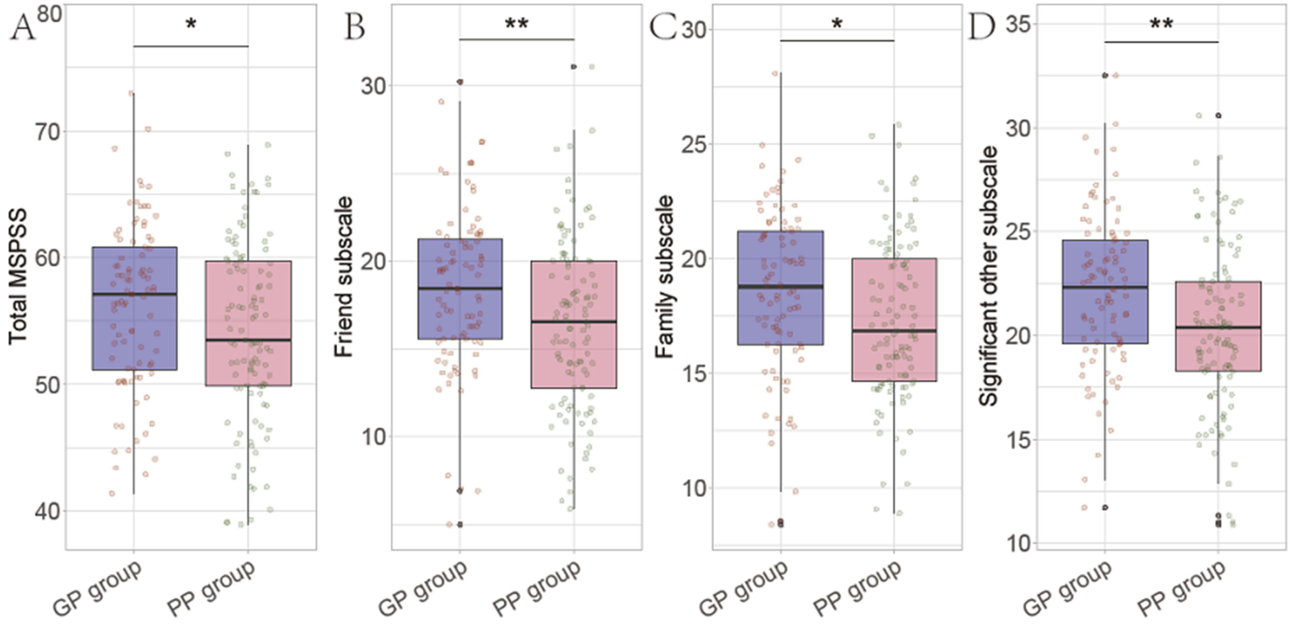

Figure 1 Comparison of MSPSS score between two groups. Purple represented GP group, pink represented PP group, and the alpha parameter was 0.2. (**A**) Total MSPSS; (**B**) Friend subscale; (**C**) Family subscale; (**D**) Significant others subscale. *P < 0.05; **P < 0.01.

Abbreviation: MSPSS, Multidimensional Scale of Perceived Social Support.

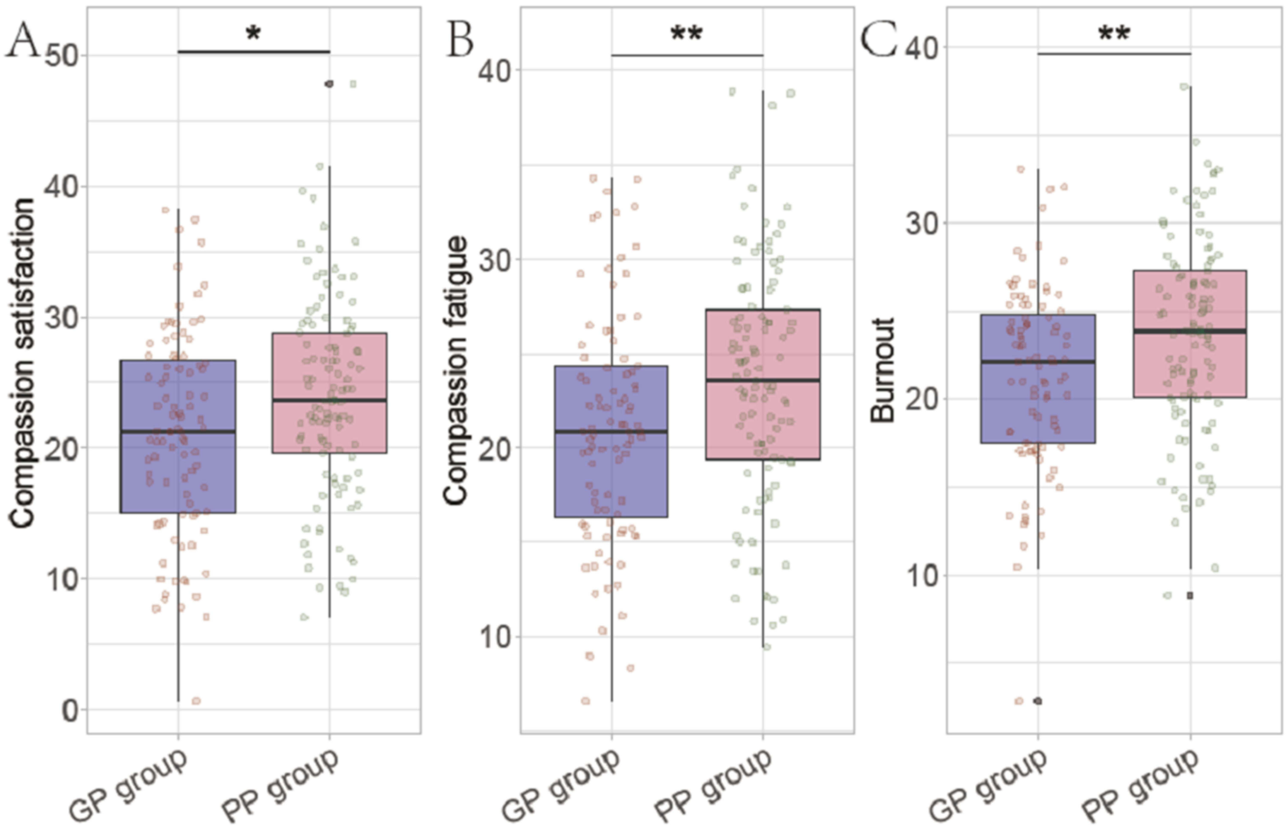

Figure 2 Comparison of caregiver ProQOL score between two groups. Purple represented GP group, pink represented PP group, and the alpha parameter was 0.2. (**A**) Compassion satisfaction; (**B**) Compassion fatigue; (**C**) Burnout. *P < 0.05; **P < 0.01.

Abbreviation: ProQOL, Professional Quality of Life Scale.

Table 3 Comparison of Pulmonary Function and 6MWT Between Two Groups

Parameters	LCF Group (n = 125)	HCF Group (n = 75)	t	P
FVC (L)	2.55 ± 0.63	2.45 ± 0.53	1.235	0.218
FEV1 (L)	1.06 ± 0.25	0.99 ± 0.31	1.734	0.085
FEV1/FVC (%)	43.52 ± 9.56	41.75 ± 6.63	1.542	0.125
Distance on the 6MWT (m)	281.46 ± 68.32	257.63 ± 72.55	2.334	0.021

Abbreviations: FVC, forced vital capacity; FEV1, forced expiratory volume in one second; 6MWT, 6-Minute Walk Test.

The Impact of Caregiver Compassion Fatigue

The low compassion fatigue (LCF) group had a mean FVC of 2.55 ± 0.63 L compared to 2.45 ± 0.53 L in the high compassion fatigue (HCF) group (*P* = 0.218), while the mean FEV1 was 1.06 ± 0.25 L and 0.99 ± 0.31 L, respectively (*P* = 0.085) (Table 3). The FEV1/FVC ratio was 43.52% ± 9.56 in the LCF group and 41.75% ± 6.63 in the HCF group (*P* = 0.125). However, a statistically significant difference was observed in the distance covered during the 6MWT, with the LCF group walking further (281.46 ± 68.32 m) than the HCF group (257.63 ± 72.55 m), yielding a P value of 0.021. This suggests that patients in the LCF group had better exercise tolerance, which may suggest a potential impact of caregiver compassion fatigue on physical performance.

The HCF group exhibited higher anxiety scores (10.27 ± 2.51) than the LCF group (9.26 ± 2.64) (*P* = 0.008) (Figure 3). Similarly, depression scores were significantly greater in the HCF group (9.95 ± 2.67) compared to the LCF

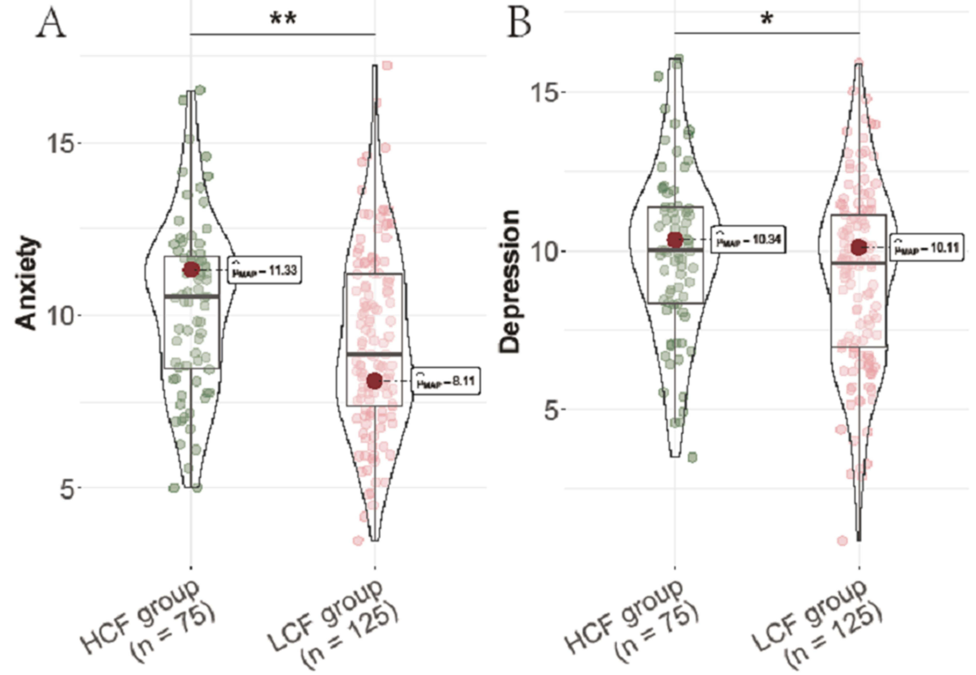

Figure 3 Comparison of Hads score between two groups. (**A**) Anxiety; (**B**) Depression. **P* < 0.05; ***P* < 0.01.
Abbreviation: HADS, Hospital Anxiety and Depression Scale.

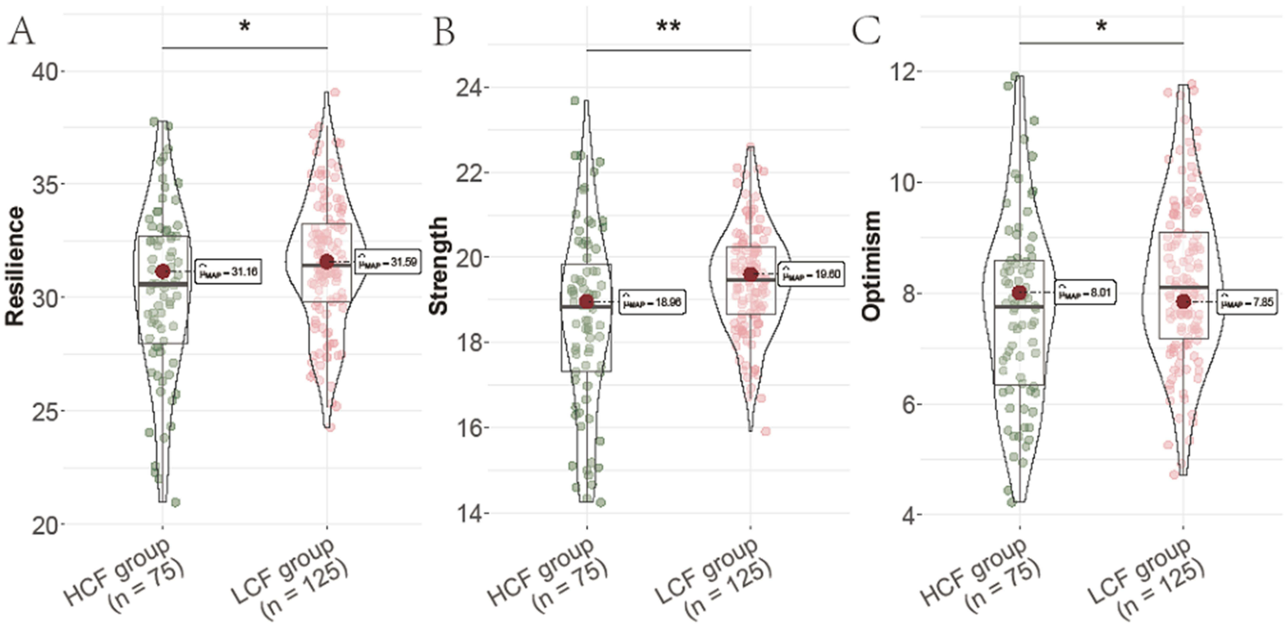

Figure 4 Comparison of CD-RISC score between two groups. (**A**) Resilience; (**B**) Strength; (**C**) Optimism. *P < 0.05; **P < 0.01.
Abbreviation: CD-RISC, Connor-Davidson Resilience Scale.

group (9.12 ± 2.87) (*P* = 0.045). These results suggest that higher levels of caregiver compassion fatigue were associated with increased anxiety and depression among elderly COPD patients.

The LCF group demonstrated higher overall resilience (31.54 ± 2.9) compared to the HCF group (30.26 ± 3.71), with a P value of 0.012 (Figure 4). Additionally, significant differences were observed in the strength component, where the LCF group scored higher (19.45 ± 1.26) than the HCF group (18.55 ± 2.14, *P* = 0.001), and in optimism (8.21 ± 1.48 vs 7.67 ± 1.69, *P* = 0.019). These findings suggest that elderly COPD patients with caregivers experiencing lower levels of compassion fatigue exhibit greater resilience, strength, and optimism.

The HCF group exhibited a higher proportion of participants categorizing themselves as "very dissatisfied" with life (20%) compared to the LCF group (7.2%), and this distribution was statistically significant (χ^2 = 19.615, *P* = 0.003) (Table 4). Additionally, higher percentages were observed in the HCF group for "dissatisfied" (18.67%) and "slightly dissatisfied" (36%) compared to the LCF group at 12.8% and 25.6%, respectively. Meanwhile, individuals in the LCF group more frequently reported positive satisfaction levels, with higher percentages in the "neutral", "slightly satisfied", "satisfied", and "very satisfied" categories compared to the HCF group. These results suggest that lower levels of caregiver compassion fatigue were associated with higher life satisfaction among elderly COPD patients.

Table 4 Comparison of SWLS Score Between Two Groups

Parameters	LCF Group (n = 125)	HCF Group (n = 75)	χ^2	P
Very dissatisfied	9 (7.2%)	15 (20%)	19.615	0.003
Dissatisfied	16 (12.8%)	14 (18.67%)		
Slightly dissatisfied	32 (25.6%)	27 (36%)		
Neutral	22 (17.6%)	9 (12%)		
Slightly satisfied	31 (24.8%)	7 (9.33%)		
Satisfied	7 (5.6%)	2 (2.67%)		
Very satisfied	8 (6.4%)	1 (1.33%)		

Discussion

The findings from our study highlight the intricate relationship between social isolation in elderly patients with COPD and the compassion fatigue experienced by their caregivers.

Firstly, we observed a notable distinction in social isolation between patients with GP and those with PP. The higher GAS scores in the PP group underscore the profound sense of isolation these patients experience. ProQOL evaluation showed that the sympathy satisfaction of nurses in PP group (23.87±7.66) was higher than that in GP group (21.06±7.78) ($P = 0.011$), and the sympathy fatigue score in PP group (23.44±6.49) was significantly higher than that in GP group (20.98±6.15) ($P = 0.007$). This finding aligns with the broader literature suggesting that social isolation can exacerbate chronic illness trajectories. According to a survey of 686 EMS personnel by Renkiewicz et al[24] 48% (330) suffered from Compassion fatigue (CF). ProQOL assessed the relationship between CF and psychosocial factors, and found that patients with CF scored 10 points higher on the ProQOL CF scale than patients without CF (27.1[±4.34] vs 17.04[±2.9]), and more than one-third of them (n = 109[33.1%]) had considered suicide. ProQOL can reflect more accurately the situation of compassion fatigue of medical staff. The possible explanations for elevated social alienation include reduced social interactions and support networks, particularly given the debilitating nature of COPD which often limits patient mobility and social activity.[24] The reduced capacity for participation in social activities could result from physical symptoms such as dyspnea and fatigue, contributing to feelings of alienation and helplessness. Moreover, social isolation may lead to a cyclical deterioration of mental health, which in turn, adversely affects disease management and rehabilitation efforts.[25]

However, for people with COPD, Support from friends, family, and significant others can be vital in mitigating feelings of isolation and may help buffer stress, foster a positive self-image, and support adherence to medical advice, thereby improving health outcomes.[26] Our study showed that the total score of MSPSS in GP group (56.13±6.56) was significantly higher than that in PP group (54.14±7.24), and the score of GP group in friend subscale and family subscale was significantly higher than that in PP group. The differential perception of support between the two groups might also be attributed to variations in personal, relational, and environmental factors that affect individuals' ability to seek and maintain supportive interactions.[27] MSPSS is a good measure of social support for patients and their caregivers. Iovino et al[28] evaluated the psychometric characteristics of MSPSS in patients with stoma and informal caregivers, and conducted confirmatory factor analysis on 775 patients with stoma, and concluded that MSPSS score was negatively correlated with depression and STOMa-related QoL, and positively correlated with perceived correlation, supporting concurrent validity.

The association between caregiver compassion fatigue and COPD patient outcomes further sheds light on the difficult dynamics at play. The mean value of FEV1 in the LCF group was significantly higher than that in the HCF group (1.06± 0.25L vs 0.99± 0.31L, $P < 0.05$). LCF group walked 281.46±68.32 m more than HCF group (257.63±72.55 m) ($p < 0.05$), indicating that the physical condition of LCF group was better than that of HCF group. Caregivers in the poor prognosis cohort reported greater compassion fatigue levels, marked by higher burnout and secondary traumatic stress but also surprisingly, higher compassion satisfaction.[28] This dual nature of caregiver experience suggests a complexity in their roles where emotional investment and the inherent stress of caregiving can simultaneously contribute to burnout and fulfillment. The stress experienced by caregivers can detrimentally impact patients through diminished quality of care provision and increased caregiver stress can heighten patient anxiety about their physical dependency.[29]

The mechanism through which caregiver well-being impacts patient outcomes was multifaceted. Caregiver stress and fatigue can lead to insufficient emotional and practical support, affecting patient care quality directly. As observed, higher caregiver compassion fatigue was correlated with lower patient exercise tolerance (as indicated by the 6MWT results), suggesting that caregiver status could influence patients' motivation or ability to engage in physical activity.[30] This might be due to lack of encouragement or shared participation in activities, which can be pivotal for patients with chronic health conditions to maintain physical and mental health.[31] Moreover, the emotional state of caregivers can be mirrored or picked up by patients, often resulting in a diminished capacity for resilience among patients, as evidenced by CD-RISC outcomes. Caregivers with higher compassion fatigue might unwittingly transmit their stress and emotional exhaustion, adversely impacting the patients' own optimism and strength.[32] Our study showed that the anxiety score in HCF group (10.27±2.51) was higher than that in LCF group (9.26±2.64) ($P < 0.05$). The depression score in HCF group (9.95±2.67) was higher than that in LCF group (9.12±2.87) ($P < 0.05$). This dynamic helps explain the elevated anxiety and depression scores observed in patients whose caregivers report higher compassion fatigue levels.[33] These mood disorders further perpetuate social isolation, creating a bidirectional feedback loop where isolation exacerbates depression, reducing the likelihood of seeking social interactions or exercising resilience strategies, thereby enhancing isolation feelings.[34]

Psychological frameworks such as Social Cognitive Theory can provide an explanatory context: caregivers' attitudes and behaviors might model pessimism and hopelessness, which patients may internalize.[35] Consequently, lower resilience and life satisfaction scores could reflect these interrelations, highlighting the critical need for interventions aimed at bolstering caregiver well-being to ameliorate patient psychosocial outcomes.[36] Regarding life satisfaction, the SWLS results demonstrate lower scores among those in the high compassion fatigue (HCF) group.[34] Our results also confirmed that overall resilience in patients with COPD was higher in the LCF group (31.54±2.9) than in the HCF group (30.26±3.71) ($p < 0.05$). The strength score of LCF group (19.45±1.26) was higher than that of HCF group (18.55±2.14,$P < 0.05$), and the optimism score of LCF group (8.21±1.48 vs 7.67 ±1.69,$P < 0.05$) was also significantly different. Life satisfaction was a comprehensive measure that reflects subjective well-being and fulfillment across various life domains, indicating how a person perceives their own life quality.[37] The stress transference model posits that highly stressed caregivers might foster household environments marred by tension, potentially diminishing the sense of achievement and satisfaction perceived by the patient.[38]

Taking into account biobehavioral health theories, prolonged psychosocial stress in caregivers can also affect physiological responses in patients, impacting cardiovascular health, immune function, and overall disease prognosis through neuroendocrine mechanisms such as the HPA axis activation.[39] For COPD patients, stress and anxiety can exacerbate respiratory symptoms, given the established links between psychological stress and respiratory function.[40] Thus, distinguishing interventions that mitigate caregiver burden might not only foster better mental health outcomes but could also translate into improved physiological health markers for patients, enhancing their overall disease management.[41]

This study acknowledges several limitations that warrant consideration. Firstly, the cross-sectional design restricts our ability to infer causality between caregiver compassion fatigue and patient outcomes; longitudinal studies could provide more definitive insights into these relationships over time. Secondly, the reliance on self-reported measures introduces potential biases, including social desirability or recall bias, which might affect the accuracy of the collected data. Additionally, the study sample was drawn from a single institution, potentially limiting the generalizability of the findings to broader populations with diverse healthcare settings or differing socioeconomic or cultural backgrounds. Lastly, our focus on specific psychosocial metrics may overlook other relevant variables—such as economic factors, healthcare access, or social determinants of health—that could influence social isolation and caregiver fatigue, suggesting a necessity for comprehensive studies including these broader determinants.

Conclusion

In conclusion, this study underscores the profound interplay between caregiver emotional health and patient psychosocial outcomes in elderly COPD patients. Addressing caregiver compassion fatigue with targeted interventions could play a vital role in enhancing both caregiver and patient quality of life. Future studies should explore interventions such as caregiver support programs, respite care, and comprehensive psychoeducation to improve caregiver resilience and, consequently, patient outcomes. Recognizing the bidirectional nature of social support and caregiver-patient interactions was crucial in designing holistic care models that effectively address the multifaceted needs of elderly COPD patients and their families.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Statement

The study was approved by the Ethics Committee of West China Hospital of Sichuan University (2024-HX-428).

Consent for Publication

All authors have agreed to publish. All authors have read and approved the final work.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

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