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The impact of caregiver burden and associated factors on trait anger levels and anger expression styles in family caregivers of palliative care patients

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Abstract

Objectives. This study aimed to examine the impact of perceived caregiver burden and associated factors on the anger levels and anger expression styles of family caregivers for patients receiving palliative care at home.

Methods. This cross-sectional and exploratory correlational type study was conducted with 343 family caregivers. Data were collected face-to-face between March and September 2022 using a Caregiver and Care Recipient Information Form, the Burden Interview, and the Trait Anger and Anger Expression Scale.

Results. There was a significant from very weak to weak correlation between the caregiver burden scores and trait anger, anger-in, anger-out, and anger control scores. The caregiver burden increased trait anger, anger-in, and anger-out while decreasing anger control. The caregiver burden, daily caregiving hours, presence of another dependent at home, presence of a separate room for the care recipient, income level, chronic illness of caregiver, duration of caregiving per month, and care recipient gender explained 17.2% of the total variation in anger control scores.

Significance of results. The caregiver burden levels and anger expression styles of family caregivers vary depending on the characteristics of both the caregiver and the care recipient. Family members may experience an increase in perceived caregiver burden, which can lead to elevated levels of trait anger, suppression of anger, and reduced anger control. Healthcare professionals should monitor the family caregivers' caregiver burden and anger levels. Family caregivers should be encouraged and given opportunities to express their feelings and thoughts about caregiving. Strategies aimed at reducing the caregiver burden and coping with feelings of anger should be planned for the family members of patients receiving palliative care at home.

Introduction

Caregiving encompasses all practices performed by the caregiver, while caregiver burden refers to the perception of physical, psychological, social, spiritual, and financial distress resulting from such caregiving responsibilities or demands (Choi and Seo 2019). The burden of care has a broad scope, including caregivers of individuals with physical and mental chronic diseases, those with disabilities, and children, adults, and elderly individuals in need of care. The presence of someone in the family who needs constant care significantly affects the primary caregiver and other family members. Although some studies in the literature emphasize the benefits that family members gain from caregiving (Bangerter et al. 2019; Cheng 2023; Polenick et al. 2019), most studies report that caregiving has numerous negative psychological, social, and physical consequences (Choi and Seo 2019; Del-Pino-Casado et al. 2019; Haley et al. 2020; Perpiñá-Galvañ et al. 2019; Schulz et al. 2020).

Palliative care is a comprehensive approach to care that aims to alleviate the health-related suffering of individuals of all ages facing serious health issues, particularly those nearing the end of life (Radbruch et al. 2020; Worldwide Hospice Palliative Care Alliance 2020). The goal of palliative care is to enhance the quality of life for patients and family caregivers coping with the biopsychosocial and spiritual challenges associated with life-threatening illnesses (Radbruch et al. 2020; World Health Organization 2020). In recent years, the demand for palliative care has increased due to advances in treatment methods, increased life expectancy, and the growing prevalence of chronic diseases (Aslan 2020). It is estimated that more than 56.8 million people require palliative care each year (World Health Organization 2020). Palliative care services are provided in hospitals, primary care facilities, home environments, and hospices (Aslan 2020;

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Kıvanç 2017). Although there has been an increase in palliative care facilities, only approximately 14% of individuals worldwide who require palliative care can access this assistance (Clark et al. 2020; World Health Organization 2020). The inability of institutions to meet the demand for palliative care has led to a shift in the provision of care services from healthcare institutions to home-based palliative care. This situation has necessitated family members to assume caring responsibilities and the role of a caregiver. While family members play a crucial role as the primary source of support for people in need of palliative care (Karabulutlu et al. 2022; Schulz et al. 2020), taking on this role can put a strain on the caring family members (Ahmad Zubaidi et al. 2020; Karabulutlu et al. 2022; Veloso and Tripodoro 2016).

Caregivers often prioritize the family member's problems under their care and become almost "invisible" to the healthcare system. However, changes in their daily lives and inadequacies in coping with the changes and symptoms experienced by the patient can lead to intense stress for caregivers (Veloso and Tripodoro 2016). Elevated levels of life stressors can lead to increased anger levels, anger suppression, and decreased anger control (Jun and Lee 2017; Yamaguchi et al. 2017). Caregiving can elicit anger in caregivers, as it is a stressful task (Calderón and Tennstedt 2021; Wang et al. 2021).

In the literature, the emotion of anger is commonly evaluated as state, trait, and anger expression. Anger expression styles are handled in three dimensions: anger-in, anger-out, and anger control. Anger-out refers to how much the individual expresses his/her anger, anger-in refers to how much the individual suppresses his/her anger and keeps it, and anger control refers to the extent to which the person controls his/her anger expression. While state anger is defined as an emotional state that reflects the intensity of anger experienced when goal-directed behavior is prevented or an injustice is perceived, trait anger is a concept that reflects how frequently state anger is experienced (Özer 1994; Spielberger 2010; Spielberger et al. 1983). Spielberger et al. (1983) suggest that individuals with high levels of trait anger tend to experience the same environmental anger triggers with more intense state anger than individuals with low levels of trait anger. However, individuals with high levels of trait anger do not always get angry. It has been reported that when conflict, disappointment, and provocation are low, there is no difference between the anger experienced by high and low-anger individuals, and as stress increases. In high-stress situations, individuals with high trait anger levels may experience more intense anger (Alcázar-Olán and Deffenbacher 2013).

Persistent, unexpressed, and unmanaged anger can have a negative impact on both the caregiver's health and the quality of care (Levenson 2019; Yamaguchi et al. 2017). Some studies have shown that it is possible to improve trait anger and anger expression styles through interventions (Batmaz et al. 2023; Ciesinski et al. 2022; Fernandez et al. 2018; Yazıcı H and Batmaz 2021). In this regard, it is noteworthy to understand the connection between caregiver burden and anger to develop effective interventions to cope with anger and reduce the burden of care to improve the well-being of both the caregiver and the patient.

Informal caregiving is a complex phenomenon influenced by the interaction of multiple factors (Elayan et al. 2024). According to the stress process model of caregiving, almost every aspect of caregiving and its outcomes is shaped by situations directly related to caregiving and the fundamental characteristics of the caregiver and care recipient, such as age, gender, ethnicity, education, occupational and economic status, physical health issues, the relationship between the caregiver and the care recipient, duration of caregiving activities, and social support (Pearlin et al. 1990). For instance, the care recipient's low functional status, the poor health of the caregiver, and socioeconomic disadvantages can increase the caregiver burden (Wong et al. 2024). The duration of caregiving activities indicates the chronic nature of stressors experienced by the caregiver (Pearlin et al. 1990). Moreover, the literature highlights that gender and societal norms disproportionately affect caregiver burdens, particularly for women, emphasizing the importance of providing support to female caregivers to alleviate their caregiver burden (Comer et al. 2024).

Given the complex structure of informal caregiving, any effort to understand this experience must consider the diverse factors contributing to its formation (Elayan et al. 2024). Investigating the potential impacts on caregiving experiences can enhance understanding of the multifaceted nature of these experiences, support the development of caregiving services and policies, and offer insights for future research involving informal caregivers. This study aimed to examine the impact of perceived caregiver burden and associated factors on the anger levels and anger expression styles of family caregivers of patients receiving palliative care at home.

Research questions

1. Are there significant differences in family caregivers' perceived caregiver burden levels based on their characteristics and the care recipient?
2. Are there significant differences in family caregivers' anger levels and anger expression styles based on their characteristics and the care recipient?
3. Does the perceived caregiver burden of family caregivers and associated factors have an impact on their anger levels and anger expression styles?

Methods

Design and participants

The research was conducted as a cross-sectional and exploratory correlational study. A power analysis was performed to determine the sample size, and the correlation coefficient for the variable of anger-in, one of the main dependent variables of the study was taken as $r = 0.18$ (Çatıker et al. 2023). Based on this value, a sample size of 343 individuals was selected, ensuring a confidence interval of 95%, a margin of error of 5%, a 0.17 effect size, and a 90% representation of the population. Using convenience sampling, 343 primary family caregivers voluntarily agreed to participate were included in the study. The inclusion criteria were being 18 years or older, having no hearing, vision, speech, or comprehension problems, and being a primary family caregiver of a patient receiving palliative care for at least 6 months. Secondary caregivers, minors, and those involved in patient care for less than 6 months were excluded.

Data collection procedures

The researchers collected data face-to-face between March and September 2022 with the Caregiver and Care Recipient Information Form, Burden Interview, and the Trait Anger and Anger Expression Scale. The study data were collected through self-report from primary family caregivers of home-based palliative care patients registered at Kütahya Health Sciences University hospital during home visits. Family caregivers responsible for the patient's care were invited to participate in the study during these visits. Individuals who expressed interest in participating and met the inclusion criteria were provided with a clear explanation of the study's purpose, duration, and procedures. Informed consent was obtained from participants prior to administering the data collection form. Participants who signed the consent form were given the questionnaires and asked to complete them. Only the illiterate participants were assisted in reading the items on the measurement tools by the same researcher, and their answers were marked. A family caregiver responsible for the primary care was recruited for each patient. The study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology guidelines (Von Elm et al. 2014).

Instruments and measures

The Caregiver and Care Recipient Information Form: This form was developed by the researchers on the literature (Karabulutlu et al. 2022; Yıldırım et al. 2018; Yıldız and Ekinci 2017) and consisted of 22 questions. The questions were about the characteristics of primary family caregivers (age, gender, place of residence, education level, marital status, childbearing status, employment status, income level, presence of chronic illness, degree of proximity to the care recipient, living in the same household with the care recipient) and the care recipient (age, gender, marital status, ability to meet his/her own excretory needs, presence of social security, having a separate room), and caregiving-related characteristics (receiving support from other family members for caregiving, average patient care time per day, duration of patient care, presence of other dependent at home, influence of other responsibilities).

Burden Interview: This scale, developed by Zarit and Zarit (1990), contains 22 statements. The Turkish validity and reliability of the scale were carried out by İnci and Erdem (2008). This four-point Likert scale yields a score ranging from 0 to 88, with high scores indicating high levels of perceived burden of care. The Cronbach alpha value of the scale was previously reported to be 0.95 (İnci and Erdem 2008). In the current study, the Cronbach alpha value of the scale was determined to be 0.90.

The Trait Anger and Anger Expression Scale: This scale was developed by Spielberger et al. (1983). The Turkish validity and reliability of the scale were carried out by Özer (1994). The scale consists of 34 items. It is based on a Likert-type four-point rating that ranges between almost never (1) and almost always (4). Scoring is carried out separately for trait anger and anger expression. The first 10 items on the scale measure trait anger. The remaining 24 items are related to anger expression style: eight for anger-out, eight for anger-in, and eight for anger control. High scores on trait anger indicate high levels of anger; high scores on anger-in indicate suppressed anger; high scores on anger-out indicate easily expressed anger; and high scores on anger control indicate manageable anger. The Cronbach alpha values for the subscales were reported to be 0.79 for trait anger, 0.62 for anger-in, 0.78 for anger-out, and 0.84 for anger control in the Turkish validity study (Özer 1994) and determined to be 0.84, 0.83, 0.84, and 0.87, respectively, in the current study.

Data analysis

The data were analyzed using the SPSS statistical program version 22.0 and G*Power 3.1 program. The independent-samples t-test, one-way analysis of variance, and post hoc analyses (Tukey and LSD) were used to examine variations in scale scores based on the descriptive characteristics of the participants and care recipients. Hierarchical multiple regression analysis was conducted to identify and explain the relationships between the variables. In this study, the participants' anger scores (trait anger, anger-in, anger-out, anger control) were considered dependent variables. In contrast, the caregiver burden scores and descriptive characteristics of the participants and care recipients were considered independent variables (Table 3). Multiple regression analysis enables the development of a mathematical equation to predict the dependent variable values based on the independent (predictor) variables. For multiple regression analysis, it is expected to meet the assumptions of multivariate normal distribution and multicollinearity (Bursal 2019). These assumptions were tested prior to conducting the regression analysis in this study. The multivariate normality of the variables was examined using Skewness and Kurtosis coefficients, Mahalanobis distance, and Cook's distance. Skewness and Kurtosis values are expected to fall from -2 to $+2$ (George and Mallery 2018). For five predictor variables, the Mahalanobis distance should not exceed 25, and Cook's distance should not exceed 1 (Bursal 2019). In this study, the skewness values ranged from 0.03 to 1.03, and the kurtosis values ranged from -0.59 to 1.48, indicating that multivariate normal distribution was achieved. The highest Mahalanobis distance was 20.18, and the highest Cook's distance was 0.21, confirming multivariate normality. Multicollinearity among the variables was assessed using correlation coefficients and the Durbin–Watson (DW) statistic. Correlation coefficients should be less than 0.75 for acceptable multicollinearity, and the DW statistic should be between 1 and 3 (Albayrak 2005; Bursal 2019). In this study, correlation coefficients ranged from -0.229 to 0.607 (<0.75), and the highest DW statistic was 2.11, indicating no multicollinearity among the variables.

Results

The mean age of the participating family caregivers was 54.59 ± 11.78 years, while that of the care recipients was 71.92 ± 15.72 years. A majority of the family caregivers were female (72.0%), residing in the province (82.2%), married (88.6%), primary school graduates (44.6%), had children (91.8%), had a moderate level of income (63.8%), were unemployed (82.2%), and did not have a chronic illness (67.3%). Analysis of caregiving-related characteristics revealed that the majority of participants caring for their parents (48.7%), cohabitated with the care recipient (75.5%), experienced a partial impact on their other responsibilities due to caregiving (58.3%), and received partial caregiving support from other family members (71.4%). Concerning the care recipients, the majority were female (55.4%), married (62.1%), had social insurance coverage (85.7%), had a separate room (76.1%), and were able to meet his/her own excretory needs (58.3%). Furthermore, 39.7% of family caregivers dedicated one to six hours per day to caregiving, 19.5% had another dependent at home, and 72.6% had been giving care for seven to 12 months.

Of the caregivers who participated in the study, female participants, those who were unemployed, those with lower levels of income, those who had been giving care for more than 24 months, those living with the care recipient, and those who did not have a separate room had significantly higher levels of caregiver burden ($p < 0.05$). The caregivers' trait anger scores showed statistically significant differences according to their level of education, the care recipient's social security coverage, income level, level of support from other family members, and duration of caregiving

Table 1. Comparison of scale scores according to descriptive characteristics ($n = 343$)

Descriptive characteristics	*n*	Caregiver burden	Trait anger	Anger-in	Anger-out	Anger control
Gender		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Male	96	34.06 ± 14.05	17.53 ± 5.48	14.97 ± 4.02	14.38 ± 3.72	20.36 ± 5.92
Female	247	38.21 ± 14.33	17.22 ± 5.54	15.44 ± 3.71	14.00 ± 3.61	19.81 ± 5.82
t		−2.424	0.464	−1.029	0.879	0.777
p		**0.016***	0.643	0.304	0.380	0.438
Education level		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Illiterate	28	43.17 ± 14.94	19.78 ± 7.16^{1}	15.67 ± 4.01	15.25 ± 4.91	19.82 ± 6.17
Literate*	26	39.61 ± 11.25	19.57 ± 5.20^{2}	15.65 ± 4.68	15.19 ± 3.75	17.61 ± 5.62
Primary school	153	37.60 ± 14.45	16.62 ± 5.24^{3}	14.98 ± 3.74	13.69 ± 3.44	20.05 ± 5.94
Middle school	39	34.84 ± 15.66	18.10 ± 5.27^{4}	16.12 ± 3.69	14.02 ± 3.43	21.23 ± 5.69
High school	64	35.53 ± 14.04	17.03 ± 5.80^{5}	15.39 ± 3.77	14.31 ± 3.67	20.15 ± 5.80
Bachelor’s degree	33	32.87 ± 13.27	16.18 ± 4.14^{6}	15.18 ± 3.37	13.90 ± 3.22	19.69 ± 5.40
F		2.151	3.029	0.688	1.481	1.248
p		0.059	**0.011***	0.633	0.195	0.286
Post hoc			1 > 3,5,6;2 > 3,5,6			
Social security of the care recipient		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Absent	49	39.20 ± 14.21	18.91 ± 4.71	15.26 ± 3.49	14.16 ± 3.29	19.10 ± 5.47
Present	294	36.69 ± 14.37	17.04 ± 5.60	15.32 ± 3.85	14.09 ± 3.70	20.11 ± 5.90
t		1.132	2.218	−0.104	0.115	−1.124
p		0.258	**0.027***	0.917	0.909	0.262
Employment status		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Unemployed	284	37.74 ± 14.06	17.41 ± 5.53	15.15 ± 3.78	14.03 ± 3.59	19.75 ± 5.87
Employed	59	33.72 ± 15.39	16.78 ± 5.48	16.11 ± 3.82	14.44 ± 3.90	21.00 ± 5.65
t		1.964	0.809	−1.784	−0.770	−1.488
p		**0.050***	0.419	0.075	0.442	0.138
Living in the same household with the care recipient		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
No	84	34.10 ± 14.73	16.86 ± 5.64	14.79 ± 3.48	13.77 ± 3.39	19.89 ± 5.38
Yes	259	38.01 ± 14.13	17.45 ± 5.48	15.48 ± 3.89	14.21 ± 3.72	19.99 ± 6.00
t		−2.177	−0.841	−1.446	−0.967	−0.140
p		**0.030***	0.401	0.149	0.312	0.888
Presence of a separate room for the care recipient		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
No	82	42.06 ± 13.12	17.52 ± 5.14	15.19 ± 3.62	14.25 ± 3.81	18.84 ± 5.79
Yes	261	35.48 ± 14.39	17.24 ± 5.64	15.35 ± 3.86	14.06 ± 3.59	20.32 ± 5.83
t		3.685	0.405	−0.335	0.422	−2.014
p		**0.000*****	0.686	0.738	0.674	**0.045***
Presence of other dependent at home		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
No	276	37.63 ± 14.30	17.29 ± 5.41	15.39 ± 3.85	14.03 ± 3.55	19.60 ± 5.80
Yes	67	34.68 ± 14.44	17.37 ± 5.97	15.00 ± 3.57	14.41 ± 4.01	21.46 ± 5.82
t		1.508	−0.106	0.762	−0.776	−2.343
p		0.132	0.916	0.446	0.438	**0.020***
Chronic illness		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Absent	231	36.39 ± 13.93	17.33 ± 5.12	15.22 ± 3.66	14.05 ± 3.20	19.53 ± 5.65

(*Continued*)

Table 1. (*Continued.*)

Descriptive characteristics	*n*	Caregiver burden	Trait anger	Anger-in	Anger-out	Anger control
Present	112	38.42 ± 15.17	17.25 ± 6.27	15.50 ± 4.07	14.21 ± 4.43	20.86 ± 6.15
t		−1.226	0.117	−0.618	−0.376	−1.982
p		0.221	0.907	0.537	0.737	**0.048***
Income level		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Low	112	39.95 ± 13.37^{1}	18.58 ± 6.05^{1}	16.18 ± 4.10^{1}	14.73 ± 4.15	19.87 ± 5.64^{1}
Middle	219	35.42 ± 14.81^{2}	16.61 ± 5.13^{2}	14.93 ± 3.58^{2}	13.83 ± 3.36	20.27 ± 5.92^{2}
High	12	39.75 ± 10.56	18.16 ± 5.25	14.25 ± 3.51	13.25 ± 2.80	15.33 ± 4.59^{3}
F		3.976	4.978	4.633	2.611	4.157
p		**0.020***	**0.007****	**0.010****	0.075	**0.016***
Post hoc		1 > 2	1 > 2	1 > 2		1,2 > 3
Influence of other responsibilities		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
No	91	31.44 ± 13.69^{1}	16.72 ± 5.51	14.63 ± 4.11	13.58 ± 3.76	20.22 ± 6.78
Partially	200	37.39 ± 13.47^{2}	17.61 ± 5.61	15.60 ± 3.85	14.30 ± 3.60	19.90 ± 5.42
Yes	52	45.57 ± 14.59^{3}	17.15 ± 5.15	15.40 ± 2.80	14.28 ± 3.57	19.78 ± 5.76
F		17.757	0.836	2.055	1.290	0.120
p		**0.000*****	0.434	0.130	0.277	0.887
Post hoc		2 > 1;3 > 1,2				
Receiving support from other family members		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Partially	245	36.13 ± 13.56	16.75 ± 4.73	15.13 ± 3.36	13.97 ± 3.29	19.92 ± 5.82
No	98	39.36 ± 16.02	18.70 ± 6.94	15.77 ± 4.70	14.43 ± 4.39	20.08 ± 5.94
t		−1.893	−2.995	−1.413	−1.064	−0.222
p		0.059	**0.012***	0.221	0.348	0.825
Average patient care time per day		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
1–6 hours	136	35.78 ± 13.98	17.61 ± 5.15	15.45 ± 3.76	14.53 ± 3.71	18.47 ± 5.46^{1}
7–12 hours	31	37.54 ± 15.19	17.01 ± 5.84	14.87 ± 3.60	14.16 ± 3.48	19.34 ± 5.58^{2}
13–18 hours	33	36.81 ± 14.89	17.24 ± 5.31	15.54 ± 3.08	14.03 ± 2.97	21.93 ± 5.70^{3}
19–24 hours	83	38.68 ± 13.86	17.15 ± 5.86	15.48 ± 4.30	13.37 ± 3.87	22.33 ± 5.92^{4}
F		0.748	0.251	0.553	1.775	9.816
p		0.524	0.860	0.647	0.152	**0.000*****
Post hoc						3,4 > 1,2
Duration of patient care		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
7–12 months	249	35.29 ± 14.03^{1}	17.24 ± 5.32^{1}	15.08 ± 3.71	13.92 ± 3.45^{1}	19.48 ± 5.64^{1}
13–24 months	26	40.57 ± 16.30^{2}	20.80 ± 7.18^{2}	16.69 ± 5.07	16.34 ± 4.92^{2}	18.42 ± 5.62^{2}
Over 24 months	68	42.14 ± 13.46^{3}	16.19 ± 5.02^{3}	15.64 ± 3.44	13.91 ± 3.52^{3}	22.33 ± 6.10^{3}
F		5.017	4.605	1.929	3.652	5.842
p		**0.001****	**0.001****	0.088	**0.005****	**0.001****
Post hoc		3 > 1	2 > 1,3		2 > 1,3	3 > 1,2
Gender of the care recipient		Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
Male	153	34.69 ± 13.73	16.98 ± 5.32	15.36 ± 4.12	14.00 ± 3.81	21.03 ± 5.99
Female	190	38.95 ± 14.60	17.57 ± 5.67	15.28 ± 3.52	14.19 ± 3.51	19.11 ± 5.59
t		−2.761	−0.990	0.182	−0.462	3.054
p		**0.006****	0.323	0.856	0.645	**0.002****

$^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$; *F*: analysis of variance test; *t*: independent-samples *t*-test; post hoc: Tukey and LSD; Sd: Standard deviation; *Caregivers who were literate could read and write but had not completed any formal education.

1,2,3,4,5,6: The numbers were used to show which groups were responsible for the difference between the groups.

Table 2. Correlations between anger scores and caregiver burden ($n = 343$)

Scales	Mean	Sd	1	2	3	4	5
1. Trait anger	17.30	5.51	–				
2. Anger-in	15.31	3.80	0.483**	–			
3. Anger-out	14.10	3.64	0.607**	0.584**	–		
4. Anger control	19.97	5.84	−0.229**	0.169**	−0.195**	–	
5. Caregiver burden	37.05	14.35	0.296**	0.260**	0.249**	−0.183*	–

*$p < 0.05$; **$p < 0.01$; Pearson correlation analysis; Sd=Standard deviation.

($p < 0.05$). Participants with lower income levels had significantly higher anger-in scores ($p < 0.05$). In addition, the participants' anger control scores showed significant differences based on the presence of a separate room for the care recipient, the presence of chronic illness, income level, duration of caregiving, and the gender of the care recipient ($p < 0.05$) (Table 1).

It was determined that as the caregiver burden scores of the participants increased, their trait anger, anger-in, and anger-out scores increased, while their anger control scores decreased ($p < 0.01$) (Table 2).

Four models were developed to determine the impact of caregiver and care recipient characteristics and caregiver burden on trait anger and expression styles. A hierarchical multiple regression analysis was performed. Before the regression analysis, the relationships between the descriptive characteristics and trait anger and anger expression styles were examined. Variables with significant relationships were included in the regression models. Categorical variables were converted into dummy variables, and the reference groups are presented in Table 3. All models were conducted in two steps. In the first step, descriptive characteristics associated with the dependent variables were included in the models. The primary independent variable, caregiver burden, was added to the models in the second step.

In Model 1, the first step included variables associated with trait anger, including education level, social security, income level, support from other family members, and caregiving duration. These descriptive characteristics explained 9.1% of the variance in trait anger ($F = 6.733$; $p < 0.001$; $R^2 = 0.091$). When caregiver burden was added in the second step, it accounted for an additional 6% of the variance, increasing the explained variance in trait anger to 15.1% ($F = 9.949$; $p < 0.001$; R^2 change $= 0.060$; $R^2 = 0.151$). In Model 2, the first step included the income level, which was associated with anger-in, in the model. Income level explained 2.5% of the variance in anger-in ($F = 8.909$; $p < 0.001$; $R^2 = 0.025$). When caregiver burden was added in the second step, it explained an additional 5.8% of the variance, increasing the explained variance in anger-in to 8.3% ($F = 15.387$; $p < 0.001$; R^2 change $= 0.058$; $R^2 = 0.083$). In Model 3, the first step included caregiving duration associated with anger-out. Caregiving duration explained 3.1% of the variance in anger-out ($F = 10.918$; $p < 0.001$; $R^2 = 0.031$). When caregiver burden was added in the second step, it explained an additional 5.6% of the variance, increasing the explained variance in anger-out to 8.7% ($F = 16.265$; $p < 0.001$; R^2 change $= 0.056$; $R^2 = 0.087$). In Model 4, variables associated with anger control, including the presence of a separate room for the care recipient, additional caregiving responsibilities, presence of chronic illness, income level, daily caregiving hours, caregiving duration, and the gender of the care recipient, were included in the first step. These descriptive characteristics explained 14.3% of the variance in anger control ($F = 8.007$; $p < 0.001$; $R^2 = 0.143$). When caregiver burden was added in the second step, it accounted for an additional 2.9% of the variance, increasing the explained variance in anger control to 17.2% ($F = 8.691$; $p < 0.001$; R^2 change $= 0.029$; $R^2 = 0.172$) (Table 3).

Discussion

According to the results, among the caregivers who participated in the study, women, those who were not employed, those with a lower income, those who lived with the care recipient, those who had been giving care for more than 24 months, those who did not have a separate room for the care recipient, and those caring for female care recipients experienced significantly higher levels of caregiver burden. Consistent with our research findings, other studies in the literature have shown that being female (Eğici et al. 2019; Karabulutlu et al. 2022; Yıldız and Ekinci 2017), being married (Eğici et al. 2019; Yıldız and Ekinci 2017), having a lower income (Karabulutlu et al. 2022; Karakurt et al. 2020), living with the patient (Yıldırım et al. 2018), giving care for more than 24 months (Karabulutlu et al. 2022), and being unemployed (Bulut et al. 2023; Karabulutlu et al. 2022; Yıldırım et al. 2018) are factors that increase caregiver burden levels. However, some studies have reported that male caregivers (Ahmad Zubaidi et al. 2020; Bulut et al. 2023; Karakurt et al. 2020), those with higher incomes (Yıldırım et al. 2018), those who do not live with the patient (Karabulutlu et al. 2022), and those with less than 6 months of caregiving experience (Karakurt et al. 2020) perceive higher caregiver burden. The literature suggests that perceived caregiver burden varies according to caregiver and patient characteristics. The caregiver burden in end-of-life care is a complex situation influenced by caregiving tasks and various socio-political and cultural factors (Veloso and Tripodoro 2016). The differences found in our research compared to other studies may be due to the complex nature of caregiver burden, care recipient characteristics, and individual and cultural differences among caregivers. In addition, the high caregiver burden in female participants may have been because society has placed the responsibility of care on women. Therefore, other family members do not provide enough support to the primary caregiver. Moreover, the inability to access financial help and to have enough physical space for individual relaxation may have caused the care burden to be perceived as excessive among unemployed caregivers, had a low income level, lived in the same house with the care recipient, and did not have a room of their own. During home visits, healthcare professionals should identify high-risk groups (women, unemployed individuals, those with low income, long-term caregivers, those without personal space, and those caring for female patients) and develop interventions to reduce caregiver burden.

Table 3. Hierarchical multiple regression models for trait anger and anger expression styles ($n = 343$)

			First step						Second step					
Regression models	Dependent variables	Independent variables	B_1	B_2	SE	95% CI [Lower/Upper bound]	t	p	B_1	B_2	SE	95% CI [Lower/Upper bound]	t	p
Model–1	Trait anger	Education level (Illiterate)	1.913	0.095	1.083	−0.218/4.044	1.766	0.078	1.435	0.071	1.053	−0.636/3.507	1.363	0.174
		Social security of the care recipient (Absent)	1.336	0.085	0.828	−0.292/2.965	1.614	0.107	1.204	0.076	0.802	−0.373/2.782	1.502	0.134
		Income level (Low)	1.137	0.097	0.636	0.114/2.388	1.788	0.075	0.843	0.072	0.618	−0.373/2. 060	1.364	0.174
		Receiving support from other family members (No)	1.519	**0.125**	**0.648**	**0.245/2.793**	**2.345**	**0.020***	1.304	0.107	0.628	0.068/2.540	2.075	0.039
		Duration of patient care (13–24 months)	**3.720**	**0.179**	**1.088**	**1.581/5.859**	**3.421**	**0.001****	3.372	0.162	1.055	1.297/5.447	3.196	0.002
		Caregiver burden							**0.096**	**0.250**	**0.020**	**0.057/0.135**	**4.874**	**0.000*****
Model values [DW = 1.853]			$F = 6.733$; $R^2 = 0.091$; $p =$ **0.000*****						$F = 9.949$; R^2 change = 0.060; $R^2 = 0.151$; $p =$ **0.000*****					
Model–2	Anger-in	Income level (Low)	**1.291**	**0.160**	**0.433**	**0.440/2.142**	**2.985**	**0.003****	1.015	0.125	0.425	0.180/1.850	2.391	0.017
		Caregiver burden							**0.064**	**0.242**	**0.014**	**0.037/0.091**	**4.619**	**0.000*****
Model values [DW = 2.119]			$F = 8.909$; $R^2 = 0.025$; $p =$ **0.000*****						$F = 15.387$; R^2 change = 0.058; $R^2 = 0.083$; $p =$ **0.000*****					
Model–3	Anger-out	Duration of patient care (13 –24 months)	**2.422**	**0.176**	**0.733**	**0.980/3.864**	**3.304**	**0.001****	2.192	0.159	0.714	0.787/3.597	3.069	0.002
		Caregiver burden							**0.060**	**0.238**	**0.013**	**0.034/0.086**	**4.580**	**0.000*****
Model values [DW = 2.008]			$F = 10.918$; $R^2 = 0.031$; $p =$ **0.000*****						$F = 16.265$; R^2 change = 0.056; $R^2 = 0.087$; $p =$ **0.000*****					
Model–4	Anger control	Presence of a separate room for the care recipient (Yes)	**1.724**	**0.126**	**0.696**	**0.355/3.093**	**2.476**	**0.014***	1.274	0.093	0.698	−0.099/2 647	1.826	0.069
		Presence of other dependent at home (Yes)	**1.974**	**0.134**	**0.752**	**0.494/3.454**	**2.624**	**0.009****	1.762	0.120	0.743	0.300 /3.223	2.371	0.018
		Chronic illness (Present)	0.577	0.046	0.661	−0.723/1.877	0.873	0.383	0.626	0.050	0.651	−0.655 /1.906	0.961	0.337
		Income level (High)	**−3.719**	**−0.117**	**1.628**	**−6.922/−0.516**	**−2.284**	**0.023***	−3.433	−0.108	1.605	−6.590 /−0.276	−2.139	0.033
		patient care time per day (19–24 hours)	**2.206**	**0.162**	**0.756**	**0.720/3.692**	**2.920**	**0.004****	2.260	0.166	0.744	0.797/3.723	3.038	0.003
		Duration of patient care (Over 24 months	**2.181**	**0.149**	**0.608**	**0.638/3.724**	**2.780**	**0.006****	2.591	0.177	0.782	1.053/4.128	3.315	0.023
		Gender of the care recipient (Male)	**1.664**	**0.142**	**0.785**	**0.469/2.859**	**2.739**	**0.006****	1.379	0.117	0.604	0.191/2.567	2.284	0.001
		Caregiver burden							**−0.073**	**−0.179**	**0.021**	**−0.115/−0.031**	**−3.419**	**0.001****
Model values [DW = 1.837]			$F = 8.007$; $R^2 = 0.143$; $p =$ **0.000*****						$F = 8.691$; R^2 change = 0.029; $R^2 = 0.172$; $p =$ **0.000*****					

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; β_1 = Unstandardized beta coefficient; β_2 = Standardized beta coefficient; SE = Standard error; R^2 = Coefficient of determination; CI = Confidence interval; DW = Durbin–Watson value.

In our study, participants with lower education and income levels, those who did not receive support from other family members, those who had been giving care for more than 24 months, and those who cared for individuals without social security had significantly higher trait anger scores. The duration of caregiving activities indicates the chronic nature of stressors experienced by caregivers (Pearlin et al. 1990). As stress levels increase, individuals with high-trait anger may experience more intense anger, especially in high-stress situations (Alcázar-Olán and Deffenbacher 2013). Healthcare professionals could benefit from teaching effective stress management techniques to family caregivers who have been caregiving for extended periods to help them cope with anger. Additionally, caregivers who lack support from other family members, provide care for patients without social security or have low income and educational levels should be offered guidance on available services and ways to share caregiving responsibilities. In our study, participants who cared for individuals in a separate room provided care for long hours or extended periods or cared for male patients had significantly higher anger control scores. Healthcare professionals can provide guidance on time management and organizing the living environment for family caregivers of home-based palliative care patients. Furthermore, it is recommended to focus on anger control strategies and plan educational programs, particularly during the initial stages of caregiving responsibilities and for those caring for female patients.

Our study found that the participants' increased perceived caregiver burden levels increased their trait anger, anger-in, and anger-out scores and decreased their anger control scores. Similarly, in a study by Çatıker et al. (2023), caregiver burden was reported to increase trait anger, anger-in, and anger-out levels while decreasing anger control levels among those caring for palliative care patients. In another study examining the relationship between caregiver burden and anger expression styles among caregivers of psychiatric patients, caregiver burden was found to have a positive relationship with trait anger, anger-in, and anger-out and a negative relationship with anger control (Yıldırım et al. 2018). In a study by Wang et al. (2021), 66% of caregivers reported experiencing moderate-to-high levels of anger in their caregiving situations. In another study conducted with family caregivers of cancer patients, positive associations were found between caregiver burden and trait anger, anger-in, and anger-out while caregiver burden was negatively correlated with anger control (Yıldız and Ekinci 2017). Calderón and Tennstedt (2021) reported that caregiving was very time-consuming and that caregivers experienced disappointment and anger during difficult caregiving situations. Our research findings are consistent with the results of studies that highlight the relationship between caregiver burden and trait anger, as well as anger expression styles. This process may negatively affect family members involved in the caregiving process. Caregiver burden, illiteracy, low income, lack of support from other family members, caregiving for 13–24 months, and the absence of social security for the care recipient were found to explain 15.1% of the variance in trait anger significantly. Caregiver burden and low-income levels accounted for 8.3% of the variance in anger-in, while caregiver burden and caregiving for 13–24 months explained 8.7% of the variance in anger-out. Furthermore, caregiver burden, the presence of a separate room for the care recipient, additional caregiving responsibilities at home, the caregiver's chronic illness, high-income level, daily caregiving for 19–24 hours, caregiving for over 24 months, and caring for male patients collectively explained 17.2% of the variance in anger control. Based on these findings, healthcare professionals addressing the emotional experiences of caregivers for home-based palliative care patients should consider factors such as low educational and income levels, lack of social security, absence of social support, insufficient living space, and prolonged caregiving as disadvantages. It is essential to support disadvantaged groups, enhance their problem-solving skills, and assist them in accessing resources. Mitigating these disadvantages may enable more effective management of caregiver burden and the resulting anger emotions. Given the detrimental effects of uncontrolled and suppressed anger on an individual's health, our research highlights the need for healthcare professionals to consider the negative emotions experienced by caregivers when providing treatment and care to patients.

Limitations

This study has some limitations. First, participants were recruited based on convenience sampling in one province of XXXX, which may limit the generalizability of the study results. Future studies are still needed to examine the impact of caregiver burden and correlated factors on anger with a more diverse sample. Second, the way some of the questionnaires ($n = 28$) were administered (with the help of the researcher) involved social interaction and was likely to increase social desirability in responses. Further research is warranted to determine whether our results would hold if all participants themselves filled in the questionnaires. The absence of differentiation based on the patients' medical diagnoses is another factor that may have influenced the perceived caregiver burden. Lastly, the exclusion of informal caregivers without a familial connection to the patient represents a limitation in the inclusivity of the study.

Conclusion

Although family members play an important role in caring for palliative care patients, our research suggests that caregiving family members can experience feelings of anger due to the burden of care. It is suggested that over time, family members' caregiver burden and experiences of anger may reduce the quality of care, leading to intra-family conflicts and adverse outcomes such as burnout and deterioration in the physical and mental health of the caregiver. It is recommended that health professionals prioritize the well-being of family caregivers in addition to that of the patient, implement interventions to reduce caregiver burden, screen for negative emotions, such as anger among caregivers, and develop programs to help them manage these emotions. In this regard, nurses, who are one of the healthcare professional groups with the most contact with patients and family caregivers, can plan psychosocial and educational interventions on issues, such as effective communication skills and managing conflict, problem-solving skills, assessing the patient's needs and planning actions appropriate for complications, effective coping strategies with stress, behaviors for maintaining and promoting health, the importance of self-care, participation in support groups, expressing emotions, and anger management strategies. They can also ensure continuity of support to reduce the caregiver burden by providing regular home visits and telephone counseling.

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Ethical approval. This study was conducted according to the principles of the 2013 Declaration of Helsinki (World Medical Association 2013). Prior to commencing the research, approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Kütahya Health Sciences University (date: February 9, 2022, number: 2022/02-03). Permission was also obtained from the institution where the research was conducted. All participants were informed of the objective and scope of the study, and written informed consent was obtained from all participants.

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