Original paper

A model of social support for informal caregivers of patients treated for cancer

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Medical Studies 2026; 42 (1): 101–114
DOI: https://doi.org/10.5114/ms.2026.160606

Key words: social support, theoretical model, cancer patient, informal caregiver.

Abstract

Introduction: Informal caregivers of persons with cancer are often the subject of research. The interest is caused by the recognition of their significant role and participation in the care of patients. Studies have confirmed that, when left alone, caregivers are exposed to burdens, somatic diseases, anxiety, stress, and a lack of support.
Aim of the research: The research goals were to analyse selected factors influencing the multidimensional aspect of social support for informal caregivers of patients treated for cancer in the stationary system and to develop a model of social support.
Material and methods: An original questionnaire was used for the socio-demographic assessment, and standardised questionnaires were adjusted for the issues dealt with in this project: the Berlin Social Support Scales (BSSS), the Rosenberg's Self-Esteem Scale (SES), the Ten-Item Personality Inventory (TIPI), the Positive Orientation Scale (POS), the State Self-Compassion Scale (SSCS), the Social Pain Thermometer (SPT), and the Emotion Thermometer (ET).
Results: Personality structure expressed through extraversion (0.66), agreeableness (0.42), conscientiousness (0.41), emotional stability (0.58), openness to experience (0.30), and attitude (0.72) affect the support (0.52). The level of support received is influenced by the following personality traits: openness, positive thinking, trusting and honest attitude towards other people, perseverance in pursuing goals, internal conviction about the rightness of actions, emotional stability and maturity, openness to life experiences, the ability to positively reevaluate difficult and realistic situations, and adequate self-assessment of one's abilities and resourcefulness.
Conclusions: The research results are used in evidence-based medical practice, which significantly improves the quality of nursing and medical care for patients and their relatives.

Introduction

The role of informal caregivers – often family members – has become increasingly important in cancer care, as they provide ongoing support across different phases of the disease. Recent studies highlight not only their contribution to patients' well-being but also the complex emotional and psychological burden they experience. In this study, we focus on understanding the perception of social support among caregivers by integrating psychological traits, emotional states, and caregiving attitudes within one coherent model. Our goal is to identify which factors most strongly influence how caregivers perceive and receive support, and which of these may be targeted through psychoeducational or psychosocial interventions.

Due to the specificity of the disease and treatment, most informal caregivers are not prepared to perform a caring function [1, 2]. Hence, Lee *et al.* note the need to study the severity of anxiety and depression in the family caregivers of patients with newly diagnosed advanced lung cancer before they started treatment. Caring for another ill family member, younger age, problems with pain, and a lower sense of self-efficacy in coping with symptoms are the main factors in anxiety and depression [3].

Changing the caregiver's status in the health system can be of key importance for patients and their loved ones. Litzelman *et al.* indicate that the involvement of the informal caregivers of cancer patients as part of a care team, continuous screening for risk stratification, and interventions to optimise their health status can improve the health situation of patients [4]. In her qualitative research, Olson argues that informal caregivers of cancer patients manage patient care at home and in hospitals but are not supported in taking on this responsibility. Hence, caregivers should be a much more focal point in cancer care reform strategies. This high dependence on informal caregivers, whose risk of stress, anxiety, and depression is well-documented, suggests that strategic changes should be made to support them [5].

Harrison confirms that informal family caregivers are crucial to providing sustainable cancer care that, on

the one hand, leads to optimal health outcomes in patients and, on the other hand, places psychological burdens on caregivers. She also indicates that the evidence of psychosocial support for caregivers does not currently take into account the impact of their role in providing their loved ones with clinical and health-related care [6].

Although we know that family and friends have a great influence on the functioning of patients during cancer treatment [7, 8], the tasks, psychosocial needs, and health of caregivers are not well understood [9]. Informal care is likely to increase as the number of cancer survivors grows, and care responsibilities may affect the quality of caregivers' lives [10, 11].

The health behaviours of caregivers also play an important role in the recovery process of patients. People who engage in physical activity have higher scores on emotion-focused coping. Litzeman *et al.* note that the health behaviours and coping strategies of informal cancer caregivers are correlated. The correlations suggest directions for future research, including whether simultaneous targeting of both factors may be particularly effective in improving the self-care of informal caregivers [12].

An important issue in the research is the quality of life of the caregiver of a person with cancer. Particular challenges for cancer caregivers are related to the intensity of the disease and treatment, increasing the risk of burden, low quality of life and burnout syndrome [13]. Research has shown that problem-solving interventions and communication skills can reduce the burden of patient care and changing care roles, while improving the overall quality of caregivers' lives. Waldron *et al.* postulate the need for further research to determine the effectiveness of interventions at all stages of caring for cancer patients, particularly focusing on the issues of caregiver maintenance, a caregiver's relationship with a cancer patient, and individual differences in the experiences of caregivers of patients with different types of cancer [14].

Caregivers' well-being has a direct and indirect impact on the quality of cancer care, including care received from a healthcare team, the caregivers themselves, and patient self-care. Supporting caregivers has tangible consequences in assessing the quality of cancer care at multiple levels and direct implications for patient outcomes [15].

Qualitative research, based on individual interviews, shows that the main areas of caregivers' problems include putting aside their own needs, becoming a manager of the disease process, and losing a sense of identity. The status of caregivers' participation in the process of having cancer is emphasised. The characteristics of informal caregivers have been shown to be similar to those of people with co-dependency, which motivates the development of targeted interventions from this perspective [2].

Social support, defined in our work in terms of perception, allows important aspects to be taken into account: the level of support obtained from various sources and the degree of satisfaction that an individual experiences from this support. It is also particularly beneficial in research on its buffering effect on people's mental health. Social support becomes a moderator and has a positive effect on psychological functioning even after a stressor occurs [16].

In a survey about the need for formal psychological support, 19% of caregivers indicated this need, although 54% experienced moderate to high levels of stress. The weak correlation between the caregivers' need for formal support and distress emphasises the need to implement systematic screening tests for both distress and the willingness to obtain formal psychological support in oncology [17].

Caring for loved ones with cancer is a significant burden. Therefore, research is undertaken on caregivers' quality of life and the impact of the patient's age and quality of life on its assessment. Caregivers of older adults with advanced cancer show a better quality of life and fewer mood disorders compared to carers of younger patients. When patients have a good quality of life, caregivers also have a good quality of life [18].

Carers' physical and mental health, financial burden, and social isolation, as well as limited family and social support continue to be important factors contributing to the high level of caregiver burden. Less recognised factors contributing to the greater burden include the caregiver's self-esteem, male gender, and the dynamic nature of cancer treatment [19].

Social support, as a key element in maintaining the well-being of caregivers of cancer patients, involves a variety of resources for delivering care. Caregivers indicated support groups, most often religious (38%) and social clubs (30%). Only one in four caregivers took advantage of formal resources such as counselling (11%) or an oncology support group (6%). There is a correlation between the increased use of social resources by caregivers and the patient's social commitment and the time that has elapsed since the cancer diagnosis [20].

Sklenarova *et al.* found that the need for support has been unmet in a significant percentage of caregivers, mainly in terms of concerns about a patient's condition, receiving information about the disease, and emotional support [21]. The unmet needs of caregivers are strong and consistent predictors of mental ill health [22]. Caregivers' unmet needs should be systematically assessed to target specific solutions [21].

A longitudinal study of the unmet needs of caregivers and the relationship with their quality of life 2 and 5 years after the initial diagnosis of patients showed, irrespective of demographic variables, the common belief of caregivers that caring for a relative with cancer was overwhelming and consistently associated with not meeting their needs in different spheres, simultaneously and prospectively ($B > 2.50$, $p < 0.05$), throughout the entire cancer experience. The cancer care plan should carefully consider the detailed, individualised,

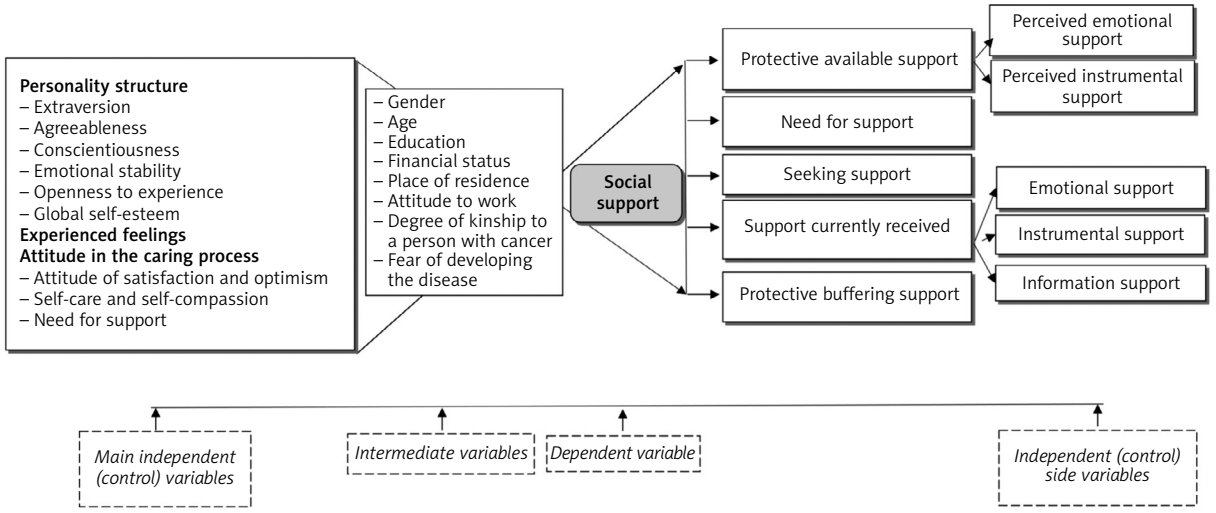

Figure 1. Theoretical model of social support for the surveyed caregivers

and long-term contribution of the unmet needs of caregivers to specific aspects of the quality of life [23]. There is also a need to develop programmes for younger carers who do not have social resources and report greater unmet needs and poorer quality of life.

Previous research, based on the literature on the subject, has also focused on finding a way to combine the system of formal and informal care to obtain higher-quality care at lower costs. Oncology systems need to play a more active role in involving patients and their families as partners in managing treatment and side effects to achieve the best possible treatment outcomes. These must be able to assess patients and caregivers to determine what tasks they will be able to perform and then ensure that they have the training and resources to perform these tasks [24].

Concluding the analysis of the studies carried out, it is noted that their authors recommend that interventions be developed and tested to reduce psychological stress and improve caregivers' quality of life, thus ensuring better quality of patient care [3]. Despite considerable evidence of informal care for people with cancer, further research needs to be conducted to characterise caregivers at high risk of burden, elucidate the correlations between caregiver and patient outcomes, and test innovative and scalable interventions [1].

Aim of the research

The goals of our work were to investigate the factors influencing the multidimensional aspect of social support for informal caregivers of patients treated for cancer in the stationary system and to develop a model of social support.

Material and methods

To achieve the research goals, a series of hypotheses were formulated to examine how personality traits, emotional states, and caregiving attitudes influence the perception, need for, and reception of social support among informal caregivers of cancer patients. This approach integrates psychological and contextual dimensions into a coherent analytical framework. The theoretical model is illustrated in Figure 1 and draws upon interdisciplinary literature, expert consultations, and the authors' extensive clinical and research experience.

Hypothesis 1 (H1): The determinants of perceived available support, consisting of perceived emotional and instrumental support, in the surveyed caregivers are a positive orientation, an altruistic and trusting attitude, and a lack of depressed mood.

Hypothesis 2 (H2): The need for support and the seeking of support by the respondents are influenced by the following: a positive attitude, a lack of experiencing extreme negative emotions, increased self-concern, and a sense of injustice.

Hypothesis 3 (H3): The determinant of the emotional and instrumental support currently received is a positive orientation, manifested in the perception of the positive aspects of life.

Hypothesis 4 (H4): The need for protective buffering support in the surveyed caregivers is influenced by the experience of emotional stability and a subjective sense of loss.

Hypothesis 5 (H5): The overall feeling of support is influenced by the caregiver's attitude towards caring and their personality structure.

The assumptions of the study are presented in Figure 1, which shows the theoretical model of the sense of social support in informal caregivers of patients treated for cancer. This theoretical model was developed based on analysis of the literature on the subject [9, 21, 25–35], discussions with specialists of various medical and care professions, and the authors' many years of experience of working with cancer patients and their relatives.

Table 1. Investigated variables and applied research tools

Variables	Index	Research method
	Main variable	
Social support	Perceived available support (PAS) The need for support (NS) Seeking support (SS) Currently received support (CRS) Protective buffering support (PBS)	Berlin Social Support Scales – BSSS
	Independent (control) side variables	
Types of support	Perceived emotional support (PES) Perceived instrumental support (PIS) Emotional support (EmS) Instrumental support (InsS) Information support (InfS) Satisfaction with support (SwS)	Berlin Social Support Scales – BSSS
	Main independent (control) variables	
Personality structure	Extroversion (E) Agreeableness (A) Conscientiousness © Emotional Stability (ES) Openness To Experience (OE) Global Self-Esteem (GSE)	Ten-Item Personality Inventory –TIPI Rosenberg Self-Esteem Scale – SES
Experienced emotions	Stress Anxiety Depression Injustice Anger Exclusion Loss Positive affect Negative affect	Emotion Thermometer – ET Positive and Negative Affect Schedule – PANAS
Attitude towards a person with cancer in the caring process	Attitude of satisfaction and optimism Self-care and self-compassion The need for support	Positive Orientation Scale – POS State Self-Compassion Scale – SCSS
	Intermediate variables	
	Gender Age Education Financial status Place of residence Attitude to professional work Degree of kinship to a person with cancer Fear of developing the disease	Personal questionnaire

The model assumes that caregivers' sense of social support is influenced by the following main independent control variables:

- personality structure, expressed through extraversion, agreeableness, conscientiousness, emotional stability, openness to experience, and global self-esteem,
- experienced emotions, including experienced social pain (injustice, exclusion, loss), emotional state (stress, anxiety, depression, anger, loss), and affect (positive and negative),
- attitude in the process of caring for a person with cancer, expressed in the state of satisfaction and optimism, self-concern and self-compassion, and the need for support.

In our study, three groups of variables were identified: the dependent variable, the main independent (control) variables, and the independent (control) side variables. The position of individual variables and their hypothetical dependence are illustrated in Table 1.

The study was of cross-sectional nature. The diagnostic survey method and the survey technique were used. The research assumptions were implemented using the authors' questionnaire to assess the socio-demographic situation and standardised research tools:

the Berlin Social Support Scales (BSSS), the Rosenberg's Self-Esteem Scale (SES), the Ten-Item Personality Inventory (TIPI), the Positive Orientation Scale (POS), the State Self-Compassion Scale (SSCS), the Social Pain Thermometer (SPT), and the Emotion Thermometer (ET).

The BSSS determines the cognitive and behavioural dimensions of the social support experienced by the examined person. It consists of five scales: the perceived support, the need for support, seeking support, the support currently received, and protective buffering support. This scale consists of eight items assessed on a four-point Likert scale. The higher the score obtained by a respondent, the higher the level of perceived social support. The Cronbach's α reliability index for this scale is 0.86 [35].

The Rosenberg's SES is a method for measuring global self-esteem that is regarded as a relatively constant feature, not a temporary state. Self-esteem is a positive or negative attitude towards oneself, a kind of global self-assessment. In this view, high self-esteem means the belief that one is a 'good enough' and a worthwhile person. According to Rosenberg, low self-esteem means dissatisfaction with oneself and rejection of oneself. The Cronbach's α coefficients for different age groups range from 0.81 to 0.83 [36].

The TIPI is a short scale made up of 10 items, each consisting of a pair of adjectives. They are selected in such a way as to reflect the possible and various characteristics falling within the scope of a given feature, describe both the negative and positive poles of a given feature, not be descriptions of the extreme intensity of both poles of the feature, not contain negation, and minimise redundancy in terms of feature descriptors. The Cronbach's α reliability indices for the Polish version of the individual subscales are similar to the original indices [37].

The POS is a research tool that examines positive orientation, including self-esteem, life satisfaction, and optimism. The scale consists of eight items, and the answers are given on a five-point scale. The value of the Cronbach's α coefficient ranges from 0.77 to 0.84, depending on the age of the respondents [38].

The SCSS consists of 26 statements and measures five factors: self-kindness, self-judgement, common humanity, isolation, and mindfulness. Responses are given on a five-point scale. The reliability of the scale was 0.8521 [39].

The ET is a tool that consists of five visual-analogue scales (such as those on a thermometer) on which each respondent marks the level of emotions experienced in a specific situation. The respondents assessed their subjective feelings during treatment on the following scales: stress, anxiety, sadness, and the need for support. The higher the score on subsequent thermometers, the greater the intensity of a specific feeling. The ET consists of two factors: ET-1 (stress, anxiety, anger), Cronbach's α – 0.875; and ET-2 (depression, need for support), Cronbach's α – 0.789 [40].

The theoretical research assumptions and empirical study were verified in accordance with the correlation and regression model [41]. The structural equation method and path analysis were used to more fully verify the theoretical model [42].

To describe the characteristics of the group of respondents, a statistical analysis of the size of the group was carried out, including the percentage index for the total number of respondents. A comparative analysis of the groups of men and women for the 'age' variable was performed using Student's *t*-test. The determinants of social support were searched based on multiple regression analysis, using the progressive stepwise method, and an analysis of residual distribution was performed. Outliers (atypical observations) were removed from the individual models (regression equations). The calculations were made using the Statistica (Poland Cracow) software package [43].

To verify if the theoretical model fits the data, structural equation modelling (SEM) was performed using AMOS software. The results were analysed concerning the assumption of a multivariate normal distribution and outliers, which resulted in the selection of a group of 160 people for further analysis. The verification of the assumption of a multivariate normal distribution indicated that this assumption was not met in the analysed model, and therefore estimators resistant to breaking the assumptions of a multivariate normal distribution were applied: MLR, MLM, MLMV – the R package (environment) with the RStudio editor was used for this purpose.

The study was carried out in the chemotherapy and radiotherapy wards of the leading cancer hospitals in Poland: Krakow, Lublin, Kielce, and Tarnow. Participation was voluntary. Having completed the questionnaire, each respondent put it into an unmarked envelope, ensuring anonymity.

A total of 203 questionnaires were distributed and 178 were returned. After analysis of data completeness, 170 questionnaires of caregivers of people with cancer were qualified for the study. A caregiver was considered a close person indicated by a patient, who lived with or was with the patient on a daily basis and was committed to helping them. The inclusion criteria for the study were as follows: consent to participate, a mental state enabling understanding and independent completion of the questionnaires, cancer diagnosis of a patient indicating their close person, and undergoing the phase of active, non-palliative cancer treatment. Informed consent was obtained from all subjects in our project.

The characteristics of the studied group are shown in Table 2.

The mean age of the women was 50.32 years, and of the men 55.41 years. This difference was statistical-

Table 2. Characteristics of the studied group

Variables	*N* respondents (*n* = 170)	% respondents
Gender		
Female	94	55.29
Male	76	44.71
Age [years]		
21–35	19	11.18
36–45	33	19.41
46–55	47	27.64
56–65	41	24.12
66–81	30	17.65
Marital status		
Married	147	86.47
Single	9	5.29
Widowed	5	2.94
Informal relationship	8	4.71
Other	1	0.59
Education		
Primary	4	2.35
Vocational	41	24.12
Secondary	62	36.47
Higher	63	37.06
Form of employment		
Full-time job	96	56.47
Part-time job or a civil law contract	15	8.83
Disability pension	13	7.65
Retirement pension	32	18.82
Benefits	2	1.18
Pupil/student	1	0.59
Does not work	4	2.35
Other	7	4.12
Place of residence		
City	55	32.35
Town	65	38.24
Village	50	29.41
Degree of kinship to a person with cancer		
Husband/wife	94	55.29
Parent	43	25.29
Sibling	16	9.41
Child	4	2.35
Other	13	7.65

ly significant ($p \leq 0.05$) and showed that the examined women were statistically younger than the men under examination. The vast majority of respondents were married or in informal relationships (nearly 91%) and worked full-time (56%). The caregivers were most often the spouses (55%) or parents (25%) of the persons with cancer.

Results

The collected data were analysed using multiple regression models and structural equation modelling (SEM) to identify key predictors of different types of perceived social support. Each subscale of the BSSS tool was examined in relation to psychological traits and emotional factors. The most important and statistically significant relationships are summarised below. These findings provide insight into the emotional and cognitive mechanisms underlying support perception and reception in the caregiving context.

Our study shows that perceived emotional support in the group of caregivers is conditioned by the POS (β = 0.29) and the 'agreeableness' variable (β = 0.24). These are important in explaining the 'PES' variable (Figure 2 shows standardised beta coefficients [β] from regression analysis. Detailed results are available in Table 3).

The positive correlation obtained between the POS and PES indicates that the caregivers who are characterised by a positive belief about themselves and the world and experience and appreciate life satisfaction, notice and perceive more the emotional support provided to them despite their difficult life situations. People with a tendency to negatively assess the situation they experience or themselves may have difficulty noticing the emotional support they receive.

The positive relationship between the 'PES' variable and agreeableness indicates that the caregivers who display altruistic, compliant, trusting, and cooperative features are more open and appreciate the emotional support given to them.

The 'negative affect' variable (β = –0.08), showing a negative correlation, the 'positive affect' variable (β = –0.10), and the 'exclusion' variable (β = –0.08) qualified for the explanation of the 'PES' variable, but were not statistically significant.

The analysis of the correlation coefficient shows that the analysed variables are related to each other at a medium level ($R = 0.52$). The described variables explain the PES as an important area of social support, explaining 27% of the variance ($R^2 = 0.27$). The remaining percentage is due to the influence of independent variables that were not part of the regression equation.

The research results obtained indicate that the determinants of PIS are the POS (β = 0.23), depression (β = –0.23), and agreeableness (β = 0.17), and they are important in explaining the 'PIS' variable.

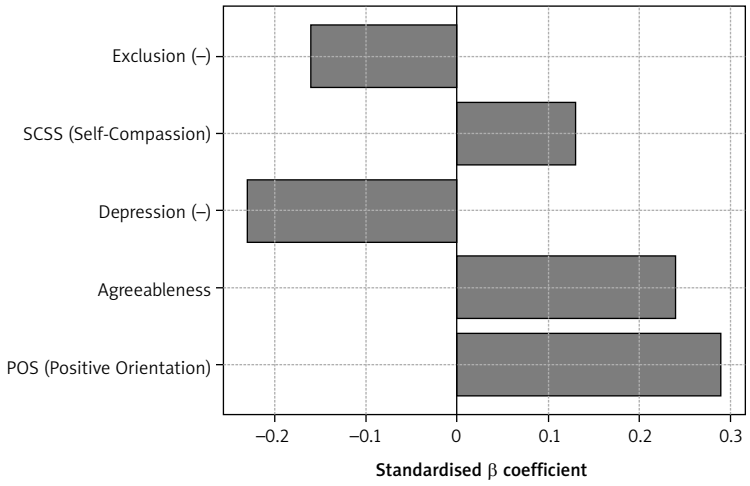

Figure 2. Key predictors of emotional support

Table 3. Determinants of the 'perceived support' variables

Variables	Beta	Stat. error Beta			*t*	*P*-value
Perceived emotional support (PES)						
Constant term			6.54	1.43	4.57	< 0.001
POS	0.29	0.08	0.14	0.04	3.62	< 0.001***
A – Agreeableness	0.24	0.07	0.48	0.14	3.49	0.001**
PANAS.NEG – negative affect	–0.08	0.07	–0.01	0.01	–1.05	0.293
PANAS.POZ – positive affect	0.10	0.08	0.02	0.02	1.32	0.187
TBS.2 – Exclusion	–0.08	0.08	–0.07	0.07	–1.03	0.307
*R = 0.52; R2 = 0.27; F(5.164) = 12.48; ***p < 0.000; **p < 0.001*						
Perceived instrumental support (PIS)						
Constant term			6.61	1.52	4.34	< 0.001
POS	0.23	0.08	0.12	0.04	2.75	0.007**
Depression	–0.23	0.07	–0.19	0.06	–3.23	0.002**
A – Agreeableness	0.17	0.07	0.36	0.15	2.44	0.016*
SCSS	0.13	0.08	0.06	0.04	1.59	0.113
*R = 0.50; R^2 = 0.25; F(4.164) = 13.78; **p < 0.001; *p < 0.05*						

R – Multiple correlation coefficient; R^2 – Multiple determination coefficient; F, p – significance of equation; t – Student's t-test.

The positive correlation obtained between the POS and PIS variables indicates that the caregivers who, in the difficult situation of caring for cancer patients, are characterised by an open attitude towards the world and have a positive self-image and are more conscious of the instrumental support provided to them in difficult situations. The surveyed caregivers who do not show a tendency to a depressive mood, negative thinking, or the features of catastrophising difficult situations are able to perceive instrumental support.

The positive correlation obtained with the 'agreeableness' variable indicates that the caregivers who show the features of openness, trust, and cooperation are more appreciative of instrumental support.

The 'self-care' variable (β = 0.13), showing a positive correlation, qualified for the explanation of the 'PIS' variable in the surveyed caregivers but did not reach a sufficiently statistically significant level.

The analysis of the correlation coefficient shows that the analysed variables are related to each other at a medium level (R = 0.50). The described variables explain PIS as an important area of social support, explaining 25% of the variance (R^2 = 0.25). The remaining percentage is due to the influence of independent variables that were not part of the regression equation.

The study shows that the need for support is determined by the variables of anger (β = –0.33) – showing a negative correlation, and injustice (β = 0.30) – show-

ing a positive correlation. The variables mentioned are important in explaining the studied variable.

The negative relationship between the 'anger' variable and the studied variable indicates that caregivers who do not experience negative emotions, anger, and irritation while caring for patients are more open to support than caregivers experiencing negative emotions during this period. Anger and negative emotions block the ability to receive support.

The 'injustice' variable, which explains the 'need for support' variable in caregivers, indicates that experiencing feelings of harm and injustice while caring for patients strengthens the need for support.

The 'positive orientation' variable (β = 0.14), showing a positive correlation, qualified for the explanation of the 'need for support' variable, but was not sufficiently statistically significant.

The analysis of the correlation coefficient shows that the analysed variables are interrelated at a medium level (R = 0.32). The discussed variables explain the need for support as an important area of social support, explaining 10% of the variance (R^2 = 0.10). The remaining percentage is due to the influence of independent variables that did not enter the regression equation.

The study shows that seeking support is conditioned by the 'SCSS' variable (β = 0.16) – showing a positive correlation, and exclusion (β = –0.16) – showing a negative relationship (Table 4). They are important in explaining the 'seeking support' variable in the surveyed caregivers.

The caregivers who are characterised by increased self-care and no sense of social exclusion are more open to seeking support when caring for cancer patients. On the other hand, those caregivers who feel withdrawn and alienated from life and activity find it difficult to actively seek support.

The analysis of the correlation coefficient shows that the analysed variables are interrelated at a medium level (R = 0.25). The discussed variables explain seeking support, explaining 6% of the variance (R^2 = 0.06). The remaining percentage is due to the influence of independent variables that were not part of the regression equation.

Our study shows that the support currently received by the surveyed caregivers is conditioned by the POS (β = 0.29), which is important in explaining the studied variable, showing a positive correlation (Explained variance (R^2) for each type of social support among informal caregivers (Figure 3).

Based on the results obtained, it can be concluded that the caregivers who experience life satisfaction are open and have a positive attitude to life situations, notice and perceive more the support currently provided to them. On the other hand, people who show a tendency to negatively assess the situation and themselves and have no prospects for the future find it difficult to perceive and appreciate the support shown.

The variables of conscientiousness (β = 0.13) and positive affect (β = 0.08), showing a positive correlation, qualified for the explanation of the discussed variable in the surveyed caregivers but were not statistically significant.

The analysis of the correlation coefficient shows that the analysed variables are related to each other at a medium level (R = 0.39). The described variable explains the support currently received as a significant area of social support, explaining 15% of the variance (R^2 = 0.15). The remaining percentage is due to the influence of independent variables that were not part of the regression equation.

The analysis of the study shows that emotional support is conditioned by the 'POS' variable (β = 0.20), showing a positive correlation at a statistically significant level (Table 4). The caregivers who have a positive attitude, optimism, hope, and openness notice and appreciate more the emotional support they receive while caring for people.

The 'conscientiousness' (β = 0.15) and the 'positive affect' variables (β = 0.10), showing a positive correlation, explain the emotional support in the surveyed caregivers, but they were not statistically significant.

The analysis of the correlation coefficient shows that the analysed variables are interrelated at a medium level (R = 0.33). The 'POS' variable explains emotional support as an important aspect of social support, explaining 11% of the variance (R^2 = 0.11). The remaining percentage of variability is due to the influence of independent variables that did not enter the regression equation.

The study shows that PIS is conditioned by the POS (β = 0.29), showing a statistically significant positive correlation (Table 4).

The surveyed caregivers who are characterised by a positive attitude and see the prospect of coping and hope are more open to the emotional support they receive. They can perceive and appreciate specific support that instructs them what to do in caring for patients as opposed to the caregivers who are pessimistic about caring for others.

The 'conscientiousness' variable (β = 0.10), showing a positive correlation, is used to explain the above variable in the caregivers, but it was not statistically significant.

The analysis of the correlation coefficient shows that the analysed variables are interrelated at a medium level (R = 0.34). The 'POS' variable explains PIS as an important area of social support, explaining 11% of the variance (R^2 = 0.11). The remaining percentage is due to the influence of the independent variables that did not enter the regression equation.

The study shows that information support is conditioned by the POS (β = 0.24), the need for support (β = 0.24), and conscientiousness (β = 0.15) from the TBS.2 variable (Table 4). The variables mentioned

Table 4. Determinants of the social support variable

Variables	Beta	Stat. error Beta	B	Stat. error B	*t*	*P*-value
Determinants of the 'need for support' variable						
Constant term			9.57	1.13	8.48	< 0.001
ANGER	–0.33	0.08	–0.21	0.05	–3.87	< 0.001***
TBS.1 – Injustice	0.30	0.09	0.24	0.07	3.48	0.001**
POS	0.14	0.08	0.06	0.03	1.80	0.074
*R = 0.32; R^2 = 0.10; F(3.165) = 6.54; **p < 0.001; ***p < 0.001*						
Seeking support'						
Constant term			10.37	2.27	4.57	< 0.001
SCSS	0.16	0.08	0.11	0.06	2.05	0.042*
TBS.2 – Exclusion	–0.16	0.08	–0.24	0.12	–2.01	0.046*
*R = 0.25; R^2 = 0.06; F(2.167) = 5.61; *p < 0.05*						
Support currently received						
Constant term			2.21	0.17	13.36	< 0.001
POS	0.29	0.08	0.02	0.01	3.47	0.001**
C – Conscientiousness	0.13	0.07	0.04	0.02	1.79	0.075
PANAS.POS – Positive affect	0.08	0.08	0.00	0.00	1.05	0.296
*R = 0.39; R^2 = 0.15; F(3.166) = 10.06; **p < 0.001*						
Emotional support						
Constant term			2.28	0.14	16.77	< 0.001
POS	0.20	0.09	0.01	0.00	2.35	0.020*
C – Conscientiousness	0.15	0.08	0.03	0.02	1.96	0.052
PANAS.POS – Positive affect	0.10	0.08	0.00	0.00	1.18	0.238
*R = 0.33; R^2 = 0.11; F(3.164) = 6.81; *p < 0.05*						
Instrumental support						
Constant term			2.28	0.27	8.29	< 0.001
POS	0.29	0.08	0.03	0.01	3.83	< 0.001***
C – Conscientiousness	0.10	0.08	0.04	0.03	1.32	0.189
*R = 0.34; R^2 = 0.11; F(2.164) = 10.48; ***p < 0.001*						
Information support						
Constant term			1.08	0.40	2.70	0.008
POS	0.24	0.08	0.03	0.01	2.84	0.005**
Need for support	0.24	0.09	0.05	0.02	2.64	0.009**
C – Conscientiousness	0.15	0.07	0.09	0.04	2.06	0.041*
PANAS.POS – Positive affect	0.13	0.08	0.01	0.01	1.60	0.111
TBS.3 – Loss	0.10	0.09	0.02	0.02	1.11	0.267
*R = 0.44; R^2 = 0.19; F(5.164) = 8.15; **p < 0.001; *p < 0.05*						
Protective buffering support						
Constant term			2.05	0.23	9.10	< 0.001
ES (Emotional stability)	0.29	0.07	0.12	0.03	3.87	< 0.001***
TBS.3 (Loss)	0.24	0.09	0.04	0.02	2.52	0.013*
PANAS.NEG	0.11	0.09	0.01	0.00	1.32	0.188
TBS.1 – Injustice	0.12	0.09	0.03	0.02	1.37	0.174
ANXIETY	0.09	0.09	0.02	0.02	1.02	0.308
*R = 0.52; R^2 = 0.27; F(5.164) = 12.17; ***p < 0.000; *p < 0.05*						

R – Multiple correlation coefficient; R^2 – Multiple determination coefficient; F, p – significance of equation; t – Student's t-test.

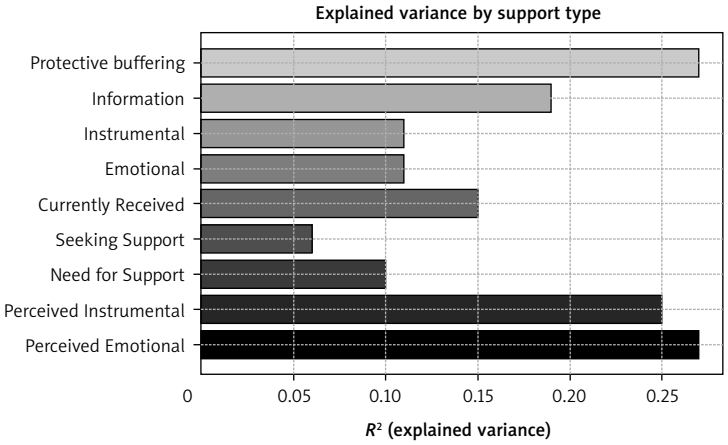

Figure 3. Explained variance (R^2) for each type of social support based on regression analysis

are important in explaining information support for caregivers. A positive relationship was obtained between the variables.

Based on the analyses, it can be concluded that people caring for cancer patients, who show a tendency to be optimistic about the situation experience life satisfaction in spite of various difficult situations and are more open to the information support provided to them. This type of support includes searching for information on recovery, the functioning of people, and the possibility of helping them.

Our study shows that information support is statistically significantly conditioned by the need for support (β = 0.24) and conscientiousness (β = 0.15). In a situation of concern and care for patients undergoing cancer treatment, the surveyed caregivers who show a greater need for support are characterised by an increased need for information support, as opposed to the caregivers who do not show such a need.

The positive correlation between these variables and conscientiousness indicates that the caregivers who are characterised by active planning, accuracy, and reliability in carrying out recommendations and a responsible approach to duties have an increased need for information support.

The variables of positive affect (β = 0.13) and (β = 0.10) loss, showing a positive correlation, are used to explain information support in the caregivers, but they were not statistically significant.

The analysis of the correlation coefficient shows that the analysed variables are interrelated at a medium level (R = 0.44). The variables described above explain instrumental support as an important aspect of social support, explaining 19% of the variance (R^2 = 0.19). The remaining percentage is due to the influence of independent variables that were not part of the regression equation.

The study shows that protective buffering support in the surveyed caregivers is conditioned by emotional stability (β = 0.29) and loss (β = 0.24). The positive correlation between the variables shows that the caregivers who are characterised by maturity, stability of experienced emotions when helping and caring for their relatives, and a sense of loss and insecurity are more open and need protective buffering support. Negative emotional affect, injustice, and anxiety, showing a positive correlation, additionally qualified for the explanation of this variable, but they were not statistically significant in the analysed group.

The analysis of the correlation coefficient shows that the variables of the need for support, anger, and extraversion which explain seeking support are interrelated at a medium level (R = 0.40), explaining 16% of the variance (R^2 = 0.16). The remaining percentage is due to the influence of independent variables that were not part of the regression equation.

The analysis of the impact of socio-demographic variables on the caregivers shows that women have a statistically higher need for support and seek support more than the surveyed men. The gender variable did not differentiate statistically in the remaining types of support.

When caring for a close person, men experience stress, anxiety, depression, anger, and need support more than women. The examined women control these states more and show greater independence in caring for cancer patients.

The surveyed men experience the illness of their relatives as injustice and a sense of loss statistically significantly more than women.

Caregivers with vocational education need protective buffering support and need support statistically significantly more than those with secondary or higher education. The 'education' variable does not differentiate the caregivers in other dimensions of support.

PIS and the need for support are expected statistically significantly by the caregivers living in large cities rather than those in small towns or villages.

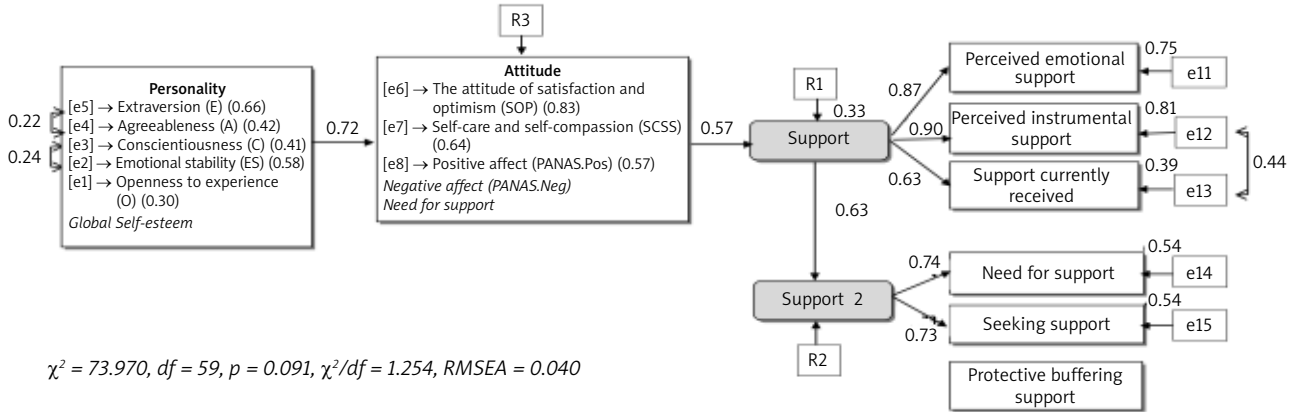

Figure 4. Final structural model of social support for informal caregivers of cancer patients

The place of residence does not differentiate the caregivers in other types of support.

Spouses caring for persons with cancer need more support currently received and specific types of this support: emotional, instrumental, and information support, compared to parents. The nature of the relationship with the person being cared for does not differentiate the level of perceived emotional and instrumental support, the need for support, and protective buffering support.

The level of the fear of developing cancer experienced by caregivers does not differentiate them in terms of the need for support and its type.

Based on the analyses of the data obtained, a sample of n = 170 individuals was selected and outliers removed. A multivariate distribution was obtained, close to the multivariate normal distribution. Figure 4 presents the final model based on structural equation modelling. It includes latent variables representing personality traits, emotional state, and caregiving attitude as predictors of perceived social support. All statistically significant paths are illustrated.

The statistical parameters obtained indicate that the model explains the previously assumed hypothetical theoretical model well for the studied caregivers of patients undergoing cancer treatment: χ^2 = 73.970 is statistically insignificant, RMSEA value = 0.040 is good, NFI measures = 0.886, CFI = 0.974, GFI = 0.937 is greater than 0.901 and approach 1, which means that the model fits very well.

Discussion

Close persons are indicated by cancer patients as the most important support providers. This is confirmed by Dębska *et al.*, who also write that the next such important caregivers are nurses and medical specialists [11].

Our study and the conducted statistical analysis allowed us to obtain a well-fitting verified research model.

For the caregivers who took care of cancer patients, personality structure, expressed through extraversion (0.66), agreeableness (0.42), conscientiousness (0.41), emotional stability (0.58), openness to experience (0.30), and attitude (0.72), influences the main variable, which is support (0.52). The combination of these variables shows that for the informal caregivers surveyed, the level of support experienced is influenced by such personality traits as: openness and features of positive thinking, a trusting and sincere attitude towards others, perseverance in pursuing goals, an internal conviction about the rightness of their actions, emotional stability and maturity, openness to life experience, the ability to positively re-evaluate difficult situations, as well as realistic and adequate self-assessment of one's abilities and resourcefulness.

Our study shows that in the personality structure of caregivers, the feature of agreeableness is associated with conscientiousness at the level of 0.22. This means that in the personality structure of the surveyed caregivers there is a significant correlation between the features of sympathy, altruism, helping others, perseverance, motivation to take goal-oriented activities, and internal belief in the rightness of their actions. The feature of conscientiousness is additionally associated with emotional stability. This correlation is negative and amounts to –0.24. This means that in the personality structure of the surveyed caregivers, an insufficient level of reliability in caring activities, conscientiousness, and perseverance negatively affect emotional stability, introducing emotional anxiety and tension. In the case of cancer treatment, such features can adversely affect the overall care for people with cancer. The 'personality structure' variable manifested by the above-described variables affects the attitude that the surveyed caregivers adopt when caring for people undergoing cancer treatment (0.72). The correlation is positive, and the indicator obtained points to a strong correlation between the variables. The attitude of the surveyed caregivers is expressed

by the POS (0.83), the 'self-care' variable (0.64), and positive affect (0.57). The attitude of people caring for patients, shaped by the variables of personality structure (0.72) and attitude (0.57), and its components, affects the level of social support for the surveyed caregivers. The obtained correlation is 0.57, determined as above average.

The main examined variable is the level of support, which, in the caregivers of patients undergoing cancer treatment, manifests itself through the detailed variables PES (0.82), PIS (0.90), and support currently received (0.63). The main 'support' variable discussed is additionally strongly associated with complementary support (0.63), which manifests itself through the need for support (0.74) and a sense of support (0.73). The correlations are positive. The correlations obtained between the studied variables indicate that the support that the surveyed caregivers receive while caring for patients during cancer treatment is expressed, in particular, in its emotional and instrumental form and the level of support currently received. Complementary support is manifested by the need for support and a subjective and individual sense of support.

The model explains approximately 40% of the variance in perceived social support ($R^2 = 0.40$), based on the structural equation model. While this leaves 60% of the variance unexplained, it reflects the inherent complexity of caregiving experiences and highlights the need for further research. This remaining portion invites exploration into contextual, cultural, and systemic influences on caregiving that were beyond the scope of this study.

In response to the formulated research hypotheses, it can be stated that all have been positively verified. Hypothesis 1 indicates that the determinants of perceived available support, consisting of perceived emotional support and perceived instrumental support in the surveyed caregivers, are positive orientation, an altruistic and trusting attitude, and lack of depressed mood. Positive verification makes it possible to state that the caregivers who have a positive opinion about themselves and the world, and who experience and appreciate life satisfaction, notice and perceive more the emotional and instrumental support provided to them, despite difficult life situations. It should also be pointed out that caregivers showing altruistic, trusting, and cooperative features and not showing a tendency to depressive mood and negative thinking are more open and appreciate the support given to them.

Hypothesis 2 assumed that the need for support and seeking of support by the respondents were influenced by a positive attitude, a lack of experiencing extreme negative emotions (such as anger), increased self-concern, and a sense of injustice. Our study shows that caregivers who do not experience negative emotions, anger, and irritation when caring for cancer patients are more open to support. It is worth paying attention to the fact that experiencing feelings of harm and injustice by caregivers while caring for patients strengthens their need for support. The above result may be useful for the purposes of multidimensional preventive activities and specialist and psychological help addressed to caregivers.

The determinants of emotional and instrumental support currently received are a positive orientation manifested by the perception of positive aspects of life. Confirming hypothesis 3 shows that, when caring for patients undergoing cancer treatment who are characterised by optimism, hope, positive attitude, and openness, caregivers are more open to the help of others, i.e. they notice and appreciate the emotional and instrumental support provided to them.

Hypothesis 4 assumed that the need for protective buffering support in the surveyed caregivers was influenced by the experience of emotional stability and a subjective sense of loss. The study shows that caregivers characterised by maturity, stability, and control of experienced emotions while caring for loved ones are more open to protective buffering support. If the situation of disease and care for a close person is assessed as a feeling of loss and insecurity, it particularly prompts caregivers to intensify the search for and need for protective buffering support.

The last hypothesis, number 5, suggests that the overall sense of support was influenced by the attitude adopted by caregivers while caring for patients and the personality structure. The applied path analysis, which verified the theoretical assumptions of the research model, shows that in the examined informal caregivers, personality traits and attitude towards the situation play an important role in the level of support received. Caregivers characterised by positive thinking, trust, openness to other people, perseverance in pursuing goals, and internal conviction about the rightness of actions are open to support in a care situation. Additionally, features such as emotional stability, maturity, openness to experiences, the ability to positively re-evaluate difficult situations and adequate self-assessment of one's abilities and resourcefulness strengthen the support they receive and help them cope with difficult situations such as caring for loved ones.

The unique research results may contribute to building the right position of informal caregivers in the treatment/recovery of cancer patients. This may prevent various negative emotions, such as anxiety and stress, which result from the lack of preparation for the caring function [1, 2]. Changing the status of informal caregivers and including them in an interdisciplinary team may improve the patients' health situation, which is confirmed by Litzelman *et al.* [4].

Our study brings both cognitive and practical value, broadens knowledge in the field of helping

caregivers, and indirectly helps patients to survive the disease and the healing process.

Conclusions

This study offers a new perspective on the complexity of social support in cancer caregiving by proposing and testing a model that combines personality traits, emotional well-being, and attitudes toward caregiving. Our findings show that caregivers who demonstrate traits such as agreeableness, emotional stability, conscientiousness, and a positive orientation are more likely to experience and actively seek social support. The structural model confirmed that these psychological characteristics significantly influence the way support is perceived and utilised.

The results suggest that individual psychological resources, often overlooked in standard oncology care, may play a critical role in shaping the caregiving experience. Interventions aiming to strengthen caregivers' internal coping strategies – such as building positive self-perception or addressing emotional vulnerability – could enhance their well-being and ability to continue caregiving roles effectively.

We recommend that oncology teams formally recognise the role of informal caregivers and routinely assess their needs. Doing so could lead to more targeted support, better collaboration between caregivers and professionals, and ultimately, improvements in patient care.

Funding

No external funding.

Ethical approval

The project was approved by the local Bioethics Committee of the Andrzej Frycz Modrzewski Krakow University (Resolution No. 29/2015 of 14 May 2015). All methods were carried out in accordance with relevant guidelines and regulations.

Conflict of interest

The authors declare no conflict of interest.

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Received: 29.05.2024
Accepted: 1.06.2025
Online publication: 31.03.2026