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Abstract: The treatment of cancer and associated healthcare procedures often impose a detrimental effect on patients' quality of life. Symptoms stemming from treatment often hinder patients' social interactions, emphasizing the crucial role of social support in preserving quality of life and alleviating stress. Moreover, patient resilience serves as a valuable asset in mitigating stress levels and upholding an optimal quality of life amidst the challenges posed by the illness. This study aims to explore the correlation between diverse sources and forms of social support, resilience, and their impact on the quality of life and stress levels among patients undergoing cancer immunotherapy. This study involved thirty patients undergoing immunotherapy at Costa del Sol Hospital in Marbella. Resilience correlated with improved cognitive functioning and diminished symptoms. Informational support from healthcare providers and emotional support from friends were linked to symptom alleviation, such as reduced appetite and insomnia. Moreover, emotional support from friends emerged as a predictor for decreased perceived stress. Interventions targeting the improvement of quality of life and reduction of stress among cancer patients should prioritize assessing support needs and involving the patient's social network, especially during the treatment phase.

Keywords: social support; quality of life; stress; cancer; resilience; patients; immunotherapy

1. Introduction

Cancer remains a leading cause of death globally, with Spain recording over 290,000 new cases in 2022 [1] and more than 110,000 related deaths in the same year. Diagnosing and treating cancer often pose prolonged stressors over long periods of time [2]. Despite improved early detection and therapeutic advancements that extend life expectancy [3], treatment-related toxicity leads to significant side effects and long-term symptoms [4].

This disease profoundly affects various aspects of life—occupational, social, and familial—over extended periods, substantially compromising the patient's quality of life [5]. Moreover, it detrimentally impacts the disease prognosis, severity, and treatment outcomes [6]. Therefore, addressing social and psychological dimensions is critical for enhancing the well-being of cancer patients [7].

1.1. Quality of life

Quality of life includes various dimensions—physical, social, emotional, and functional—affected by the disease [8]. The healthcare process and treatment profoundly influence these dimensions [9], contributing to physical and psychological challenges [10] that diminish patients' overall quality of life [11]. Assessing quality of life in cancer patients is crucial for several reasons [12]: Firstly, it helps to evaluate treatment benefits on overall well-being. Secondly, it offers insights from the patient's viewpoint, thereby enriching care. Lastly, it serves as a prognostic factor for treatment [13], correlating with improved survival rates [14]. Both patients and healthcare professionals acknowledge the pivotal role of assessing and improving patients' quality of life, considering it as vital as life expectancy [12].

1.2. Perceived Stress

Throughout the cancer journey, both the treatment and diagnosis contribute to persistent and chronic stress for most patients [15]. Notably, the subjective perception of the disease's impact influences stress levels more significantly than the objective characteristics of the illness [16]. Thus, evaluating and addressing stress becomes crucial, given its association with immune response, disease advancement [17], and quality of life. Moreover, stress serves as a predictive factor for future health declines and functional limitations in cancer patients [18].

1.3. Social support

Social support is an interactive concept involving interpersonal exchanges of assistance, including material, emotional, and informational support within a specific context. Despite cancer patients perceiving high levels of support [19], the symptoms they experience can limit social interactions [20]. Moreover, a lack of social support is linked to increased stress, decreased quality of life [21], and even a higher risk of mortality [22]. In research, three primary types of support emerge: emotional, instrumental, and informational, each playing key roles, with emotional support being notably significant [23]. Close sources of support, such as partners, family, and friends, exert a considerable influence on patients' quality of life [4]. Similarly, healthcare professionals represent a significant source of social support, although it has been less explored in research.

1.4. Resilience

Resilience is characterized as an individual's capacity to face adversity [24]. It doesn't imply invincibility but rather involves developing the ability to confront, learn from, and emerge strengthened by hardships [25]. Resilience has been linked to maintaining the quality of life in cancer patients [26]. Likewise, it helps to reduce patients' perceived stress [27], highlighting the importance of instilling confidence in patients, emphasizing their capability to face the illness [28] Additionally, it influences psychological coping strategies [29], enabling patients to manage emotions related to diagnosis, treatment, and resulting symptoms [30].

1.5. The present study

The objective of this study is to examine the correlation between social support and resilience and their impact on perceived stress and quality of life among cancer patients undergoing immunotherapy. Specifically, the study aims to ascertain whether patient satisfaction with received social support and resilience is inversely related to perceived stress while positively associated with an improved quality of life. Furthermore, the study seeks to identify the specific sources (partner, friends, family, healthcare professionals) and types (instrumental, informational, emotional) of support linked to stress reduction and improved quality of life. This research aims to provide a comprehensive understanding of the primary sources and types of support significantly associated with stress alleviation and improved quality of life among patients undergoing cancer treatment. Emphasizing the importance of healthcare professionals as a key support source, particularly for patients actively undergoing treatment, is an essential aspect of this study.

The hypotheses outlined in this study are as follows:

1)   Patient satisfaction with social support and resilience is anticipated to show a negative correlation with perceived stress and a positive correlation with the quality of life among patients undergoing immunotherapy.

2)   Higher satisfaction levels with emotional and informational support from diverse sources are expected to correspond with a decrease in perceived stress and an increase in the quality of life.

2. Materials and Methods

2.1. Participants

The study was conducted at Costa del Sol Hospital (Marbella), where participants received treatment. A total of 30 cancer patients currently undergoing immunotherapy participated, ranging in age from 41 to 83 years, with a mean age of 65.73 (SD = 10.35). Among them, 80% were male (24), and the remaining 20% were female (6). Patients were experiencing various types of cancer (Table 1). Inclusion criteria specified that participants had to be cancer patients currently undergoing immunotherapy and over 18 years old. Exclusion criteria were applied to patients with medical discharge, those not currently undergoing immunotherapy, and individuals below the legal age.

Table 1. Sociodemographic and health variables.

Age	65.73 (10.35) [1]
Time since initial diagnosis (months)	15.10 (17.46) [1]
Gender	% (N)
Male	80 (24)
Female	20 (6)
Marital status	
Married	73.3 (22)
Divorced - Separated	10.0 (3)
Widowed	10.0 (3)
Common-law partnership	6.7 (2)
Living situation	
Lives alone	16.7 (5)
Lives with others	83.3 (25)
Education	
Completed university or higher education	13.3 (4)
Currently in university or higher education	3.3 (1)
Completed high school or vocational training	26.7 (8)
Completed only compulsory education	33.3 (10)
None of the above completed	23.3 (7)
Employment status	
Civil servant	3.3 (1)
Self-employed	6.7 (2)
Employed	3.3 (1)
Unemployed	3.3 (1)
Homemaker	6.7 (2)
Retired	43.3 (13)
On sick leave	33.3 (10)
Cancer type	
Cervix	3.3 (1)
Head and Neck	3.3 (1)
Breast	6.7 (2)
Non-Small Cell Lung Cancer (NSCLC)	50.0 (15)
Non-Melanoma Skin	3.3 (1)
Renal	10.0 (3)
Small Cell Lung Cancer (SCLS)	6.7 (2)
Bladder	6.7 (2)
NSCLC and SCLC	3.3 (1)
Received treatment	
Atezolizumab IO	10.0 (3)
Durvalumab IO	16.7 (5)

Nivolumab + Ipilimumab	6.7 (2)
Nivolumab IO	13.3 (4)
Pembrolizumab IO	20.0 (6)
Chemotherapy + Atezolizumab IO	10.0 (3)
Chemotherapy + Pembrolizumab IO	23.3 (7)

[1] Mean (Standard Deviation)

2.2. Instruments

The health and sociodemographic questionnaire collected the following data: age, time since initial diagnosis (in months), gender, marital status, household situation, education level, employment status, type of cancer, and received treatment.

Quality of life: *EORTC-QLQ C-30-European Organization for Research and Treatment of Cancer* [31], used in an adapted version for the Spanish population [32]. This questionnaire evaluates multiple dimensions of patients' quality of life, self-reported by patients. It includes a global health status domain, a functioning domain (consisting of five functional scales), and a symptom domain (comprising three scales and six items related to patient symptoms).

Perceived stress: *Perceived Stress Scale (PSS)* [33]. We used the version adapted for the Spanish population [34]. This scale evaluates the patient's perception of stressfulness associated with life events and situations experienced within the last month.

Resilience: *Connor-Davidson Resilience Scale 10-Item (CD-RISC 10)* [35], a shortened adaptation of the original scale [36] comprising 10 items. A higher total score indicates greater resilience among cancer patients.

Social support: *Frequency and Satisfaction with Social Support Questionnaire (QFSSS)* [37]. The questionnaire evaluates social support from a multidimensional perspective, assessing patients' satisfaction with emotional, instrumental, and informational support received from diverse sources. This study incorporates assessments from family, partners, friends, and healthcare professionals.

2.3. Procedure

The study was conducted at Costa del Sol Hospital in Marbella. Upon completing the questionnaire, interviews were conducted with patients. Before administering the questionnaire, participants were briefed on the voluntary and confidential nature of their involvement through an informed consent document. Ethical approval was obtained from the Ethics Committees of Costa del Sol Hospital (internal code: 003_feb22_PI2 – QoL Inmunoterapia) and the University of Malaga (registration number: CEUMA: 58-2016-H), ensuring compliance with ethical and legal guidelines for research.

The analysis of the data collected was performed using IBM SPSS version 23, including descriptive statistics, Pearson correlation coefficient, and multiple linear regression analyses.

3. Results

3.1. Relation between social support and resilience concerning perceived stress and quality of life

Table 2 shows the correlation coefficients. Among the functional scales, emotional support from friends shows a correlation with physical functioning, while instrumental and informational support from this source show a correlation with social functioning. Additionally, emotional and informational support from family, along with informational support from the partner, correspond to the emotional and cognitive functioning of patients. In the case of support offered by healthcare professionals, instrumental support aligns with increased physical functioning, whereas informational support correlates with improved role and social functioning.

Table 2. Relation between social support and resilience with perceived stress and quality of life.

EORTC QLQ-C30	Family			Partner			Friends			Healthcare Professionals			Resi
	Emo	Instru	Info	Emo	Instru	Info	Emo	Instru	Info	Emo	Instru	Info	
Global Health Status	-.044	-.173	.041	.006	.013	.198	.153	-.046	.039	.147	.130	.174	.441**
Functional scales													
Physical func	-.087	-.071	.037	-.006	-.061	.058	.327*	.089	.110	.288	.367*	.256	.174
Role func	-.017	-.224	-.005	-.069	-.107	.055	.084	-.075	-.063	.292	.293	.356*	.332*
Emotional func	.376*	.236	.509**	.186	.183	.348*	.238	.122	.200	.331*	.462**	.533**	.722**
Cognitive func	.422*	.119	.402*	.199	.152	.380*	.128	.133	.005	.515**	.492**	.494**	.553**
Social func	-.004	-.148	.063	.034	-.016	.166	.265	.325*	.331*	.172	.282	.313*	.358*
Symptom scales													
Fatigue	.071	.241	-.041	.219	.211	.036	-.051	.014	-.038	-.246	-.299	-.297	-.370*
Nausea and vomiting	-.153	-.069	-.219	-.076	-.049	-.161	-.329*	-.273	-.271	-.228	-.285	-.340*	-.614**
Pain	-.003	.065	-.132	-.081	-.103	-.220	-.037	-.010	-.053	-.150	-.236	-.321*	-.252
Dyspnea	.096	.202	.046	.060	.087	-.084	-.158	.089	.117	-.285	-.420*	-.483**	-.303
Insomnia	.130	.174	-.077	-.065	-.033	-.187	-.401*	.061	-.012	-.098	-.275	-.286	-.305
Loss of appetite	-.066	.013	-.148	.047	.025	.030	-.074	.065	-.016	-.312*	-.401*	-.477**	-.412*
Constipation	-.366*	-.196	-.328*	-.167	-.127	-.432*	-.218	-.174	-.088	-.141	-.263	-.327*	-.517**
Diarrhea	-.019	-.092	.020	.191	.144	.202	.110	-.008	-.145	-.089	<.000	-.039	-.206
Financial difficulties	.042	.143	-.036	.233	.275	.202	-.152	.062	.030	-.214	-.102	-.160	-.321*
Perceived stress scale	-.195	-.337*	-.308	-.087	-.083	-.296	-.426*	<.000	-.086	-.182	-.251	-.293	-.403*

Abbreviation: func, functioning; Resi, resilience; emo, emotional; instru, instrumental; info, informational

*$p < .05$; **$p < .01$

Similarly, various forms of support from healthcare professionals (emotional, instrumental, or informational) are associated with improved emotional and cognitive functioning. When considering symptom scales and items, emotional support from friends correlates with less nausea, vomiting, and insomnia. Likewise, emotional and informational support from family, along with informational support from the partner, are linked to decreased gastrointestinal problems. Informational support from healthcare professionals shows connections with lower instances of nausea, vomiting, pain, and gastrointestinal issues, mirroring the impact of instrumental support from healthcare professionals in reducing dyspnea. Moreover, any type of support from healthcare professionals is also associated with decreased appetite loss. In terms of patients' perceived stress, instrumental support from family and emotional support from friends appear to be associated with higher stress scores. On the other hand, resilience shows correlations with lower perceived stress, higher global health status, increased scores across role, emotional, cognitive, and social functioning scales, as well as improved symptom management in areas such as fatigue, nausea and vomiting, appetite loss, constipation, and even financial difficulties.

3.2. Predictive models of quality of life and perceived stress

The regression analyses unveiled significant models related to several dimensions of quality of life and perceived stress. In each equation, the predictors of satisfaction with social support and resilience, both found significant in correlation analyses, were introduced (Table 3).

In relation to the functioning scales, the only dimension that presented a significant model is cognitive functioning. The regression equation for cognitive functioning has an $R^2 = .306$, F = 11.888, $p = .002$. Resilience (ß = .553, $p = .002$) contributes to predicting better cognitive functioning. In terms of symptoms, the regression equation for fatigue has an $R^2 = .137$, F = 4.290, $p = .048$. Resilience (ß = -.370, $p = .048$) contributes to lower fatigue. The regression equation for nausea and vomiting has an $R^2 = .376$, F = 16.300, $p = <.001$. Resilience (ß = -.614, $p = <.001$) predicts less nausea and vomiting. The regression equation for dyspnea has an $R^2 = .234$, F = 8.531, $p = .007$. Informational support from healthcare professionals (ß = -.483, $p = .007$) contributes to less dyspnea. For insomnia, the regression equation has an $R^2 = .161$, F = 5.182, $p = .031$. Emotional support from friends (ß = -.401, $p = .031$) predicts less insomnia in the patient. For appetite loss, the regression equation has an $R^2 = .228$, F = 8.253, $p = .008$). Informational support from healthcare professionals (ß = -.477, $p = .008$) contributes to less appetite loss. The regression equation for constipation has an $R^2 = .268$, F = 9.867, $p = .004$). Patient resilience (ß = -.517, $p = .004$) contributes to predicting less constipation in the patient. Regarding the perceived stress by the patient, the regression equation has an $R^2 = .181$, F = 5.754, $p = .024$. In this case, emotional support from friends (ß = -.426, $p = .024$) decreases the stress perceived by cancer patients. Finally, no significant models were obtained for overall health status, physical, role, emotional, and social functioning areas, as well as for the symptoms of pain, diarrhea, and financial difficulties.

Table 3. Multiple lineal regression analysis for quality of life and perceived stress

Cognitive function

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	46.722	12.154		3.844	<.001**
Resilience	1.237	.359	.553	3.448	.002**

R = .553 *R²* = .306 Adjusted *R²* = .280 *F* = 11.888 Sig = .002**

Fatigue

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	75.932	24.112		3.149	.004**
Resilience	-1.474	.712	-.370	-2.071	.048*

R = .370 *R²* = .137 Adjusted *R²* = .105 *F* = 4.290 Sig = .048*

Nausea and vomiting

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	71.863	15.785		4.553	<.001**
Resilience	-1.881	.466	-.614	-4.037	<.001**

R = .614 *R²* = .376 Adjusted *R²* = .353 *F* = 16.300 Sig = <.001**

Dyspnea

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	98.780	31.276		3.158	.004**

Healthcare Informational Support	-18.699	6.402	-.483	-2.921	.007**

R = .483 *R²* = .234 Adjusted *R²* = .206 *F* = 8.531 Sig = .007**

Insomnia

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	94.589	28.422		3.328	.003**
Friends Emotional Support	-14.177	6.228	-.401	-2.276	.031*

R = .401 *R²* = .161 Adjusted *R²* = .130 *F* = 5.182 Sig = .031*

Loss of appetite

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	186.179	58.069		3.206	.003**
Healthcare Informational Support	-34.146	11.886	-.477	-2.873	.008**

R = .477 *R²* = .228 Adjusted *R²* = .200 *F* = 8.253 Sig = .008**

Constipation

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	69.681	18.465		3.774	<.001**
Resilience	-1.712	.545	-.517	-3.141	.004**

R = .517 *R²* = .268 Adjusted *R²* = .241 *F* = 9.867 Sig = .004**

Stress

Model	Non-standardized coefficients		Standardized coefficients	*t*	Sig.
	B	Standard error	Beta		
(constant)	43.200	9.829		4.395	<.001**
Friends Emotional Support	-5.115	2.132	-.426	-2.399	.024*

R = .426 *R²* = .181 Adjusted *R²* = .150 *F* = 5.754 Sig = .024*

*$p < .05$; **$p < .01$

4. Discussion

The objective of this study is to analyze how resilience and various types of social support (emotional, instrumental, and informational) from friends, family, partner, and healthcare providers relate to perceived stress and quality of life among cancer patients receiving immunotherapy treatment.

In our first hypothesis, we proposed that satisfaction with social support and resilience would inversely correlate with perceived stress and positively associate with patients' quality of life. The outcomes validate this hypothesis, revealing connections between resilience, each type of support, and every source with reduced stress or higher scores in specific quality of life dimensions. These findings corroborate existing studies linking inadequate social support to diminished quality of life and decreased patient-perceived stress [4]. They also align with prior research illustrating the link between patient resilience and decreased stress levels and improved quality of life [38].

Our second hypothesis proposed that emotional and informational support from various sources would alleviate perceived stress and improve patients' quality of life. The findings confirm this hypothesis for certain sources. Consistently with prior research, the outcomes highlight

emotional support as the most influential factor in ameliorating quality of life and mitigating stress among cancer patients [39], closely followed by informational support [40]. In fact, other studies emphasize that instrumental support shows the weakest correlation with stress reduction and improvements in quality of life [41].

Friendship emerged as a significant predictor, correlating with fewer symptoms, higher quality of life, and reduced stress, aligning with prior studies underscoring its relevance for those with cancer [42]. The emotional support from friends notably helps patients to develop better coping mechanisms and a more positive outlook toward their illness [43].

Similarly, support from healthcare professionals plays a key role in improving patients' quality of life, akin to the impact of friends and family [44]. In this study, informational support from healthcare professionals stands out, a crucial finding considering that patients often rely on this source for essential information [45].

5. Conclusions

The results from the study underscore the critical role of interventions aimed at improving the quality of life for cancer patients. Targeting the patient's social support network, engaging them throughout the entire process of the disease, and particularly during treatment, proves pivotal in improving their well-being. Additionally, nurturing patients' resilience becomes a vital aspect of coping effectively with the disease.

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