Association Between Perceived Interpersonal Support and Quality of Life Among Adult Patients Undergoing Chemotherapy at an Integrated Academic Cancer Institute

IAN B. LAU, BS; HAMID R. TORABZADEH, BA; WESLEY H. PENG, MS; KATHLEEN HIGGINBOTHAM, LICSW; FRED J. SCHIFFMAN, MD, MACP

ABSTRACT

PURPOSE: Increased interpersonal support may improve the quality of life of patients with a cancer diagnosis. We seek to determine the relationship between perceived interpersonal support (PIS) and quality of life (QOL) among adult patients receiving chemotherapy infusions at an academic cancer institute.

METHODS: We surveyed patients with cancer receiving chemotherapy infusions at The Miriam Hospital (TMH) of Brown University Health from February 2024 to April 2024. We administered two established surveys in-person to patients: (1) a 12-item Interpersonal Support Evaluation List (ISEL), and (2) a 16-item Quality of Life Scale (QOLS). Linear regressions were run to understand any association between performance on the ISEL and the QOLS, and between demographic characteristics and ISEL or QOLS performance.

RESULTS: Of 432 eligible chemotherapy patients during the study period, 93 (22%) completed the prospective surveys. The mean (SD) ISEL total score was 31.2 (6.0) out of a maximum of 36, and the mean QOLS total score was 93.5 (11.8) out of a maximum of 112. Higher PIS was significantly associated with greater QOL satisfaction (β = 0.86; 95% CI, 0.28 to 1.43; P = 0.004), indicating a 0.86-unit QOLS increase per unit rise in ISEL score. Patients who identified as "Black or African American" (β = –5.36; 95% CI, –9.39 to –1.32; P = 0.010) or "Other" (β = –4.91; 95% CI, –8.95 to –0.88; P = 0.018) had a significantly lower ISEL total score compared to those who identified as "White or Caucasian."

CONCLUSION: PIS is positively associated with QOL among patients undergoing chemotherapy. Cancer institutes should proactively make workforce, programmatic, and resource investments to better address gaps in support to improve QOL.

KEYWORDS: Interpersonal support; quality of life; cancer support; cancer survivorship

INTRODUCTION

The diagnosis of cancer has a profound impact on a patient's quality of life (QOL). Measuring QOL involves a diverse set of criteria related to physical, functional, psychological, social, behavioral, and spiritual well-being.[1] Similarly, a cancer diagnosis can heavily test a patient's interpersonal support system, defined as the perceived availability of interpersonal resources.[2] This definition broadly captures the diversity of social support systems, including structural (i.e., number of contacts in social network) and functional (i.e., the perceived availability of support such as financial aid or emotional support).[3,4] Reliance on interpersonal support points to a growing need to promote empathetic, inclusive, and accessible support systems for all patients with cancer, with a focus on integrating social support systems as a social determinant of health in oncology care. This is particularly critical considering patients' changing support needs when diagnosed with cancer and throughout the cancer continuum. For patients, their priority during illness may take the form of "spiritual struggle, the search for forgiveness, and the search for purpose and meaning in life."[5] Therefore, the goal of cancer treatment should not simply be to increase survival time but also to improve QOL.[6]

Social support systems have been determined to be highly important for maintaining optimal physical health, supporting mental health, and improving longevity, all of which can affect quality of life. A positive support system can enhance resilience to stress, protect against trauma-related experiences, and reduce clinical morbidity and specific/all-cause mortality.[7-9] Support from social networks has also been shown to buffer periods of unpredictability and/or adversity, such as during the COVID-19 pandemic and at the time of initial cancer diagnosis.[10-12] Experimental research has demonstrated the role three neurobiological pathways (autonomic nervous, neuroendocrine, and immune systems) play in linking social support with health and longevity. This includes inhibition of defense responses, promotion of homeostasis, social bond formation through parasympathetic system, hypothalamic pituitary axis (HPA) stress regulation, and oxytocin production, which can ultimately lead to higher perceived quality of life.[13]

Chemotherapy is one of the most common treatments for patients with cancer.[14] Its mechanism of action leads to killing of not only cancer cells but also healthy cells, causing side effects such as fatigue. Due to its many potential adverse side effects on the body, patients undergoing chemotherapy need strong emotional support and may require

interventions that promote mental health to deal with anxiety or depression.[15] As such, it is crucial to study how the interpersonal support structure can affect these specific patients with cancer.

This proof of concept study focuses on exploring the relationship between PIS and QOL for patients receiving chemotherapy at an academic medical center in Rhode Island. Given that greater support reduces the burden of navigating cancer on one's own, it is expected that increased PIS is associated with higher QOL in this patient population. By analyzing patient social support systems on quality of life in the largest cancer institute in Rhode Island, this study aims to identify specific areas of support that can impact resilience in patients with cancer and elucidate areas for investment at the cancer center level.

METHODS

Study Population

This study enrolled patients from the Brown University Health Cancer Institute at The Miriam Hospital (TMH) who met inclusion criteria of: (1) an adult 18+, and (2) receiving chemotherapy infusion treatment with an active cancer diagnosis. Brown University Health is a comprehensive, integrated, academic health system affiliated with The Warren Alpert Medical School of Brown University.

The cross-sectional study received approval from the Lifespan/ Brown University Health Institutional Review Board under expedited review 45 CFR 46.110(b)(1), Category 7(a) from the Human Research Protection Program. Patients were selected for an in-person interview during scheduled chemotherapy infusion appointments based on the normal course of care conducted by the oncologists, nurses, and the social worker team. Sampled patients were representative of the overall patient population. The study period was from February 9, 2024 to April 26, 2024.

Survey Methods

After confirming eligibility and obtaining consent from patients during interviews, trained research staff administered two surveys, including (1) a 12-item Interpersonal Support Evaluation List (ISEL), and (2) a 16-item Quality of Life Scale (QOLS). Trained study staff provided each potential participant with a consent form that included the name and contact information of the principal investigator and IRB. Study staff were available to answer any questions about the surveys should they arise.

The ISEL-12 is a modified 12-item measure of patient perception of social support.[16] The ISEL-12 is derived from the long original version of the ISEL and contains 12 items which assess the perceived availability of social support on a four-point scale ranging from "definitely false" to "definitely true." There are three subscales measuring appraisal, belonging, and tangible support scores consisting of four items each. Appraisal support measures perceived availability of someone to talk to about one's problem; belonging: people one can do things with; and tangible: availability of material aid. All items are summed to yield a total score (scores range 0–36).

The Quality of Life Scale (QOLS) is a 16-item measure of five conceptual domains of QOL which have strong correlation to social support: (1) material and physical well-being; (2) relationships with other people; (3) social, community and civic activities; (4) personal development and fulfillment; and (5) recreation.[17] A seven-point scale ranging from "delighted" (7), "pleased" (6), "mostly satisfied" (5), "mixed" (4), "mostly dissatisfied" (3), "unhappy" (2), "terrible" (1) is used. All items are scored to yield a total score (scores can range from 16 to 112).

Data Extraction

Key demographic characteristics of patients were collected from the EPIC Electronic Health Record (EPIC Systems, Verona, WI), including: gender, age, race, ethnicity, marital status, insurance type, prior consult history with a social worker, and advanced directive status. Additional clinical data collected include: cancer diagnosis category,[18] year of cancer diagnosis, and intent of current chemotherapy treatment.

Statistical Analysis

All descriptive results (as % of responses) using non-missing responses were reported across each of the ISEL and QOLS domains. Univariable linear regression analyses were conducted to identify any associations between collected demographic characteristics extracted from EPIC and performance on either the ISEL or QOLS. We finally ran a simple, unadjusted linear regression model to understand any association between performance on the ISEL and performance on the QOLS. Analyses were conducted using Stata version 18.0 (StataCorp LLC), with significance defined as $p < 0.05$.

RESULTS

Of 432 eligible chemotherapy patients being treated in the infusion rooms at the Norman & Rosalie Fain Health Center at TMH during the study period, 93 (22%) completed the prospective surveys and had an up-to-date and complete medical record for the purposes of our study [**Table 1**]. The average (SD) age was 68.4 years old (10.3). The majority of patients were male (50.5%), White or Caucasian (79.6%), not Hispanic or Latino (94.6%), married (64.5%), on Medicare (62.4%), diagnosed in 2023 or 2024 (59.1%), and the most common cancers were gastrointestinal (30.1%), genitourinary (23.7%), and breast (17.2%).

Cumulative ISEL Ratings

With the exception of question 5, over 70% of patients reported the highest level of PIS (either responding "definitely

Table 1. Demographic Characteristics of Interviewed Patients Undergoing Chemotherapy

Characteristic	N (%) N = 93
Gender	
Female	46 (49.5%)
Male	47 (50.5%)
Age	
Mean (standard deviation)	68.4 (10.3)
Race	
Black/African American	10 (10.8%)
White or Caucasian	74 (79.6%)
Other	9 (9.7%)
Ethnicity	
Hispanic or Latino	3 (3.2%)
Not Hispanic or Latino	88 (94.6%)
Prior Consult with Social Worker	
Yes	31 (33.3%)
No	62 (66.7%)
Year of Diagnosis	
2024	12 (12.9%)
2023	43 (46.2%)
2022	10 (10.8%)
2021	7 (7.5%)
Before 2021	21 (22.6%)

true" for normal scored or "definitely false" for reverse scored) [**Table 2**]. Questions as defined in the ISEL survey were categorized into one of the three types of PIS, either appraisal, belonging, or tangible. On average, patients expressed the highest level of PIS for appraisal support (80.1%), followed by tangible support (75.5%), and belonging support (71.8%). Across the interpersonal support scores, participants had the lowest PIS in belonging support, such as finding someone to go to a movie with on short notice.

Cumulative QOL Ratings

Overall, patients demonstrated high satisfaction in their QOL [**Table 3**]. Over 80% of patients were "delighted" or "pleased" with their material comforts; their relationships with parents, siblings, children, spouse/significant others, and close friends; reading, listening to music, and consuming other entertainment; and their independence. Of all QOL domains, patients reported the lowest average levels of satisfaction with their health (4.69), participation in organizations/public affairs (4.99), and participation in active recreation (4.89) on the 7-point scale.

Linear Regression Analysis

Among participants who fully completed the ISEL (n=92) and QOLS (n=55) surveys, the mean (SD) ISEL total score was 31.2 (6.0) out of a maximum of 36, and the mean QOLS total score was 93.5 (11.8) out of a maximum of 112 [**Table 4**].

Table 2. Interpersonal Support Evaluation List (ISEL) Results by Question

Question	1. definitely false	2. probably false	3. probably true	4. definitely true
I would have a hard time finding someone to go with me on a day trip.	73.4%	10.6%	7.5%	8.5%
There is no one I can share my most private worries and fears with.	90.4%	1.1%	5.3%	3.2%
If I were sick, I could easily find someone to help with my daily chores.	6.4%	2.1%	20.2%	71.3%
There is someone I can turn to for advice about handling family issues.	6.5%	3.3%	18.5%	71.7%
I could easily find someone to go with me to the movies that evening.	5.3%	6.4%	26.6%	61.7%
When I need suggestions on a personal problem, I know someone I can ask.	2.1%	2.1%	16.0%	80.0%
I don't often get invited to do things with others.	74.5%	11.7%	11.7%	2.1%
If I had to go out of town, it would be difficult to find someone who would look after my home.	73.4%	8.5%	9.6%	8.5%
If I wanted to have lunch, I could easily find someone to join me.	6.4%	2.1%	13.8%	77.7%
If I was stranded 10 miles from home, there is someone I could call who could come and get me.	3.2%	1.1%	9.6%	86.2%
If a family crisis arose, it would be difficult to find someone to give me advice.	78.5%	11.8%	4.3%	5.4%
If I needed some help moving to a new home, I would have a hard time finding someone to help.	71.3%	17.0%	6.4%	5.3%

Items 2, 4, 6, 11 make up the Appraisal Support subscale; Items 1, 5, 7, 9 the Belonging Support subscale; Items 3, 8, 10, 12 the Tangible Support subscale. Some items are reverse scored.

Table 3. Quality of Life Scale (QOLS) Results by Domain

Domain	1. Terrible	2. Unhappy	3. Mostly dissatisfied	4. Mixed	5. Mostly Satisfied	6. Pleased	7. Delighted
Material comforts	0.0%	0.0%	1.1%	5.4%	11.8%	28.0%	53.8%
Health, physically fit	0.0%	5.4%	12.9%	30.1%	20.4%	20.4%	10.8%
Relationships with parents, siblings & other relatives	0.0%	1.1%	0.0%	4.4%	10.9%	20.7%	63.0%
Having and rearing children	0.0%	0.0%	0.0%	7.8%	7.8%	11.7%	72.7%
Close relationships with significant other	1.3%	0.0%	1.3%	4.0%	4.0%	9.3%	80.0%
Close friends	0.0%	1.1%	0.0%	4.3%	10.8%	17.2%	66.7%
Helping others,volunteering, advising	0.0%	1.1%	3.2%	16.1%	17.2%	23.7%	38.7%
Organizations and public affairs	2.4%	7.1%	8.2%	22.4%	15.3%	21.2%	23.5%
Learning or school	1.2%	1.2%	8.1%	12.8%	24.4%	20.9%	31.4%
Knowing yourself, asset, limitations	0.0%	0.0%	0.0%	8.7%	17.4%	29.4%	44.6%
Work (job or home)	1.2%	1.2%	4.6%	10.3%	19.5%	26.4%	36.8%
Expressing yourself creatively	0.0%	2.1%	4.3%	14.9%	21.3%	28.7%	28.7%
Socializing-meeting other people, etc.	0.0%	4.3%	6.5%	10.8%	16.1%	29.0%	33.3%
Reading, music, and entertainment	0.0%	0.0%	2.2%	5.4%	12.0%	21.7%	58.7%
Active recreation	2.3%	5.7%	9.1%	22.7%	26.1%	11.4%	22.7%
One's independence	0.0%	1.1%	2.2%	9.7%	8.6%	25.8%	52.7%

Table 4. Regression Analysis of Associations with ISEL and QOLS scales

	ISEL (n=92)		QOLS (n=55)	
Mean (SD, Minimum, Maximum)	31.2 (6.0, 7, 36)		93.5 (11.8, 67, 112)	
Median	33.5		96.0	
Linear Regression	Coefficient (95% CI)	P-value	Coefficient (95% CI)	**P-value**
ISEL	—	—	**0.86 (0.28, 1.43)**	**0.004**
QOLS	**0.86 (0.28, 1.43)**	**0.004**	—	—
Male	0.72 (–1.81, 3.25)	0.57	–0.58 (7.08, 5.93)	0.86
Age	–0.01 (–0.13, 0.11)	0.88	0.11 (–0.20, 0.42)	0.47
Black or African-American	**–5.36 (–9.39, –1.32)**	**0.010**	–0.58 (–11.12, 9.95)	0.91
Other Ethnicity	**–4.91 (–8.95, –0.88)**	**0.018**	–0.08 (–10.62, 10.45)	0.99
Hispanic or Latino	–3.83 (–10.93, 3.27)	0.29	8.81 (–8.26, 25.88)	0.31
Prior Consult with Social work	–2.17 (–4.82, 0.49)	0.11	–2.99 (–9.82, 3.84)	0.38
Year of Diagnosis: 2021	4.55 (–1.03, 10.13)	0.11	2.21 (–9.70, 14.12)	0.71
Year of Diagnosis: 2022	0.41 (–4.22, 5.05)	0.86	0.56 (–12.43, 13.56)	0.93
Year of Diagnosis: 2023	1.21 (–2.01, 4.44)	0.46	**–7.64 (–15.28, –0.01)**	**0.05**
Year of Diagnosis: 2024	–0.54 (–4.90, 3.83)	0.81	–5.94 (–16.00, 4.13)	0.24

The association between ISEL total score and QOLS total score was evaluated using unadjusted, univariable linear regression. The coefficient for ISEL total score was 0.86 (95% CI, 0.28 to 1.43; P = 0.004), indicating that for each unit increase in the ISEL score, the QOLS score increased by 0.86 units. The model explained 14.5% of the variance in the QOLS total score (R-squared = 0.1446).

The association between demographic and clinical characteristics of patients and their performance on the ISEL and QOLS surveys were tested independently using univariable linear regressions. The coefficients for gender, age, ethnicity, marital status, insurance type, prior consult history with a social worker or psychologist, advanced directive status, cancer diagnosis category, year of cancer diagnosis, and intent of current chemotherapy were not significant for either survey with the exception of the year of 2023 for the QOLS.

Linear regression on the relationship between race and ISEL total score showed a significant effect of race on ISEL

total score (F(2, 88) = 5.78; P = 0.0044). The model explained approximately 11.6% of the variance in ISEL total score (R-squared = 0.1161). Patients who identified as Black or African American had a significantly lower ISEL total score, with a coefficient of –5.36 (95% CI, –9.39 to –1.32; P = 0.010) compared to those who identified as White or Caucasian. Similarly, those categorized as "Other" also had a lower ISEL total score, with a coefficient of –4.91 (95% CI, –8.95 to –0.88; P = 0.018). The average ISEL total score for the White or Caucasian reference group was 32.14 (95% CI, 30.80 to 33.47).

Similarly, the relationship between year of diagnosis and QOLS total score was examined using linear regression, with patients who were diagnosed in 2023 having a nearly significant lower QOLS total score, with a coefficient of –7.64 (95% CI, –15.28 to –0.01; P = 0.05) compared to those diagnosed before 2021, with a similar pattern observed in 2024 (although insignificant).

DISCUSSION

In approximately a quarter of adults receiving chemotherapy at TMH, our study found a positive association between PIS and QOL. With every unit increase in PIS, QOL increased by 0.86 units. This supports findings in other research contexts that have concluded the role of increased PIS in reducing anxiety and depression and improving physical health and response to negative life events.[19-22] Another study among patients with lung cancer undergoing chemotherapy demonstrated the important role of PIS as a mediator for the relationship between depression and QOL.[23]

Additionally, from the subset of patients identifying as Black or African American or Other, there is an indication of significant racial disparities in PIS and disparities in QOL that should be further tested. Although not shown to be statistically significant, there may be additional disparities for those more recently diagnosed with cancer among a broader cohort of patients undergoing chemotherapy.

Across ISEL domains, a majority of patients reported strong PIS. Lowest areas of satisfaction in belonging and tangible categories suggest strong potential for interventions and support from social workers and patient navigators to (1) build support groups among chemotherapy patients to promote engagement in social activities, and (2) build more comprehensive support resources for tangible tasks like moving, assisting with chores, or physical activities. Prior research has also demonstrated the role of strong PIS in reducing potentially unnecessary aggressive end-of-life care, emphasizing the need for this type of assessment in clinical care.[24-29]

Across QOL domains, our results indicate a strong focus among patients on their own lives and close networks rather than external affairs or activities. Mixed levels of satisfaction with health among chemotherapy patients could be addressed through programs related to chemotherapy-specific wellness and health maintenance education during the course of treatment. Interestingly, building community through recreational activities and civic engagement among these patients during chemotherapy can simultaneously improve QOL satisfaction and belonging support.

Our current support system, Brown University Health's Community Health Institute (CHI), has various programs in place to address social determinants of health, including social support needs such as screening for incarcerated and low-income patients. However, there is still limited programming for addressing social support systems among patients with cancer.[30-33] This type of limited support is evident across hospital systems throughout the country. From the perceived ratings of PIS and QOL, TMH and other cancer institutes across the country can undertake specific interventions to improve tangible supports and opportunities to improve belonging and community-building, along with specific health and recreation-focused efforts to improve QOL of patients undergoing chemotherapy.

Limitations

Our study does have some key limitations. Firstly, our smaller study showed a low survey response rate (22%) of eligible patients, which may be subject to non-response bias. Notably, characteristics of respondents to our survey were representative of non-respondents. From survey respondents, we were unable to collect an equal number of valid data for QOL as ISEL due to unanswered satisfaction ratings by patients during survey administration out of respect for patients' willingness to forgo answering certain questions. This study represents an exploratory analysis of patient-reported ratings within a defined study duration, and reflects survey response within routine clinical care rather than a longitudinal data collection effort. Due to the potential for high-patient attrition, variability in patient care plans, and difficulty contacting patients, a longitudinal collection was not conducted. We encourage future researchers to assess all criteria and coordinate with patient treatment teams to ensure collection of data. Secondly, although our sample was representative of the population at TMH, another issue was the lack of generalizable representation across racial and ethnic groups in the U.S., particularly minority groups. Future studies should include a broader and diverse sample to determine if the pattern found in our study holds for these populations. Finally, our linear regression model testing ISEL and QOLS was unadjusted. Given the limited sample size, multivariable adjustment for potential confounders in **Table 4** was not performed.

CONCLUSION

In conclusion, this proof of concept study revealed the positive association between PIS and QOL in patients receiving chemotherapy. The relatively lower ratings of belonging and tangible support compared to appraisal support highlight a need for support groups and services for tangible tasks, with a particular focus on African American and other racial/ethnic populations. Low satisfaction with health, participation in organizations/public affairs, and participation in active recreation calls for a way to bring together patients in programs that benefit wellness and health maintenance and encourage them to contribute toward positive change on issues. Our findings suggest that cancer institutes should find targeted interventions (i.e., social work, patient navigation, screening, etc.) to meaningfully address PIS and ultimately improve the QOL of the patients they serve.[34,35] This study's findings align with efforts of the American Cancer Society and the Centers for Medicare & Medicaid Services (CMS) calendar year (CY) 2025 Medicare Physician Fee Schedule (PFS) final rule, which provides reimbursement for principal illness navigation services.[36,37] We provide insights to better inform health systems in evolving to address the unique social support needs of patients with cancer to ultimately improve quality of life.

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Authors

Ian B. Lau, BS, Division of Biology and Medicine, Brown University; Brown University Health Cancer Institute, The Miriam Hospital, Brown University Health, Providence, Rhode Island.

Hamid R. Torabzadeh, BA, Division of Biology and Medicine, Brown University; Brown University Health Cancer Institute, The Miriam Hospital, Brown University Health, Providence, Rhode Island.

Wesley H. Peng, MS, Division of Biology and Medicine, Brown University; Brown University Health Cancer Institute, The Miriam Hospital, Brown University Health, Providence, Rhode Island.

Kathleen Higginbotham, LICSW, Brown University Health Cancer Institute, The Miriam Hospital, Brown University Health, Providence, Rhode Island.

Fred J. Schiffman, MD, MACP, Division of Biology and Medicine, Brown University; Brown University Health Cancer Institute, The Miriam Hospital, Brown University Health, Providence, Rhode Island.

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Correspondence

Ian B. Lau
ian_lau@brown.edu
ORCID: 0009-0009-0641-4590