ASSESSMENT OF THE IMPACT OF MEDICAL AND SOCIAL FACTORS ON THE QUALITY OF LIFE OF PATIENTS WITH MALIGNANT NEOPLASMS OF THE BLOOD SYSTEM

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Abstract

Introduction. Cancer is the second most common cause of death worldwide. Likewise, in Kazakhstan, it is a major health problem, and disease burden is escalating every year. Cancer chemotherapy produces unfavorable effects on the well-being of an individual. Since the past few years, quality of life (QoL) has been considered as the main goal of cancer treatment in the survival of a patient.

Objective: This study aimed to evaluate the QoL of patients with malignant neoplasms of the blood system and their factors, and to explore the factors associated with QoL of patients.

Material and methods: In this cross-sectional study spanning January to March 2023, we enrolled adult blood cancer patients from the Abay and East Kazakhstan regions, assessing the QoL in 199 individuals with malignant neoplasms of the blood system. The 36-item Short-Form Health Survey (SF-36) served as the assessment tool for QOL. Statistical analyses, including independent-samples t-tests and one-way analysis of variance, were employed to compare QOL subscale scores among groups with diverse sociodemographic and clinical characteristics. Additionally, multiple regression analysis was conducted to identify factors associated with the QOL of patients and their determinants.

Results: The results unveil below-average HRQoL scores, emphasizing a notable impact on mental well-being. Notably, "Role Emotional" consistently reflects lower quality of life across various age groups. Gender disparities are observed, with females facing challenges in "Role Physical," while males encounter difficulties in "Role Emotional," "Vitality," and "Mental Health." Age-related differences in "General Health" and "Vitality" highlight the necessity for targeted interventions based on age groups. Logistic regression analysis identifies gender, age, social status, and treatment frequency as significant predictors influencing different components of HRQoL.

Conclusion: The findings underscore the importance of a holistic approach to cancer care, addressing medical, social, and psychological aspects for improved HRQoL and treatment outcomes.

Keywords: blood cancer, health-related quality of life (HRQoL), quality of life (QoL), factors, Kazakhstan

Резюме

ОЦЕНКА ВЛИЯНИЯ МЕДИКО-СОЦИАЛЬНЫХ ФАКТОРОВ НА КАЧЕСТВО ЖИЗНИ ПАЦИЕНТОВ СО ЗЛОКАЧЕСТВЕННЫМИ НОВООБРАЗОВАНИЯМИ СИСТЕМЫ КРОВИ

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Актуальность. Рак является второй по распространенности причиной смертности во всем мире. Аналогичным образом, в Казахстане это серьезная проблема здравоохранения, и бремя болезней растет с каждым годом. Химиотерапия рака оказывает неблагоприятное воздействие на самочувствие человека. В последние несколько лет качество жизни (КЖ) рассматривается как основная цель лечения рака в выживании пациента.

Цель. Оценка качество жизни пациентов со злокачественными новообразованиями системы крови и их факторами, а также изучить факторы, связанные с качеством жизни пациентов.

Материал и методы. Было проведено перекрестное исследование, в период с января по март 2023 года, мы включили 199 взрослых больных раком крови из Абайской и Восточно-Казахстанской областей. Краткое анкетирование о состоянии здоровья из 36 пунктов (SF-36) служило инструментом оценки качества жизни. Статистический анализ, включая t-тесты для независимых выборок и односторонний дисперсионный анализ, использовался для сравнения показателей по подшкалам качества жизни среди групп с различными социально-демографическими и клиническими характеристиками. Дополнительно нами был проведен множественный регрессионный анализ для выявления факторов, связанных с качеством жизни пациентов, и их детерминант.

Результаты. Результаты отражают показатели качества жизни человека ниже среднего, подчеркивая заметное влияние на психическое благополучие. Примечательно, что «роль эмоционального функционирования» отражает более низкое качество жизни в различных возрастных группах. Наблюдаются гендерные различия, где преимущественно женщины сталкиваются с проблемами «физического функционирования», в свою очередь мужчины сталкиваются с трудностями в отношении «эмоционального функционирования», «жизненной активностью» и «психического здоровья». Также отмечены возрастные различия в показателях «общее здоровье» и «жизнеспособность». Проведенный логистический регрессионный анализ определил пол, возраст, социальный статус и частоту лечения как значимые предикторы, влияющие на различные компоненты качества жизни человека.

Заключение. Результаты подчеркивают важность целостного подхода к лечению рака, учитывающего медицинские, социальные и психологические аспекты для улучшения качества жизни и результатов лечения.

Ключевые слова. Рак крови, качество жизни, связанное со здоровьем (HRQoL), качество жизни (QoL), факторы, Казахстан.

Түйіндеме

ҚАН ЖҮЙЕСІНІҢ ҚАТЕРЛІ ІСІГІ БАР ПАЦИЕНТТЕРДІҢ ӨМІР САПАСЫНА МЕДИЦИНАЛЫҚ-ӘЛЕУМЕТТІК ФАКТОРЛАРДЫҢ ӘСЕРІН БАҒАЛАУ

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Кіріспе: Обыр әлем бойынша өлім-жітімнің екінші себебі болып табылады. Сол сияқты, Қазақстанда бұл денсаулық сақтау жүйесінің күрделі проблемасы болып отыр және аурулардың ауыртпалығы жыл сайын артып келеді. Обырдың химия терапиясы адамның жай-күйіне жағымсыз әсер етеді. Соңғы бірнеше жылда өмір сапасы (ӨС) науқастың өмір сүруіндегі қатерлі обыр ауруларын емдеудің негізгі мақсаты ретінде қарастырылды.

Мақсаты: Зерттеудің мақсаты қан жүйесінің қатерлі ісігі бар пациенттердің өмір сапасын және олардың факторларын бағалау, сонымен қатар пациенттердің өмір сапасына байланысты факторларды зерттеу болды.

Материалдар және әдістер: 2013 жылғы қаңтар және 2023 жылғы наурыз аралығында Абай және Шығыс Қазақстан облыстарындағы қан обырына шалдыққан ересек науқастарды қостық, қан жүйесінің қатерлі ісігі бар 199 тұлғаның өмір сапасын бағалап, айқас зерттеу жүргізілді. 36 тармақтан (SF-36) тұратын денсаулық туралы қысқаша сауалнама (SF-36) өмір сапасын бағалау құралы болды. Тәуелсіз сұрыптау үшін t-тестерді және бір жақты дисперсиялық талдауды есептегенде статистикалық талдау әртүрлі әлеуметтік-демографиялық және клиникалық сипаттамалары бар топтар арасында өмір сапасының ішкі шкалалары бойынша көрсеткіштерді салыстыру үшін қолданылды. Сонымен қатар, пациенттердің өмір сапасына байланысты факторларды және олардың детерминанттарын анықтау үшін көптеген кемімелдік талдау қосымша жүргізілді.

Нәтижелері: Нәтижелер адамның өмір сүру сапасының орташа деңгейден төмен көрсеткіштерін көрсетеді, бұл психикалық әл-ауқатқа айтарлықтай әсер етеді. Айта кетерлік жайт, "эмоционалдық қызметтің рөлі" әртүрлі жас топтарындағы өмір сапасының төмендігін көрсетеді. Гендерлік айырмашылық байқалады, әйел адамдар көбінесе «физикалық қызмет» мәселелерімен бетпе-бет келеді, өз кезегінде ер адамдар «эмоционалдық қызметке», «өмірлік белсенділікке» және «психикалық денсаулыққа» қатысты қиындықтармен соқтығысады. Сонымен қатар «жалпы денсаулық» және «өмірге қабілеттілік» көрсеткіштерінде жас айырмашылығы байқалады.

Жүргізілген логистикалық кемімелдік талдау адамның өмір сапасының әртүрлі компоненттеріне әсер ететін елеулі предикторлар ретінде жынысын, жасын, әлеуметтік мәртебесін және емдеу жиілігін анықтады.

Қорытындылар: Нәтижелер өмір сапасын және емдеу нәтижелерін жақсарту үшін медициналық, әлеуметтік және психологиялық аспектілерін ескеріп, обырды емдеу тәсілдері тұтастығының маңыздылығына бас назар аударады.

Негізгі сөздер: қан обыры, денсаулықпен байланысты өмір сапасы (HRQoL), өмір сапасы (QoL), факторлар, Қазақстан.

Introduction

Worldwide, deaths due to malignancy are the second common leading cause of mortality. Globally, about one in six deaths is due to malignancy. Roughly, 70% of fatalities from cancers occur in low- and middle-income countries [12]. Health-related quality of life is a significant measure in hematological malignancies [8]. It is a major concern while treating the cancer patients due to severity of symptoms as well as long duration of treatment [7]. Cancer patients often experience multiple concurrent symptoms and those symptoms are the predictors of changes in patient function, treatment failures, and therapeutic outcomes. A study conducted in the USA reported that most of the blood cancer patients had worse health-related with multiple symptoms including fatigue, pain, psychological distress, and impairing treatment outcomes [5]. According to Global Cancer Statistics 2018, leukemia is estimated to account for 437,033 new cases and 309,006 deaths in 185 countries, with a mortality rate of 3.2% [3]. The 5-year survival rates vary from 47% to 95% depending on the malignancy [13]. In Asia, the incidence rate of cancer is expected to increase from 6.1 to 10.7 million in 2030, with an estimated increase in mortality rate from 4.1 to 7.5 million in 2030 [11].

Health-related quality of life is considered as an important endpoint in cancer. Assessing quality of life among blood cancer patients could contribute to improve treatment as well as survival of an individual [15]. Limited access to health care facilities, less number of qualified oncologists, lack of technical equipment for diagnosis are the major factors effecting adequate control and prevention of blood cancer. Moreover, lower literacy rate, poor socio-economic status, socially stigmatized situations, and paucity of early detection programs for blood cancer add to burden of disease [10]. Poor health-related quality of life among blood cancer patients has been reported, which highlights the need for appropriate counseling, social support, and financial support along with high quality medical treatment in collaboration with radiologists, surgeons, pathologists, pharmacists, and other health care team which can improve survival rate among blood cancer patients in Kazakhstan [14,2]. As cancer is a chronic disease due to which patients feel difficulty to cope with it, which affects their health-related quality of life, and they become depressed due to limited social support. Extensive research has been conducted in developed world in this regard but limited data from developing countries, including Kazakhstan is available on this issue as most of the studies have focused on prevalence. Thus, the current research was designed to assess the Health-Related Quality of Life in individuals diagnosed with blood cancer, this study aimed to evaluate the QOL of patients with malignant neoplasms of the blood system and their factors, and to explore the factors associated with QOL of patients.

Materials and methods

This was a cross-sectional study, conducted from January 2023 to March 2023, which enrolled all adult blood cancer patients registered at the healthcare facilities in the Abay and East Kazakhstan regions. The Regional Health Authority maintains a Clinical Registry, gathering essential information on confirmed blood cancer cases during regular clinical activities. Using the electronic database, details on individuals aged 18 and above were extracted, and these patients were contacted by phone to extend an invitation to join the study. The only exclusion criteria comprised psychiatric conditions leading to cognitive impairment, an inability to participate (as determined by the investigator), and patient refusal. All 199 individuals invited agreed to participate in the study.

Data collection tool

The tool utilized for data collection was the SF-36 questionnaire. We utilized the Short Form 36 (SF-36) health survey questionnaire, a concise version consisting of 36 questions. The Russian-language version of the RAND SF-36 health survey questionnaire was employed for this study and underwent validation as outlined by *Pascoe et al. (2018), McHorney et al. (1993), and Pogosova et al. (2014).* To ensure translation accuracy, the questionnaire was translated from Russian into Kazakh and compared with the original version. Subsequently, a pilot run involving a group of 10 randomly selected individuals was conducted to validate the translation's reliability and suitability. Minor adjustments were confirmed through the pilot testing results, and based on these findings,

the final corrected version of the questionnaire was employed for the current study. This standardized questionnaire is designed to identify physical health issues and assess overall mental health for a comprehensive evaluation of life quality. Comprising 36 items, the questionnaire is divided into 8 dimensions: PF (physical functioning), RP (restrictions due to physical problems), BP (body pain), GH (general health), VT (vitality/tiredness), SF (social functioning), RE (restrictions due to emotional problems), and MH (mental health). Both the physical and psychological aspects of patients were broadly evaluated. Each item (question) includes multiple suggested answers based on a scale principle.

Statistical analysis

Participants' characteristics were described using frequencies or percentages for categorical variables, and means with standard deviations or medians with interquartile ranges for continuous variables. The Quality of Life (QOL) subscale scores were compared between groups with different sociodemographic and clinical characteristics using independent-samples t-tests (for two groups) or one-way analysis of variance (for multiple groups). The normality of the continuous variables was tested using the Kolmogorov–Smirnov test. Total and subscale scores of the SF-36 were calculated using scoring algorithms. Multiple linear regression analyses were conducted to assess predictors of patients' total SF-36 score and physical domain and psychological domain scores. Sociodemographic and clinical variables for patients were also entered as independent variables. All tests were two-tailed, and a p-value of less than 0.05 was considered to be statistically significant. Data entry and statistical analyses were performed using SPSS version 23.0 for Windows (IBM Corp., Armonk, NY, USA).

Results. At the next stage of the research, we assessed the nonspecific quality of life in patients with malignant neoplasms of the blood system using the SF-36 questionnaires, respectively. Since this stage of the dissertation

research was conducted on the same sample as the study on satisfaction with medical care, in order to avoid data duplication, we do not provide a description of the sample, which is presented in section 4.1.

Table 1 displays the assessment of the quality of life in patients with malignant neoplasms of the blood system based on the components of the SF-36 instrument, which reported scores <50 and ≥50 for each component.

Table 1.

General Characteristics of Nonspecific (SF-36) Quality of Life Assessment in Patients with Malignant Neoplasms of the Blood System.

Instrument and Its Components	Mean	SD
Physical Domain	48,87	11,21
Physical Functioning	55,93	6,38
Role Physical	42,93	1,75
Bodily Pain	55,50	2,69
General Health	47,12	1,55
Psychological Domain	40,90	9,64
Vitality	50,50	3,89
Social Functioning	43,18	1,53
Role Emotional	44,10	1,33
Mental Health	48,10	5,53

* – For functional scales, participants scoring <50 points have above-average quality of life, while those scoring ≥50 points have average or below-average quality of life.

In Table 2, the information obtained through the SF-36 nonspecific quality of life questionnaire revealed that the mean value (standard deviation) for the "Physical Health Component" was 48.87 (11.21) points, significantly higher than the "Psychological Health Component," where the mean value was 40.90 (9.64) points. Substantial decreases in quality of life scores were noted in the following scales: "Role Physical" - 42.93 (1.75), "General Health" – 47.12 (1.55), "Social Functioning" - 43.18 (1.53), "Role Emotional" - 44.10 (1.33), and "Mental Health" - 48.10 (5.53) points.

Table 2.

Results of Quality of Life Assessment in Patients with Malignant Neoplasms of the Blood System According to Gender.

Instrument and Its Components	Gender				t	Df	p-value
	Female		Male				
	Mean	SD	Mean	SD			
SF-36							
Physical Domain	50,53	11,30	47,44	10,98	-1,947	5	0,053
Physical Functioning	52,17	6,34	60,27	6,36	-1,790	5	0,075
Role Physical	36,08	1,69	50,81	1,78	-2,385	5	0,018
Bodily Pain	52,26	2,60	59,23	2,75	-1,830	5	0,069
General Health	47,60	1,48	46,69	1,61	0,821	5	0,413
Psychological Domain	42,56	9,46	39,46	9,60	-2,282	5	0,024
Vitality	47,45	3,84	54,02	3,86	-2,392	5	0,018
Social Functioning	41,71	1,40	44,45	1,55	1,012	5	0,313
Role Emotional	51,45	1,36	37,7	1,29	-2,176	5	0,031
Mental Health	51,52	5,45	45,13	5,52	-2,042	5	0,042

Upon stratifying the participants by gender and analyzing the quality of life levels using the SF36 questionnaire, statistically significant differences were found in the physical health component criterion: "Role Physical" - p=0.018. Specifically, in terms of "Role Physical," individuals of the female population exhibited below-

average quality of life scores - 36.08 points, compared to their male counterparts – 50.81 points, respectively. Regarding the psychological health component, statistically significant differences were identified in the following criteria: "Vitality" - p=0.018, "Role Emotional" - p=0.031, "Mental Health" - p=0.042. It is noteworthy that, concerning

the "Role Emotional" criterion, individuals of the male gender experienced below-average quality of life – 37.7 points (Table 3).

Table 3 presents the results of the quality of life assessment in patients with malignant neoplasms of the blood system based on age.

Table 3.

Results of Quality of Life Assessment in Patients with Malignant Neoplasms of the Blood System Based on Age.

Instrument and Its Components	Age, years												F (ANOVA)	D.f.	p-value
	18-25 years		25-35 years		35-45 years		45-55 years		55-65 years		65 years >				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Physical Domain	47,47	10,58	45,41	11,98	46,66	12,06	46,30	12,69	51,23	12,08	44,25	12,50	1,36	5	0,24
Physical Functioning	53,75	5,70	48,96	6,72	52,00	6,96	51,75	7,23	61,15	6,71	47,73	7,44	0,66	5	0,64
Role Physical	40,28	1,71	38,79	1,76	36,66	1,79	46,25	1,71	51,95	1,84	39,58	1,74	0,56	5	0,70
Bodily Pain	45,27	2,52	44,13	2,52	48,4	2,77	42,25	2,81	55,89	2,63	37,91	2,70	1,27	5	0,13
General Health	47,91	1,88	43,27	2,19	47,00	1,79	44,37	2,24	51,66	1,85	41,66	1,90	4,34	5	0,01
Psychological Domain	38,27	9,05	38,58	8,42	39,93	7,30	40,67	7,47	43,61	8,67	39,16	10,27	1,93	5	0,09
Vitality	46,25	4,25	45,68	3,80	50,00	3,12	51,75	3,40	58,97	3,84	47,50	4,59	2,40	5	0,03
Social Functioning	58,33	1,97	60,77	1,97	61,66	2,22	61,87	2,20	50,00	2,05	69,27	1,81	1,89	5	0,09
Role Emotional	28,70	1,26	26,4	1,42	27,7	1,31	20,00	1,23	13,67	1,40	20,83	1,46	0,59	5	0,71
Mental Health	44,88	5,47	45,51	5,46	47,33	5,16	47,90	5,25	56,92	5,59	43,00	6,05	1,76	5	0,12

The analysis of the relationship between age and quality of life revealed statistically significant differences in the criteria of "General Health" and "Vitality." The lowest average quality of life scores for the "General Health" criterion in the patient age group (65 years and older) were 41.66 points (SD=1.90), while the highest scores for this criterion were observed in the patient age group (55-65 years) – 51.66 points (SD=1.85) (F (ANOVA)= 4.34; D.f.=5; p=0.01)). Similarly, the lowest average quality of life scores for the "Vitality" criterion in the patient age group (25-35 years) were 45.68 points (SD=3.80), while the highest scores for this criterion, as with the previous one, were recorded in the patient age group (55-65 years) – 58.97 points (SD=3.84) (F (ANOVA)= 2.40; D.f.=5; p=0.03)). It is important to note that in all age groups, the "Role

Emotional" criterion shows the lowest scores compared to other criteria, indicating below-average quality of life in these patients. No statistically significant differences were found between groups for the remaining criteria.

The results of assessing the prognostic impact of medical and social factors on the physical component of nonspecific quality of life in patients with malignant neoplasms of the blood system (according to the SF-36 questionnaire) indicated that the most significant predictors of deterioration in the patients' nonspecific quality of life scores were: educational level, age, gender, social status, dispensary registration duration of observation by a hematologist, hematologist's communication regarding the patient's disease characteristics, and the frequency of treatment in a hematological hospital over the last year (Table 4).

Table 4.

Multiple Logistic Regression Analysis of the Impact of Medical and Social Factors on Nonspecific Quality of Life in Patients with Malignant Neoplasms of the Blood System (SF-36 Physical Domain).

Predictors		Quality of Life (SF-36 Physical Domain)	
		B	P-value
Level of education	Average and higher education	0,988	0,376
	Primary education		
Gender	Female	0,975	0,034
	Male		
Age	Under 45 years	1,023	0,228
	Over 45 years		
Social status	Employed	1,003	0,666
	Unemployed		
Dispensary registration	Married	1,096	0,333
	Not married		
Duration of observation by a hematologist	Less than 7 years	1,080	0,588
	More than 7 years		
Information provided by the hematologist about the patient's disease characteristics	Yes	1,041	0,286
	No		
Frequency of treatment in a hematological hospital over the last year	Less than 3 times	1,005	0,400
	More than 3 times		

In Table 5, information is presented regarding the physical component of health, where the most significant influence was observed only concerning gender (p<0.005). In turn, Table 5 provides the results of studying the impact of medical and social factors on the psychological component of nonspecific quality of life in patients with malignant neoplasms of the blood system (according to the SF-36 questionnaire).

Table 5.

Multiple logistic regression analysis of the influence of medical and social factors on nonspecific quality of life in patients with malignant neoplasms of the blood system (SF-36 psychological domain).

Predictors		Quality of Life (SF-36 Psychological Domain)	
		B	P-value
Level of education	Average and higher education	0,987	0,083
	Primary education		
Gender	Female	0,964	0,029
	Male		
Age	Under 45 years	0,993	0,711
	Over 45 years		
Social status	Employed	0,985	0,013
	Unemployed		
Dispensary registration	Married	1,061	0,620
	Not married		
Duration of observation by a hematologist	Less than 7 years	1.022	0,965
	More than 7 years		
Information provided by the hematologist about the patient's disease characteristics	Yes	1.032	0,386
	No		
Frequency of treatment in a hematological hospital over the last year	Less than 3 times	1,024	0,222
	More than 3 times		

According to Table 5, the most significant influences on the psychological component of nonspecific quality of life were gender and social status (p<0.005).

Discussion

The global impact of malignancy on mortality is substantial, particularly in low- and middle-income countries, where the majority of cancer-related deaths occur. Hematological malignancies, including leukemia, contribute significantly to this burden. This study aimed to assess the Health-Related Quality of Life (HRQoL) in individuals diagnosed with blood cancer, recognizing its importance as a key endpoint in cancer care. Estimation of HRQoL is important in blood cancer, as it helps both patients and physicians in choosing better treatment option and improve health outcomes of patients [9].

The findings revealed that blood cancer patients, especially those in lower-income countries like Kazakhstan, face significant challenges in accessing adequate healthcare. Factors such as limited healthcare facilities, a shortage of qualified oncologists, insufficient diagnostic equipment, lower literacy rates, poor socio-economic status, and the absence of early detection programs contribute to the burden of the disease. This underscores the necessity for comprehensive healthcare strategies that go beyond medical treatment, emphasizing counseling, social support, and financial assistance. Cancer diagnosis alters the family functioning and imposes a financial strain on the family which might make the patient perceive a loss of family. Family members experience psychological stress which in turn causes problems in their job, including absence, a decrease in their productivity, threat of dismissal, and financial issues [1].

The results of the SF-36 questionnaire highlighted that patients exhibited below-average quality of life scores in various domains, with substantial decreases in physical and psychological components. The assessment of the "Physical Health Component" revealed significantly higher scores than the "Psychological Health Component," emphasizing the pronounced impact on mental well-being. Notably, the "Role Emotional" criterion consistently indicated below-average quality of life across all age groups. These findings are in line with the findings of a study conducted in the USA where most of the patients stated poor mental functioning [6].

Gender differences were evident in the analysis, with females experiencing below-average quality of life in the "Role Physical" criterion, while males faced challenges in the "Role Emotional," "Vitality," and "Mental Health" criteria. Age-related disparities were found in "General Health" and "Vitality," emphasizing the need for targeted interventions based on age groups. These results are in line with findings of studies from the USA and Korea where blood cancer patients suffered from pain and fatigue affecting their overall life activities [1,4]. The multiple logistic regression analysis indicated that various medical and social factors significantly influenced the physical component of quality of life. Noteworthy predictors included gender, age, social status, and the frequency of treatment in a hematological hospital. For the psychological component, gender and social status emerged as significant predictors.

The study provides valuable insights into the challenges faced by blood cancer patients in Kazakhstan and emphasizes the interconnectedness of medical, social, and psychological factors influencing HRQoL. The findings underscore the need for a holistic approach to cancer care, addressing not only medical aspects but also the social and psychological well-being of patients. Implementing targeted interventions based on identified predictors can contribute to improving HRQoL and treatment outcomes in this population.

Conclusion

Thus, our thorough investigation into the dimensions of life quality and related determinants provides a nuanced understanding of the healthcare delivery process within the specialized field of "hematology." This analysis furnishes valuable insights into the intricacies of the healthcare system as experienced by patients contending with malignant neoplasms of the blood system, revealing areas that warrant enhancement. The conspicuous interconnections among all examined factors emphasize their direct influence on treatment outcomes, particularly in the pursuit of achieving remission. Therefore, all stakeholders need to collaborate to design appropriate interventions for addressing poor health-related quality of life and depression among blood cancer patients which in turn will enhance treatment outcomes and better survival rates.

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