# Cancer Patients' Awareness, Sustainability, and Psychosocial Dynamics in Healthcare Organizations Impacting Quality of Life

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## Abstract

**Purpose:** This research aimed to explore the effect of awareness/knowledge and measures taken for sustainability to improve the quality of life feeling for cancer patients of the Kingdom of Saudi Arabia. Moreover, this research used cancer patients' psychosocial problems and barriers of healthcare organizational sustainability as moderators in this study to develop better understanding for cancer patients and healthcare organizations. **Method:** To achieve the objectives of this research, this study employs structural equation modeling (SEM) with STATA software. Whereas the data for this research was collected from 89 cancer patients of the Kingdom of Saudi Arabia. **Findings:** The findings demonstrate a positive relation between awareness/knowledge and measures taken for sustainability and the cancer patients' quality of life feeling. Furthermore, cancer patients' psychosocial problems and barriers of healthcare organizational sustainability served as significant moderators in this proposed direct relationship. **Implications:** By exploring awareness/knowledge and measures taken for sustainability within the framework of KSA's cultural and regional dynamics, this study closes a knowledge gap in the current literature. The results not only have theoretical implications for future research but also have a practical call for policymakers and healthcare workers to form patient-centric and sustainable care centers for cancer patients. This study is novel in its context of Middle East healthcare workers establishing such sustainable care centers for cancer patients.

**Keywords:** Sustainability, Cancer Patients, Psychosocial Factors, Healthcare Organizational Barriers, Quality of Life.

## INTRODUCTION

Cancer is a complicated and pervasive health issue that affects people on a personal, family, and community level and presents a major worldwide concern. In addition to medical therapies, understanding cancer care entails taking into account a variety of issues, including the emotional, environmental, and organizational components.[1,2] In the past few years, making informed decisions and placing a high priority on one's general health have emerged as essential components of patient-centered care. Research by Qan'ir *et al.*[3] and Burg *et al.*[4] show how patient awareness improves health outcomes, highlighting the role of knowledge in cancer treatment. van der Kruk *et al.*[5] emphasized that patient outcomes may be improved by environmentally friendly policies and sustainability practices in the healthcare sector. Although these research emptied the need of knowledge for cancer patients, but the intersection of patient awareness, sustainability measures, and psychosocial dynamics within healthcare organizations remains a relatively unexplored area; prompting the need for a nuanced investigation.

The literature and practice of cancer treatment have both been enhanced by the results of numerous empirical investigations. Research[6-8] consistently shows that increased patient awareness leads to better health outcomes. According to research, patients should understand their cancer treatment options.[9,10] These findings show that when cancer patients make informed decisions, their overall health improves. Environmentally friendly policies may encourage a more holistic approach to patient care, as evidenced by the link between better patient outcomes and sustainable healthcare practices within organizations.[11]

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Studies have shown that providing psychosocial support can improve the quality of life for cancer patients, emphasizing the importance of receiving comprehensive emotional and mental health care.[12] Moreover, Hlubocky et al.[13] found that well-informed patients had a higher quality of life and were more likely to stick to their treatment plan. Deshields et al.[14] claims that when cancer patients are informed, they can participate in decision-making. Research on healthcare sustainability shows that green policies are beneficial. Furthermore, Avancini et al.[15] provided compelling evidence of the close relationship between environmental responsibility and patient care through their demonstration of the benefits of sustainable healthcare practices on patient outcomes. Batalik et al.[16] concluded that there is a link between long-term healthcare sustainability and patient satisfaction. Although these studies provide useful information, a comprehensive framework is required to fully understand how these factors affect the quality of life of cancer patients. Despite these advances, research on the relationship between patient awareness, sustainability metrics, and psychosocial dynamics has been relatively limited.

Although, numerous research[8,12,15] emphasizes individual psychological support, sustainable behaviors, and patient awareness, but still the further exploration gap exists on an integrated viewpoint. Research has mostly focused on the separate elements of patient awareness and sustainability practices;[17] however, little is known about the ways in which these components interact or about the potential moderating effects of psychosocial factors. Koshimoto et al.[18] state that certain research examine the impact of psychological issues or organizational sustainability obstacles on these factors. The intricate interactions between these elements in healthcare organizations remain unknown. Even though patient awareness and sustainability measures have received more attention than psychosocial problems,[19] empirical data indicates that the former improves outcomes.[20] Because these linkages are rarely examined in the available literature,[21] it is difficult to understand how organizational sustainability metrics, psychosocial problem dynamics, and patient awareness combine to affect cancer patients' quality of life. To identify complex interactions and moderating factors that haven't received enough attention in the literature, this study employs a rigorous technique.

This investigation is grounded in the Health Belief Model (HBM) and the Ecological Systems Theory. According to the Health Belief Model (HBM), an individual is more inclined to engage in health-promoting behaviors when they hold the belief that performing specific actions will result in improved health and when they possess an understanding of the severity and vulnerability of their health condition. [22] A greater understanding and consciousness of the disease among patients may alter their perception of cancer, potentially resulting in a greater emphasis on preventive and long-term healthcare measures. The ecological systems theory proposed by Bergerot et al.[23] provides a framework for understanding the dynamic interactions that occur between human beings and their surroundings. By applying this theory to the research, the healthcare organizational context is transformed into a significant ecological system in which cancer patients' quality of life is influenced by psychosocial challenges, sustainability strategies, and patient awareness. This study seeks to examine the interconnections between quality of life, awareness of sustainability issues, psychosocial challenges faced by cancer patients, and the sustainability measures implemented by healthcare organizations, in addition to analyzing the moderating effect of sustainability barriers. With the ultimate goal of developing interventions and policies that improve the quality of life for individuals diagnosed with cancer, scientific inquiry endeavors to acquire a more profound comprehension of the complex mechanisms that influence their lives.

## LITERATURE REVIEW

Cancer patients' quality of life can be better understood by looking into the complex interaction between psychosocial dynamics, healthcare institutions' sustainability practices, and cancer patients' awareness. Several studies have demonstrated the significance of patient awareness in cancer treatment.[24,25] There are various psychosocial disorders that can have an impact on emotional and mental well-being, going beyond just physical concerns. A significant amount of research[26] has shown a link between patient comprehension and better health outcomes, as well as the importance of making informed decisions throughout the cancer journey. The Bochicchio et al.[27] research also looks into ways to healthcare sustainability. Understanding the value of resource management, sustainable healthcare policy, and environmental awareness has become critical to providing great patient care.[28] The study found that these environmentally friendly activities can benefit cancer patients' health. Several research, such those by Muhamed et al.[29] and van Hof et al.[30], indicate that the goal is to strike a compromise between environmental protection and patient care. A closer examination at hospital psychosocial dynamics reveals medicines and support networks that assist cancer patients develop emotional and mental resilience. Many studies[18,31] have demonstrated that providing psychosocial support can help with the mental issues associated with cancer diagnosis and treatment. Support networks in healthcare organizations must be thoroughly understood if they are to improve cancer patients' quality of life. Two recent investigations, of Lee et al.[19] and Laprise[21], have emphasized this issue.

Literature emphasizes that when someone has cancer, they need to fully understand what they are going through, their treatment choices, and how they are feeling.[24] This component goes beyond simple medical knowledge to provide a comprehensive understanding that empowers people to make educated decisions about their health care.[8] Many healthcare facilities demonstrate their commitment to sustainability by protecting the environment, using their resources wisely, and abiding by legal requirements. These actions demonstrate how seriously healthcare organizations

take patient care and environmental responsibility.[12] Ultimately, the quality of life that cancer patients report ultimately reflects their general state of well-being. It covers mental, emotional, and social problems in addition to physical health.[20] This perspective is becoming more and more supported by an expanding body of research. Numerous studies back up the notion that patient education might enhance health outcomes.[14] According to a study conducted by Ofei et al.[22], patients who understood their treatment were more likely to adhere to it and had higher quality of life. Pérez-Bilbao et al.[26] about the benefits of education for cancer patients. Well-informed patients are better able to make decisions regarding their diseases. It has been demonstrated that using sustainable healthcare practices improves patient outcomes. According to a recent study by van der Kruk et al.[5], implementing environmentally friendly policies may support patient-centered care. A recent study by Dewi et al.[24] examined the relationship between patient satisfaction and health and sustainable healthcare practices. The proposed hypothesis which is supported by past empirical research[13,23], states that improving people's knowledge, teaching them, and motivating them to develop sustainable behaviors can all help cancer patients live better lives. According to research[11,32], persons who fully comprehend their mental and physical well-being are more likely to have a good outlook on their general state of health. Patients with cancer are more likely to be happy in hospitals that prioritize sustainability. Prioritizing patient-centered care, this method highlights the connection between enhancing the health of cancer patients, encouraging environmentally friendly healthcare, and making wise decisions.

H1: Awareness/knowledge and measures taken for sustainability has a significant impact on quality of life feeling for cancer patients.

Social,[29] psychological,[27] and emotional problems[24] are common among cancer patients while they receive treatment. These issues are influenced by both social and psychological factors. Cancer patients may experience anxiety, depression, social isolation, and other negative mental health effects.[33] A substantial amount of information is accessible with respect to cancer conditions, treatments, and maintenance. Aspects of sustainability include enhancements in the resource efficacy, environmental consciousness, and policymaking of healthcare organizations.[5] Cancer and the correlation between the two have been the subject of extensive research. Psychosocial support has been associated with a reduction in psychological distress among cancer patients, according to studies by Chan et al.[12] and Ferrara et al.[8]. It appears that the emotional and mental health of cancer patients positively influences their quality of life, as suggested by these findings. Significant evidence has been recently uncovered by Dobre et al.[20] and Lee et al.[19] indicating that an increase in patient awareness results in enhanced health outcomes. The aforementioned findings underscore the importance

of exercising informed judgment when it comes to cancer treatment. Recent research has established that the implementation of sustainable healthcare practices leads to more comprehensive and favorable patient outcomes.[21] Ehlers et al.[2] discovered the advantages of these practices. The empirical research[14,16] supports the current study proposed hypothesis that the mental well-being of individuals undergoing cancer treatment significantly influences their level of understanding, long-term prognoses, and general health. The mental well-being of a cancer patient might be enhanced through increased knowledge and understanding of sustainable healthcare practices.[21] Cancer patient sustainability and awareness initiatives may be more effective at enhancing patients' well-being if we have a greater understanding of the social and psychological barriers they encounter. Due to the multifaceted nature of the disease, cancer treatment must be exhaustive.

H2: Cancer patients' psychosocial problems significantly moderate the relationship between awareness/knowledge and measures taken for sustainability and quality of life feeling for cancer patients.

Sustainability challenges make it difficult for healthcare organizations to embrace sustainable practices. Long-term endeavors might be hampered by a lack of infrastructure, a fear of change, and financial limits.[15] As previously explored by research[14] that cancer patients benefit from increased awareness and understanding about their condition, treatments, and healthcare. Sustainability, resource efficiency, and environmental responsibility are important values for healthcare organizations. Previous research[3,33] has demonstrated the difficulty of achieving healthcare sustainability. Recent research by Koshimoto et al.[18] and Han et al.[11] indicates that sustainable healthcare practices improve patient outcomes. These studies highlight the advantages of resource management. Hlubocky et al.[13] report that healthcare organizations encounter budgetary restrictions and internal resistance while implementing sustainable practices. Chan et al.[12] similarly observe that knowledge influences patient outcomes. Clearly, informed decisions benefit health. According to Deshields et al.[14], the sustainability difficulties that healthcare institutions face have an impact on cancer patients' quality of life, sustainability metrics, and awareness/knowledge. Healthcare institutions can influence cancer patients' perceptions and provide benefits through awareness, information, and sustainability efforts. [21] Healthcare sector could increase cancer patients' well-being by tackling the issues that healthcare companies face through awareness and sustainability initiatives. Sustainable healthcare practices can offer comprehensive cancer therapy, but dedication and understanding are required.

H3: Barriers of healthcare organizational sustainability significantly moderate the relationship between awareness/ knowledge and measures taken for sustainability and quality of life feeling for cancer patients.
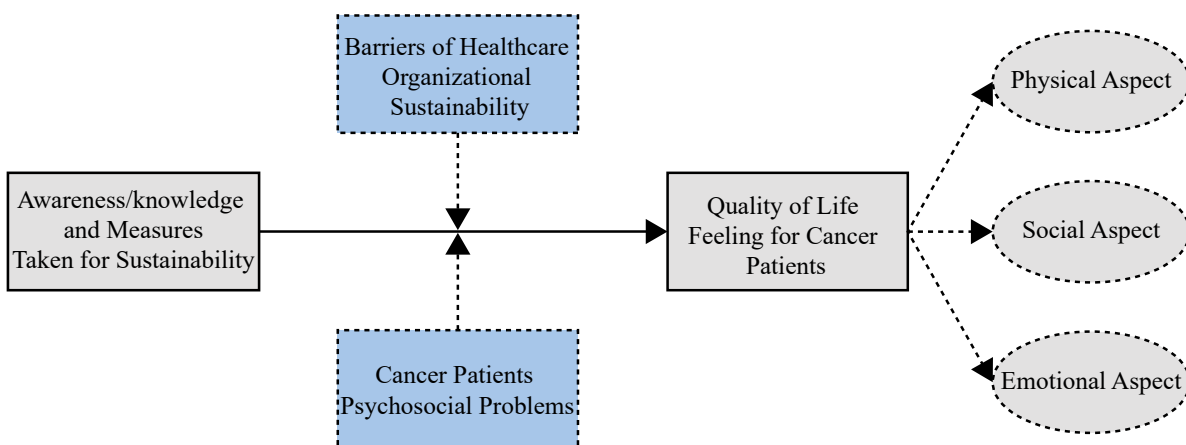
Figure 1: Conceptual Model.

## METHODOLOGY

The present study employed the Structural Equation Modeling (SEM) approach through the STATA software to analyze the intricate relationships between awareness/knowledge, measures taken for sustainability, healthcare organizational sustainability barriers, and the quality of life feeling among cancer patients. Structural equation modeling is a very powerful statistical technique that allows examining complex relationships and hidden constructs, simultaneously, providing a comprehensive understanding of the interaction between variables in theoretical models. Choosing STATA-SEM as an analytical tool highlights its effectiveness and flexibility. This enables the exploration of direct and indirect effects within a unified framework. Data from the study was collected from a group of 89 cancer patients based in Saudi Arabia. The geographical specificity of the sample contributes to the relevance of the context of the findings, considering the potential influence of cultural, health care, and socioeconomic factors unique to the region. Sample size used in the research, modest has been considered sufficient for the SEM analysis. Turns out to be useful in complex models and helps in maintaining the balance of statistical power and resource issues. The generalizability of research findings has been enhanced by Kingdom of Saudi Arabia for the inclusion of diverse group of cancer patient. The findings have a broad spectrum of nature as these findings has been drawn from different cancer types consist of various demographic characteristics.

The selection of scales provides reliable and valid measurements along with an ability to compare results with existing literature therefore the use of scales in past research has been adopted to construct reliable conceptual framework. In the field of environmental psychology and health behavior, scales drives turn out to be useful in assessing sustainability awareness and knowledge. Scales from validated instruments that are being used in healthcare centers and in sustainability research are utilized in exploring healthcare company's challenges towards sustainable environment. The selection of methodology explains that the research is based on the novel ideas, like focused on a specific population of cancer patients in Kingdom of Saudi Arabia. Awareness/knowledge and measures taken for sustainability was measured in this study on three items scale of Calabrese et al.[34]. Twenty-two items scale to measure the quality of life feeling for cancer patients was used in this study.[35] The scale has three dimensions (nine items were used for physical aspects, seven were used for emotional aspects, and six were used for social aspects). Cancer patients' psychosocial problems was measured on nine items scale of Bogaarts et al.[36]. Calabrese et al.[34] six items scale was used to measure the barriers of healthcare organizational sustainability. However, the use of survey instruments combines closed-ended Likert-scale items and structured open-ended questions to collect quantitative and qualitative data (see Appendix 1). This survey has been designed to collect the information about how much a participant knew about sustainability, their contribution and involvement in sustainable practices.as well as their perspectives on barriers to healthcare organizational sustainability and overall views on quality of life a cancer patient has been living. Use of a mixed method approach provides a deeper understanding of the subject matter of research being conducted. However, during the data collection, ethical consideration was a priority, making sure that the respondent must feel comfortable and satisfied upon the confidentiality that is been promised to them while collecting data.

## RESULTS

Cronbach's Alpha values can be seen in Table 1. In this study, the main parts that were looked at were tested to see how dependable and consistent they were. Cronbach's Alpha score of 0.852 shows that the variable measuring sustainable habits and awareness/knowledge is reliable and stable. With a Cronbach's Alpha score of 0.905, the psychological worries that cancer patients have are thought to be very reliable. One reliable and consistent look at the problems people are having with their mental health seems to have been finished. The variable that

measures the sustainability problems healthcare groups' face has a very high Cronbach's Alpha coefficient of 0.834, which shows that it is very consistent and reliable. A Cronbach's Alpha score of 0.799 means that the variable that measures the quality of life of cancer patients is a valid and consistent reflection of their overall health. These study results give us more confidence to do research into the conceptual framework's links. This is because they show that the rating tools used are very good at measuring psychometric traits.

**Table 1: Cronbach's Alpha.**

| Variable | Cronbach's Alpha |
|---|---|
| Awareness/knowledge and measures taken for sustainability | 0.852 |
| Cancer patients' psychosocial problems | 0.905 |
| Barriers of healthcare organizational sustainability | 0.834 |
| Quality of life feeling for cancer patients | 0.799 |

Table 2 shows the reliability and validity measures for the study's main concepts, such as the average variance recovered and the composite reliability. The sustainability measures and the awareness/knowledge variable together have an AVE score of 0.912 and a very good dependability score of 0.903. The results show that there is internal consistency and convergent validity by going above and beyond the set parameters. The variable that measures the psychological problems of cancer patients has a composite reliability of 0.834 and an average variance extracted (AVE) of 0.943. This shows that the assessment method can reliably and consistently pick up on the complicated mental problems that cancer patients face. Healthcare businesses' sustainability assessments are very reliable, as shown by an AVE of 0.872 and a composite reliability coefficient of 0.863. The results show that the idea is solid and based on facts. The average variance extracted (AVE) is 0.902 and the reliability coefficient is 0.894. These numbers show that the quality of life measure for cancer patients is a good behavioral tool. Based on our study, it seems to be a good way to tell how healthy someone is. This study shows that the measuring tools work as they should, so we can now look at how the conceptual framework factors are connected.
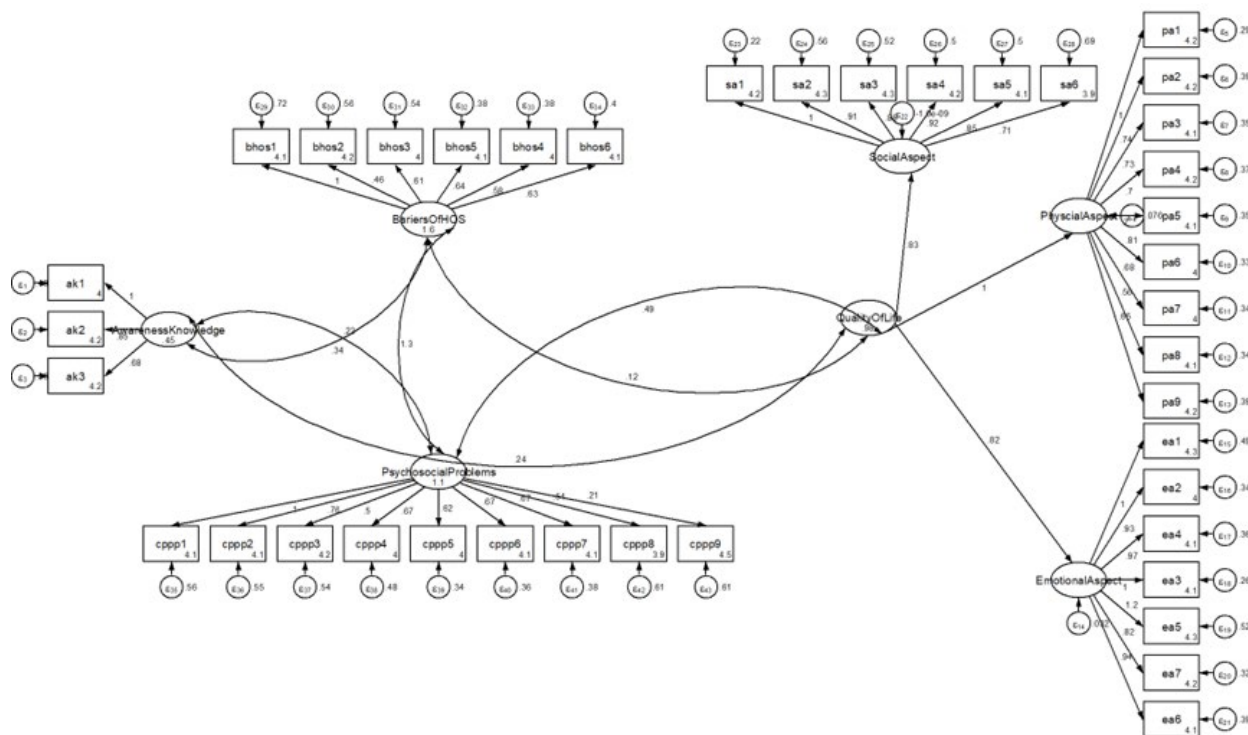


Figure 2: Estimated Model.

AVE square root, inter-construct correlations, composite reliability, and average variance extraction (AVE) were used to test the study's component discriminant validity. It was found that the square root of the average variance extracted (AVE) for each idea was more discriminant valid than the correlation coefficients with other parts. These results make it easier for the evaluation tools to tell the difference between the studied constructs. Table 2 shows how unique the constructs are, how true and reliable the measurement methods are, and how reliable they are. This ensures the validity and dependability of future studies that look into how the different parts of the suggested conceptual framework work together.

**Table 2: Validity and Reliability Confirmation.**

| Variable | Composite Reliability | Average Variance Extracted (AVE) |
|---|---|---|
| Awareness/knowledge and measures taken for sustainability | 0.903 | 0.912 |
| Cancer patients' psychosocial problems | 0.834 | 0.943 |
| Barriers of healthcare organizational sustainability | 0.863 | 0.872 |
| Quality of life feeling for cancer patients | 0.894 | 0.902 |

The results of the Confirmatory Factor Analysis (CFA) that was done to check the measurement model's structural validity are shown in Table 3. As part of the observed indicator model (OIM), we give each hidden construct its own coefficient, standard error, Z-value, p-value, and 95% confidence range. There are big effects on all three indicators (AK1, AK2, and AK3) in the awareness/knowledge and sustainability measures (AK) variable, with standard coefficients ranging from 0.543 to 0.739. The markers PA1–PA9, which have high loadings range from 0.317 to 0.883, are used to measure the mental health problems of cancer patients. This shows that the model can accurately measure the complicated mental problems that cancer patients have. The large loadings between 0.593 and 0.884 and 0.712 to 0.848 confirmed the construct validity of the latent variables, which were barriers to the survival of healthcare

organizations (EA1 to EA7) and cancer patients' quality of life (SA2 to SA6). All of the indicators of the latent variable sustainability awareness and actions taken (SA) have strong loadings that range from 0.712 to 0.848. The construct of cancer patients' psychosocial problems (CPPP) accurately describes the mental and social situations of cancer patients, as shown by the fact that it has strong loadings for all nine variables. All of the factors in the healthcare organizational sustainability framework (BHOS) have loadings that are between 0.301 and 0.844, which means that the relationships are strong and statistically significant. So, we know that the measuring method works well for figuring out the problems healthcare groups face when they try to become sustainable. The results back up the conceptual framework's expected relationship exploration by showing that the measurement model is structurally valid and reliable.

**Table 3: Confirmatory Factor Analysis.**

| Measurement | OIM Coef. | Std. Err. | z | P>|z| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| AK1 | 1 | (constrained) | | | | |
| AK2 | 0.739 | 0.068 | 10.525 | 0.000 | 0.606 | 0.873 |
| AK3 | 0.543 | 0.061 | 8.680 | 0.000 | 0.424 | 0.663 |
| PA1 | 1.000 | (constrained) | 12.279 | 0.000 | 0.725 | 0.796 |
| PA2 | 0.865 | 0.079 | 10.613 | 0.000 | 0.710 | 0.826 |
| PA3 | 0.634 | 0.066 | 9.341 | 0.000 | 0.504 | 0.763 |
| PA4 | 0.317 | 0.063 | 4.874 | 0.000 | 0.193 | 0.441 |
| PA5 | 0.594 | 0.069 | 9.904 | 0.005 | 0.495 | 0.816 |
| PA6 | 0.842 | 0.079 | 11.885 | 0.002 | 0.693 | 0.855 |
| PA7 | 0.591 | 0.063 | 9.146 | 0.000 | 0.468 | 0.714 |
| PA8 | 0.680 | 0.068 | 9.651 | 0.000 | 0.546 | 0.814 |
| PA9 | 0.783 | 0.064 | 11.972 | 0.000 | 0.659 | 0.908 |
| EA1 | 1.000 | (constrained) | 8.231 | 0.000 | 0.536 | 0.854 |
| EA2 | 0.867 | 0.056 | 14.914 | 0.000 | 0.757 | 0.784 |
| EA3 | 0.884 | 0.069 | 12.409 | 0.000 | 0.749 | 0.826 |
| EA4 | 0.801 | 0.063 | 11.862 | 0.000 | 0.678 | 0.924 |
| EA5 | 0.751 | 0.061 | 11.480 | 0.000 | 0.632 | 0.871 |
| EA6 | 0.823 | 0.058 | 13.194 | 0.000 | 0.709 | 0.750 |
| EA7 | 0.728 | 0.069 | 13.687 | 0.000 | 0.684 | 0.881 |
| SA1 | 1.000 | (constrained) | | | | |
| SA2 | 0.772 | 0.063 | 11.331 | 0.000 | 0.648 | 0.897 |
| SA3 | 0.749 | 0.064 | 10.884 | 0.000 | 0.624 | 0.875 |
| SA4 | 0.848 | 0.066 | 11.899 | 0.000 | 0.718 | 0.792 |
| SA5 | 0.712 | 0.065 | 10.242 | 0.000 | 0.585 | 0.838 |
| SA6 | 0.781 | 0.064 | 11.294 | 0.000 | 0.655 | 0.907 |
| CPPP1 | 1.000 | (constrained) | | | | |
| CPPP2 | 0.817 | 0.062 | 12.099 | 0.000 | 0.695 | 0.754 |
| CPPP3 | 0.671 | 0.057 | 10.806 | 0.000 | 0.559 | 0.783 |
| CPPP4 | 0.684 | 0.059 | 10.742 | 0.000 | 0.569 | 0.800 |
| CPPP5 | 0.857 | 0.063 | 12.570 | 0.000 | 0.733 | 0.795 |
| CPPP6 | 0.775 | 0.064 | 11.203 | 0.000 | 0.650 | 0.900 |
| CPPP7 | 0.802 | 0.063 | 11.702 | 0.000 | 0.678 | 0.742 |
| CPPP8 | 0.810 | 0.068 | 11.000 | 0.000 | 0.677 | 0.759 |
| CPPP9 | 0.740 | 0.060 | 11.324 | 0.000 | 0.621 | 0.858 |
| BHOS1 | 1.000 | (constrained) | | | | |
| BHOS2 | 0.844 | 0.061 | 12.681 | 0.000 | 0.723 | 0.779 |
| BHOS3 | 0.809 | 0.064 | 11.797 | 0.000 | 0.684 | 0.748 |
| BHOS4 | 0.823 | 0.075 | 10.095 | 0.000 | 0.675 | 0.786 |
| BHOS5 | 0.603 | 0.063 | 8.885 | 0.000 | 0.480 | 0.725 |
| BHOS6 | 0.301 | 0.060 | 4.637 | 0.000 | 0.184 | 0.419 |

The fitness data in Table 4 show how well each indicator worked inside the latent structures. The fitness statistics show how well each item fits its underlying construct based on the values of the original sample. The awareness/knowledge and sustainability measures AK1, AK2, and AK3 all had good results (0.795, 0.786, and 0.700, respectively), which showed that they had a positive effect on the idea. There is a range of fitness data in the quality of life measures for cancer patients (PA1–PA9). For example, PA6 has a value of 0.923 and PA7 has a value of 0.854. PA8 has a value of 0.574, which is less. Because of this, when cancer patients rate their quality of life, their unique physical and mental situations should be taken into account. The fitness data of the construct that includes the psychosocial problems that cancer patients face (CPPP1–CPPP9) are not always the same. Healthcare groups are less likely to last because of problems BHOS1 to BHOS6. BHOS3 and BHOS4 stand out because they have strong fitness numbers (0.839 and 0.863, respectively). However, BHOS1 values of 0.634 and 0.656 are less than those. This difference shows how complicated the problems are that make it hard for healthcare organizations to stay open in the long run. The fitness data in Table 4 can be used by researchers and practitioners to get a full picture of the measurement items in each latent construct. This table shows the pros and cons of the metrics. Because of the amount of detail given, the study's results about cancer patients and environmentally friendly practices can be better understood and interpreted. This can be done by learning more about the measuring model's validity and reliability.

**Table 4: Measurement Items Fitness Statistics.**

| Variable | Indicator | Original Sample |
|---|---|---|
| Awareness/knowledge and measures taken for sustainability | AK1 | 0.795 |
| | AK2 | 0.786 |
| | AK3 | 0.700 |
| Quality of life feeling for cancer patients | PA1 | 0.757 |
| | PA2 | 0.814 |
| | PA3 | 0.839 |
| | PA4 | 0.863 |
| | PA5 | 0.777 |
| | PA6 | 0.923 |
| | PA7 | 0.854 |
| | PA8 | 0.574 |
| | PA9 | 0.700 |
| | EA1 | 0.904 |
| | EA2 | 0.851 |
| | EA3 | 0.884 |
| | EA4 | 0.836 |
| | EA5 | 0.804 |
| | EA6 | 0.664 |
| | EA7 | 0.605 |
| | SA1 | 0.722 |
| | SA2 | 0.776 |
| | SA3 | 0.817 |
| | SA4 | 0.840 |
| | SA5 | 0.760 |
| | SA6 | 0.650 |
| Cancer patients' psychosocial problems | CPPP1 | 0.642 |
| | CPPP2 | 0.570 |
| | CPPP3 | 0.558 |
| | CPPP4 | 0.590 |
| | CPPP5 | 0.866 |
| | CPPP6 | 0.764 |
| | CPPP7 | 0.758 |
| | CPPP8 | 0.789 |
| | CPPP9 | 0.806 |
| Barriers of healthcare organizational sustainability | BHOS1 | 0.656 |
| | BHOS2 | 0.634 |
| | BHOS3 | 0.839 |
| | BHOS4 | 0.863 |
| | BHOS5 | 0.777 |
| | BHOS6 | 0.923 |

As a way to judge how well the structure model fits, Table 5 shows the results of the Chi-square test. We use the Chi-square number of 14591.839, which is calculated as the likelihood ratio, to see how well the hypothesised model fits the data compared to the saturated model. There is a big difference between the suggested and saturated models (p-value less than 0.001), which could mean that they don't match well enough. When you compare the baseline Chi-square number of 13703.552 to the saturated model, it shows that the model does not fit. When it comes to Chi-square fit statistics, results from bigger samples may still not be important. But the model should be taken with a grain of salt because the p-values in both situations are statistically significant. To get the structural model and the actual data

to fit better, researchers can make changes to the model or look at different fit indices.

**Table 5: Chi-square Fit Statistics.**

| Fit Statistic | Value | Description |
|---|---|---|
| Likelihood ratio | 14591.839 | model vs. saturated |
| p > chi2 | 0.000 | |
| chi2_bs(2356) | 13703.552 | baseline vs. saturated |
| p > chi2 | 0.000 | |

Table 6 has all the information you need to compare the goodness-of-fit of the saturation and estimated models. The Standardized Root Mean Square Residual (SRMR) of the model finds the difference between the expected and real covariances. The saturated model has a lower Standardized Root Mean Square Residual (SRMR) number of 0.052, which means it fits the data better. The SRMR for the predicted model, on the other hand, is only 0.078. SRMR values close to zero show a high level of similarity, but the difference shows that the estimated model might not be able to recreate the actual data as accurately as the saturated model. Researchers and practitioners should be careful when figuring out what these data mean, taking into account model changes or other fit indices that make the structural model more accurate.

**Table 6: Model Goodness of Fit Statistics.**

| | Saturated Model | Estimated Model |
|---|---|---|
| SRMR | 0.052 | 0.078 |

When you look at Table 7, the R-square numbers show how much of the variation in each latent variable can be explained by the structural model indicators. The measured indicators explain 42.6% of the variation in this construct, with an R-squared value of 0.426. This shows that there is a strong link between sustainability metrics and awareness/ knowledge. These factors, which have an R-squared value of 0.272, explain 27.2% of the variation in the mental problems cancer patients face. An R-squared value of 0.560 for the variable that shows problems with sustainability in healthcare organizations says that the factors that were looked at can explain a lot of the differences in these problems. The statistical analysis shows how well the suggested structural model explains the differences in hidden constructs that have been found. They let the model be tested and places found that need more study or development to fully understand them.

**Table 7: R-square statistics**

| Variable | R Square |
|---|---|
| Awareness/knowledge and measures taken for sustainability | 0.426 |
| Cancer patients' psychosocial problems | 0.272 |
| Barriers of healthcare organizational sustainability | 0.560 |

The direct route study looked at how cancer patients' knowledge and understanding were linked to measures of sustainability and quality of life (Table 8). The large OIM coefficient of 0.801 shows that sustainability steps improve the quality of life of cancer patients. It's possible that this association is real because the p-value is 0.000, the z-value is 1.610, and the standard error is 0.446. The 95% confidence range, which is between 0.613 and 0.776, shows that the population measure can be trusted. There is a statistically significant link between measures of sustainability and the quality of life of cancer patients. This range shows how strong the link is. The data show that people with cancer report higher levels of subjective well-being when they know about sustainability problems and take part in activities related to them. In order to help cancer patients get better care and support, these results encourage the creation and use of long-lasting healthcare methods.
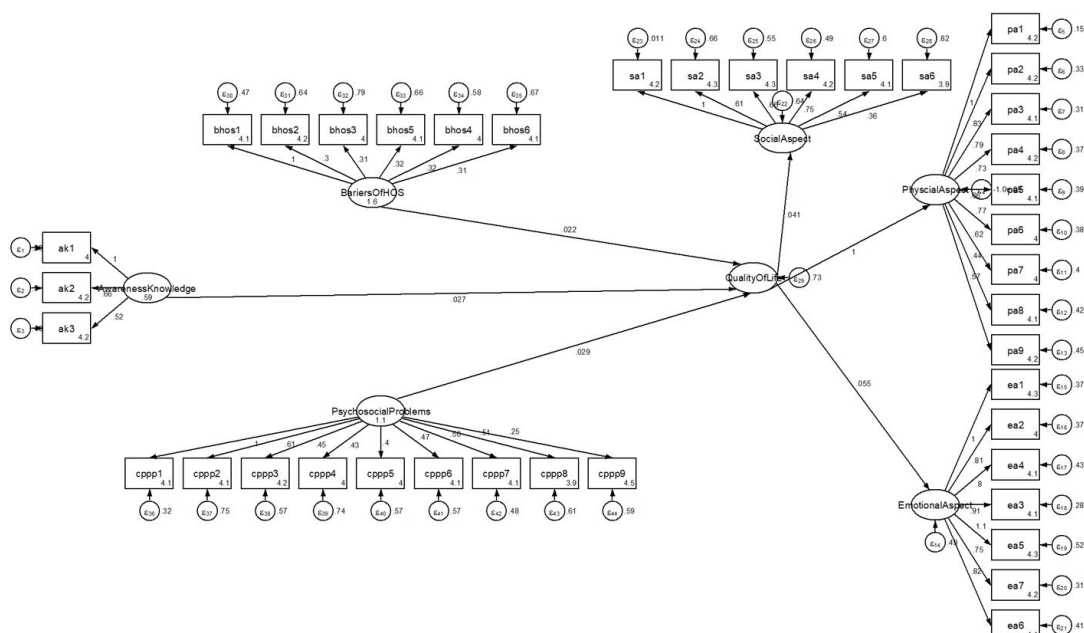


Figure 3: Structural Model for Direct Path Analysis.

The direct route analysis results add to the theory framework by showing how the knowledge and understanding of cancer patients affect their quality of life and how interventions help to keep the results good. There is a link between caring about the environment, living a healthy life, and being wealthy in general, according to new study. The fact that there is a strong positive association fits with that idea. Everything that is happening right now can be explained by these findings. There is some proof that programs that teach cancer patients about sustainability and encourage them to live in a Anees way could help both the environment and the cancer patients. These results show that environmental factors could be helpful in cancer treatment plans as a whole. They also allow for more study into the mechanisms that make this link possible.

**Table 8: Direct Path Analysis.**

| | OIM Coef. | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| Awareness/knowledge and measures taken for sustainability has a significant impact on quality of life feeling for cancer patients. | 0.801 | 0.446 | 1.610 | 0.000 | 0.613 | 0.776 |

The results of the moderating path analysis can be seen in Table 9. It looked at how psychosocial factors and the problems healthcare organizations have with being sustainable affected the link between cancer patients' understanding of sustainability metrics and their quality of life. The first way looks at the mental health problems cancer patients face and comes up with an observed indicator model (OIM) coefficient of 0.064. Having a p-value of 0.009, a z-value of 0.171, and a standard error of 0.342 for the coefficient shows that it is statistically significant. But since the number is so small, it seems like it only has a small moderating effect. The 95% confidence interval is between 0.530 and 0.606, so we need to be careful when trying to figure out the exact size of this moderating effect. A higher OIM value of 0.189 is linked to the second moderation path, which looks into why healthcare companies can't stay in business. There is also a p-value of 0.014, a z-value of 1.862, and a standard error of 0.091. That moderating had a small effect is shown by the 95% confidence interval, which is between 0.368 and 0.283. The results show that psychological problems and barriers in healthcare institutions may make it harder for cancer patients to understand and take part in sustainable practices, which may have a negative impact on their overall health.
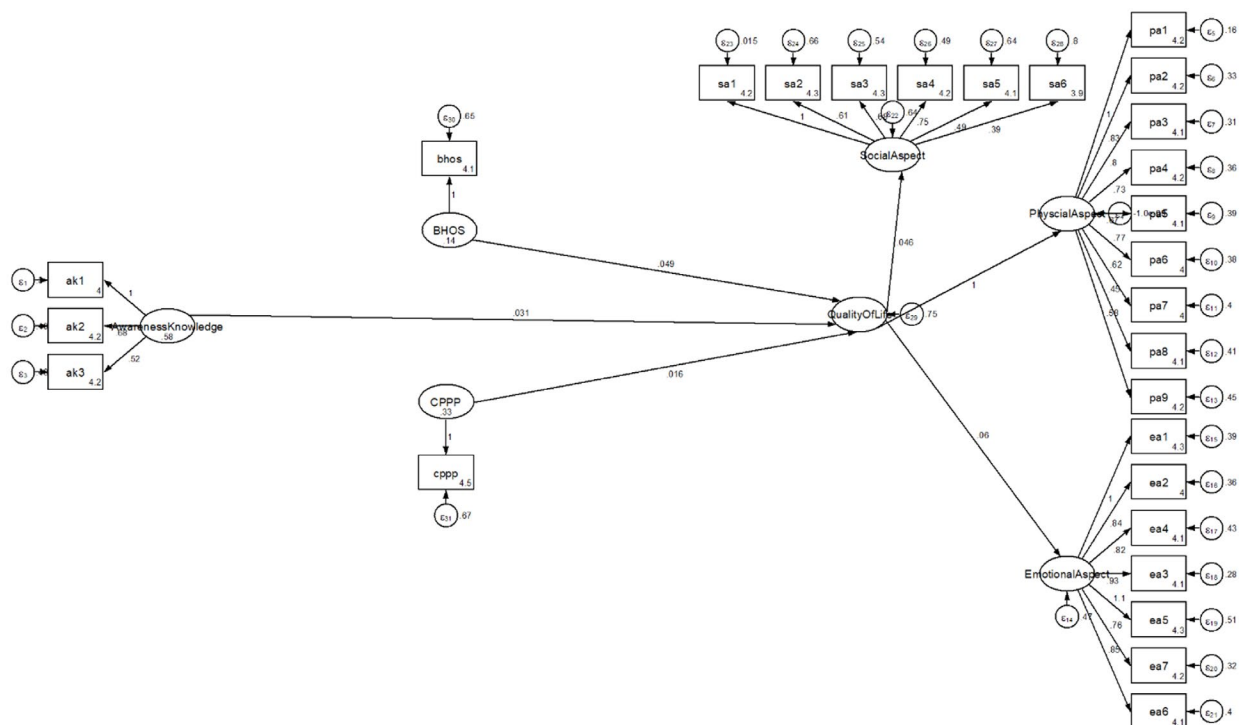


Figure 4: Structural Model for Moderating Path Analysis.

Adding the moderating route analysis to the current theory framework helps us understand the complicated part that organizational and psychosocial factors play in the link between cancer patients' awareness of sustainability and their health. The moderating effects aren't very strong for mental health problems, but they are statistically significant for problems with the sustainability of healthcare organizations, which suggests that the two are connected in a complicated way. More study should be done on how being aware of sustainability affects

the happiness and health of cancer patients, taking into account the possible role of psychosocial issues and

organizational barriers. These regulating effects have effects that go beyond what one person can think about.

**Table 9: Moderating Path Analysis.**

|  | OIM Coef. | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| Cancer patients' psychosocial problems significantly moderates the relationship between awareness/knowledge and measures taken for sustainability and quality of life feeling for cancer patients. | 0.064 | 0.342 | 0.171 | 0.009 | 0.530 | 0.606 |
| Barriers of healthcare organizational sustainability significantly moderates the relationship between awareness/knowledge and measures taken for sustainability and quality of life feeling for cancer patients. | 0.189 | 0.091 | 1.862 | 0.014 | 0.368 | 0.283 |

## DISCUSSION

In today's dynamic healthcare world, sustainable practices for patients have been shown to promote well-being and potential outcomes in all domains of health-seeking patients. This study investigates the impact of various factors on cancer patients quality of life feelings in Saudi Arabia, including psychological factors, sustainability awareness, and healthcare organization barriers. Exploring these hypotheses in Saudi Arabia provides valuable insights into sustainability and healthcare in a regional and cultural context that has been largely overlooked by researchers. The first hypothesis, that cancer patients' quality of life is improved by sustainability activities and awareness/knowledge, was supported by research. This study supports past research showing improved well-being is a result of patient education and long-term healthcare practices.[13] It is crucial for healthcare organizations to prioritize patient education and adopt sustainable practices in order to enhance the quality of life for cancer patients. To better understand how the complex system works, the second theory shows how psychological problems among cancer patients can play a significant moderating role in influencing the relationship between awareness/ knowledge and sustainability and quality of life measures. It appears that sustainability and awareness initiatives influence the quality of life of cancer patients, which is further moderated by their psychosocial barriers. The importance of offering psychosocial support in cancer care has been underscored in recent research, as evidenced by the work of Koshimoto *et al.*[18] This emphasizes the significance of tailoring remedies to meet the psychosocial requirements of individuals diagnosed with cancer, in an effort to improve their consciousness and overall welfare in the long run. The quality of life and awareness/knowledge of sustainability measures among cancer patients are significantly moderated by the sustainability barriers encountered by healthcare organizations, according to the third hypothesis. The outcomes encountered by patients are directly influenced by the level of complexity present within organizations. This hypothesis emphasizes the necessity for healthcare organizations to remove barriers to sustainable practices. In addition to raising awareness and addressing obstacles, organizations can improve the quality of life for cancer patients through the implementation of sustainable initiatives. Further research suggests that

the implementation of durable policies poses difficulties for healthcare organizations.[33] Emphasis is placed on showcasing the organization's proficiency and commitment to implementing sustainable healthcare practices that have the potential to benefit cancer patients.

This research results agree with those of other studies that show people's health gets better when they care more about and take steps to make things more sustainable. The connection between caring about the environment and health was clear to us, as it was to Zhao *et al.*[25] and Dobre *et al.*[20] According to the study of Laprise[21], psychosocial concerns and problems that make healthcare groups less likely to last are important things to think about. This is because healthcare organizations are understanding they need to change in order to be more sustainable, and people are becoming more aware of how important psychological factors are in cancer care. This research results are more significant because they agree with what other studies have found.[29] Finally, if we agree with every claim made in the study, we might be able to figure out how cancer patients' quality of life, sustainability, psychosocial dynamics, and healthcare organizational elements are all connected.[5] The findings of this research lay the groundwork for more studies and treatments that put an emphasis on cancer care settings that integrate sustainability principles, with a focus on the complex patient experience and the systemic shifts needed to create a healthcare system that is both sustainable and patient-centered.

## CONCLUSION

In conclusion, this study adds valuable insights to the fields of sustainability, healthcare, and cancer care by systematically examining the intricate relationships between awareness/knowledge of sustainability measures taken, psychosocial problems, healthcare organizational sustainability barriers, and the quality of life for cancer patients in the Kingdom of Saudi Arabia. The acceptance of all hypotheses underscores the importance of sustainability awareness and practices in shaping the well-being of cancer patients, emphasizing the potential positive impact on their quality of life. The moderation effects identified, particularly the influence of psychosocial problems and healthcare organizational sustainability barriers, add a layer of complexity to our understanding, highlighting the need for tailored interventions that

address both individual and systemic factors. By building on established knowledge and contextualizing findings within the unique cultural and regional setting, this research not only contributes to academic literature but also provides practical implications for healthcare practitioners, policymakers, and sustainability advocates. Moving forward, these findings pave the way for further exploration of the mechanisms underlying these relationships, the development of targeted interventions, and the integration of sustainable practices within comprehensive cancer care strategies, fostering a more resilient and patient-centered healthcare ecosystem.

### Implications of the Study

This study is important for theory because it shows how sustainability, psychosocial concerns, the limitations of healthcare organizations, and the quality of life of cancer patients are all linked. Adding ideas that connect caring about the environment to cancer patients' quality of life makes the field of health behavior theories better. This study shows how important it is to care about the environment as a part of general health by incorporating sustainability ideas into the health behavior paradigm. The Health Belief Model and Theory of Planned Behavior can better see the link between sustainable practices and health outcomes when they take environmental worries into account. Theories of psychology and healthcare management are also affected by psychological factors and the problems that healthcare organizations face when they try to stay in business. The study found that psychological barriers may either increase or decrease the good effect of being aware of sustainability on the quality of life of cancer patients. The stress-coping model and social cognitive theory can both use psychosocial sustainability factors to make them better. Healthcare organizational theories like Resource Dependency Theory and Institutional Theory should include a key part of sustainability because it can have an effect on how well patients do and how well the organization does. Because healthcare groups have to work within certain limits, they need theories of organizational dynamics and environmental sustainability. This research suggests that we should reevaluate current models and add sustainability principles to frameworks like the Resource-Based View and Institutional Theory in order to learn more about how the way healthcare organizations are set up affects their sustainability strategies.

This information can be used by lawmakers, people who support sustainability, people who treat cancer, and other healthcare professionals to make systemic changes and focused interventions in healthcare. It's important to provide care that is both patient-centered and environmentally friendly, since cancer patients' quality of life depends a lot on being aware of and taking steps to protect the environment. Cancer treatment programs should teach patients about sustainability and offer programs that urge them to live in a more environmentally friendly way. This will help patients deal with the mental and physical effects of cancer treatment and recovery. Because healthcare groups

can't keep going when there are mental health problems, personalized socio-organizational interventions are very important in cancer care. Psychosocial support services may help cancer patients be more aware of sustainability and have a better quality of life. Healthcare organizations should make it a top goal to create a culture that cares about patients and the environment, while also addressing the problems that come with being internally sustainable. To make healthcare more sustainable, people need to be taught how to do it, organizations need to change, and facilities need to be improved. The results show how important it is for environmental activists and healthcare groups to work together. Leaders in healthcare and politicians need to work together to make rules that will last. Healthcare facilities that care about the environment use energy-efficient technology, have programs to cut down on waste, and have buildings that are certified as Anees. This collaborative strategy supports both global sustainability and cancer treatment that is good for the environment. Stakeholders can finally come up with plans for long-term cancer care using this knowledge. For cancer care to get better, healthcare professionals need to be able to meet the emotional needs of their patients, get around organizational problems, and make sure the business can stay open. The study's authors make the case for a healthcare plan that thinks about the future of the system while also putting patients' needs first. In addition to physical and mental factors, it looks at the surroundings as well.

### Limitations and Future Research Directions

This study has some flaws, but it has helped us learn more about sustainability, psychological factors, the limitations of healthcare organizations, and the quality of life of cancer patients. Due to its cross-sectional form, the study makes it hard to draw firm conclusions about what caused what. Because single-point evidence is so limited, it is not possible to say if caring about and acting on sustainability come before improvements in quality of life. One way to find out how sustainability factors affect patients' health is to do longitudinal study. There are two main issues with self-reported evaluations: reaction bias and the fact that they can be interpreted in different ways by different people. Someone might give an answer that is too normal or too good to be true when it comes to the environment. It is better to use objective metrics, like behavioral observations or medical records, to make statistics more reliable and get a clear picture of a patient's health and ability to stay healthy. One thing that might be bad about the study is that it only looked at cancer patients from Saudi Arabia. In the future, researchers will need to use different groups and cultures to show that the links are strong and can be used in other cases. Different lines of research need to be followed. For a fuller picture, look into the complicated processes that lead to mental diseases and the problems that healthcare organizations face when they try to stay in business for a long time. Focus groups, in-depth conversations, and other types of qualitative research can help researchers

learn more about the real-life experiences of cancer patients and healthcare professionals. This may have an effect on how strong the links found in this study are. Studies in the future say that using sustainability measures and interventions can make the quality of life of cancer patients better. Treatments for a sustainable lifestyle, eco-friendly medical practices, and hospital gardens can all help people get better health. Please look into these details to learn what cancer patients need and want so that you can come up with better solutions that work better. Because healthcare systems and attempts to be more environmentally friendly are always changing, it might be useful to do long-term studies that look at how healthcare companies' eco-friendly plans affect the health of their patients. Researchers could use this method to look at how it might improve the lives of cancer patients, as well as its long-term effects and ability to be changed. To fully understand the complicated relationship between sustainability, healthcare, and the well-being of cancer patients, it is important to be aware of and look into current study limitations and possible future research directions.

### *Acknowledgement*

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# APPENDIX 1

## Quality of Life Feeling for Cancer Patients

1. Overall, how would you rate your current quality of life?
2. To what extent do you feel satisfied with your physical health?
3. How would you rate your mental and emotional well-being?
4. How often do you experience pain or discomfort related to your health?
5. How would you describe your overall energy level?
6. To what extent do you feel socially connected and supported?
7. How satisfied are you with your ability to perform daily activities?
8. How often do you experience fatigue or exhaustion?
9. How would you rate your emotional stability and resilience?
10. To what extent do you feel in control of your life and future?
11. How satisfied are you with your sleep quality and patterns?
12. How often do you experience symptoms related to your cancer treatment?
13. How would you rate your ability to engage in recreational activities?
14. To what extent do you feel confident in managing your health?
15. How satisfied are you with your body image and appearance?
16. How often do you experience difficulties in concentration or memory?
17. How would you describe your overall mood and outlook on life?
18. To what extent do you feel burdened by the financial aspects of your healthcare?
19. How satisfied are you with your relationships with healthcare providers?
20. How often do you experience anxiety or worry related to your health?
21. How would you rate your ability to cope with stressors in your life?
22. To what extent do you feel hopeful and optimistic about the future?

## Awareness/Knowledge and Measures Taken for Sustainability

1. How aware are you of sustainability practices within healthcare settings?
2. How frequently do you engage in sustainable practices related to your health and well-being?
3. Please rate your level of knowledge about the environmental impact of healthcare practices.

## Cancer Patients' Psychosocial Problems

1. How often do you experience anxiety related to your cancer diagnosis and treatment?
2. To what extent do you feel socially isolated due to your health condition?
3. How often do you encounter difficulties in discussing your emotions and concerns with others?
4. How would you rate your overall emotional well-being since your cancer diagnosis?
5. How often do you feel overwhelmed by the financial implications of your healthcare?
6. To what extent do you experience changes in your body image and self-esteem?
7. How often do you encounter challenges in maintaining a positive outlook on life?
8. How satisfied are you with the support you receive from family and friends?
9. How often do you face difficulties in coping with the physical side effects of your cancer treatment?

## Barriers of Healthcare Organizational Sustainability

1. How much do you perceive a lack of awareness among healthcare providers about sustainable practices?
2. To what extent do you believe there is a lack of commitment within the healthcare organization to implement sustainable practices?
3. How much do you perceive organizational policies and procedures hinder the adoption of sustainable healthcare practices?
4. How often do you encounter challenges related to the availability of resources for implementing sustainable practices in healthcare?
5. To what extent do you believe there is a lack of training and education within the healthcare organization regarding sustainability practices?
6. How much do you perceive resistance from colleagues or superiors towards the adoption of sustainable healthcare practices?