

Comparison of psychological well-being, hope, and health concern in leukemia patients before and after receiving stem cells

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ABSTRACT

Objectives: The aim of this study was to compare psychological well-being, hope, and health concerns in leukemia patients before and after receiving stem cells. **Methods:** The statistical population of the present study consisted of leukemia patients in Tehran, and the research sample was among the patients referred to the Bone Marrow Transplant Center of Shariati Hospital in Tehran, and they were placed in two experimental and control groups (15 people in each group), which were selected by purposive sampling method. **Results:** To collect the data for the research, three psychological well-being questionnaires were used by Riff (2002), Schneider's Hope Scale (SHS), and Schneider's (1991) Health Concern Questionnaire (HCQ). To analyze the data in this research, according to the "pre-test-post-test design with the control group," covariance analysis was used. **Conclusion:** Based on the research findings, it was concluded that receiving stem cells increases hope and psychological well-being in leukemia patients and significantly reduces health concerns.

Keywords: Blood cancer, health concerns, hope, psychological well-being, stem cells

Introduction

Today, cancer is considered one of the most important health problems worldwide, cancer is a group of diseases associated with uncontrolled growth and expansion of abnormal cells (Morhan *et al.*^[1] stated that being diagnosed with cancer and its confirmation after sampling and pathology report brings a great crisis for the patient and his family.^[2] In the world today, more than 200 types of cancer are known, and these cancers can surround different tissues of the body. Cancer is a disease in

which cells lose their ability to divide and grow normally, and this leads to the invasion, destruction, and decay of healthy tissues.^[3] Cancer is considered one of the most important diseases of this century and the second cause of death after cardiovascular diseases.^[4] Cancer is the second cause of death in developed countries and the third cause of death in less developed countries. Currently, leukemia is the cause of 11% of deaths worldwide.^[5] Cancer is considered a paralyzing and incurable disease and after its diagnosis, a person suffers from anxiety and depression caused by unrealistic fear of death and reduction of social energy. The need for frequent hospitalizations and constant worries for patients and their families leads to mental disorders.^[6] Leukemia is one of the most common malignant diseases in young adults and accounts for approximately 8% of all cancers

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and is known as the fifth most common cancer in the world.^[17] Leukemia is a chronic and resistant disease that affects a person's life in all physical, psychological, social, spiritual, economic, and family dimensions.^[8] Research has shown that such a diagnosis can lead to deep emotional problems such as depression.^[9] It creates worry, anxiety, negative orientation toward the future, and intolerance of ambiguity in these patients.^[10] One of the new methods in the treatment of leukemia patients is bone marrow transplantation. Bone marrow transplantation and peripheral blood stem cell transplantation are processes that are performed to compensate for the lack of stem cells that have been destroyed by high-dose chemotherapy or radiation therapy.^[11] Despite the advances in medical science, cancer continues to spread dramatically. Knowing about cancer is a surprising and worrying experience for every person. One of the most important neurological variables between mental pressure and a person's vulnerability to different types of mental disorders is worry. Anxiety is the most common symptom associated with many mental disorders. Worry is a chain of negatively charged and relatively uncontrollable thoughts and ideas and an effort to engage in mental problem-solving about an issue whose outcome is uncertain, but which requires consideration of one or more negative outcomes. In addition, worry is closely related to fear processes and affects mental health.^[12]

In worrying about one's health, anxiety and mental preoccupation are excessive and disproportionate. These people repeatedly examine themselves (such as checking their throat in the mirror) and constantly search about the disease (for example, on the Internet) and seek reassurance from family, friends, and doctors. In some cases, anxiety leads to maladaptive avoidance of situations (for example, seeing sick family members) or activities (for example, exercise). Health concerns have a prominent place in a person's life, affecting daily activities and causing conflict in a person's life.^[13] There is a high level of concern about health, and a person easily panics about his health status.^[14]

Numerous studies have proven that psychological support for patients, especially patients with cancer, can be effective in the treatment process and their quality of life. We have heard the life stories of patients with incurable diseases who were able to fight their illnesses; in the meantime, the patient's personality and type of beliefs are very effective in the adaptation process of his loss and his illness.^[15] Psychological well-being is one of the important areas in positive psychology research and is a multi-component concept including self-acceptance, positive relationships with others, autonomy, control over the environment, purposeful life, and personal growth.^[16] People with high well-being experience positive emotions and have a positive evaluation of the events and events around them, whereas people with a low sense of well-being evaluate the events and events in their lives as unfavorable.^[17] Research in positive psychology and other related sciences has shown that people who experience more positive emotions and optimism live longer. Also, hopeful and happy people have stronger social relationships

with their friends, spouse, neighbors, and relatives.^[18,19] Hope is an emotional force that directs the imagination toward positive things. Hope energizes people and equips them to prepare for work and activity.^[20] Bailey and Snyder^[21] believe that hope is a positive motivational state with clear goals in mind for life. From a psychological point of view, hope shows the perception of people in relation to their abilities to reach the goal, expand the strategies to reach the goal, and maintain motivation until reaching the goal.^[22] Therefore, according to the importance of the stated content, the aim of this research is to compare psychological well-being, hope, and health concerns in patients with leukemia before and after receiving stem cells.

Methods

In this research, according to the topic of the research, the most appropriate method for testing the research hypothesis and investigating the effect of the independent variable on the dependent variable is the pre-test-post-test plan with the control group.

The type of study in this research is quasi-experimental. Quasi-experimental designs have one or more control groups; however, the arrangement of subjects is not random. In this type of research method, the goal is to approach real experimental research. The statistical population of the present study was made up of patients with blood cancer in Tehran in 2021. The research sample was among the patients referred to the Bone Marrow Transplant Center of Shariati Hospital in Tehran and was selected by purposive sampling. To collect information from the statistical population of the research, a questionnaire was used.

Measuring tool

Reef Psychological Well-Being Questionnaire^[23]: The short version of the 18-question Psychological Well-Being Scale of Reef was designed by Reef in 1989 and revised in 2002. This version includes six factors of independence, control over the environment, personal growth, positive communication with others, purposefulness in life, and self-acceptance. The total score of these six factors is calculated as the overall psychological well-being score. This test is a type of self-measurement tool that is answered on a six-point scale from "completely agree" to "completely disagree" and the higher the score, the better the psychological well-being. In this research, reliability was obtained using Cronbach's alpha method of 0.81.

Schneider's Hope Questionnaire (SHS): A 12-question hope scale designed by Schneider (2002) for people over 15 years of age and includes two subscales of passage and motivation. To answer each question, a continuum from 1 completely (wrong) to 4 completely (correct) is considered. In a study conducted by Golzari^[24] on 660 female students in Tehran, the reliability of Omid Schneider's scale was investigated with the internal consistency method and the Cronbach's alpha coefficient was 0.89.^[25] In this research, a reliability of 0.86 was obtained using Cronbach's alpha method.

Spoth and Dush Health Concerns Questionnaire (HCQ): The health concerns questionnaire has 54 questions and three subscales of physical, mental, and social health concerns. The results of the calculations performed on the reliability estimation of the subscales of HCQ-54 indicate that the value of the alpha coefficient is 0.87 for the subscales of physical concerns, 0.91 for mental concerns, and 0.85 for social concerns. The scale of health concerns is equal to 0.96. Spoth and Dush obtained the validity of this test at 0.92.^[26] The Cronbach's alpha values for the physical, mental, and social health concerns in the aforementioned questionnaire were 0.89, 0.93, and 0.64, respectively. The Cronbach's alpha value for the overall scale of health concerns was 0.80. The validity of the aforementioned scales was 0.81, 0.80, 0.82, and 0.83, respectively, for the physical, mental, social, and overall scale of health concerns.^[27] In this research, a reliability of 0.78 was obtained using Cronbach's alpha method.

Findings

Descriptive findings include the mean and standard deviation of psychological well-being scores, hope, and health concerns of the subjects, which are presented in the following tables. Table 1 shows the mean and standard deviation of the score of psychological well-being, hope, and health concern in the experimental and control groups, separately in the pre-test and post-test phases.

As seen in Table 1, the mean (standard deviation) of the psychological well-being score for the experimental and control groups in the pre-test was 49.25 (6.47) and 48.5 (6.54), respectively, and in the post-test, it was 55.5 (6.92) and 48.35 (6.57), respectively. Also, the mean (standard deviation) of the hope score for the experimental and control groups in the pre-test was 21.3 (3.69) and 22.25 (3.93), respectively, and in the post-test, it was 27.2 (2.71) and 8.22 (2.98), respectively. Also, the mean (standard deviation) of the health concern score for the experimental and control groups in the pre-test was 168.12 (9.53) and 168.5 (10.96), respectively, and in the post-test, it was 160.85 (75.10), and 168.75 (11.01), respectively.

Before analyzing the data related to the hypotheses ensure that the data of this research meet the basic assumptions of the analysis of covariance, four assumptions of linearity, multiple collinearity, homogeneity of variances, and homogeneity of the slope. The regressions were examined, which are expressed in order.

Linearity

In this research, the psychological well-being pre-test, hope, and health concern were considered auxiliary variables (covariates), and their post-tests were considered dependent variables. The linearity of the relationship between each dependent variable and its covariate was tested. The relationship between the pre-test and post-test for three variables in psychological well-being, hope, and health concern was obtained as $r = 0.85$, $r = 0.97$, and $r = 0.97$, respectively. According to the obtained data, the assumption of linearity for the variables of psychological well-being, hope, and health concern is established (Glass, 1940).

Multiple non-collinearity

When auxiliary variables (covariates) have a high correlation with each other at $r = 0.80$, we are faced with a condition called multiple collinearities, and in fact, the correlation coefficients should be less than 0.80. This is an important phenomenon that should be avoided in multivariate analysis tests (Garson, 2012). In the present study, pre-tests of psychological well-being, hope, and health concern were considered as auxiliary variables (covariates). The correlation between the pre-tests of all three variables was obtained in a range between 0.01 and 0.30 ($P < 0.005$). According to the obtained correlations, it can be said that the assumption of multiple non-collinearity between auxiliary variables (covariates) has been met.

As can be seen in Table 2, Levin's test is insignificant in all three variables of psychological well-being, hope, and concern for psychological health. As a result, the assumption of homogeneity of variances is confirmed.

As can be seen in Table 3, the interaction between auxiliary variables (pre-tests) and dependent variables (post-tests) is not significant at factor levels (experimental and control groups). Therefore, the assumption of regression homogeneity has been met.

As can be seen in Table 4, the significance level of the Kolmogorov-Smirnov test is greater than 0.05, so the assumption of normal distribution of the variables has been met.

The contents of Table 5 show that there is a significant difference between the experimental and control groups in terms of

Table 1: Mean and standard deviation of psychological well-being, hope, and health concern in the experimental and control groups, separately in the pre-test and post-test stages

Variables	Statistical indicators	Examination group		Control group	
		Mean	Standard deviation	Mean	Standard deviation
Psychological well-being	Pre-test	49.25	6.47	48.5	6.54
	Post-test	55.5	6.92	48.35	6.57
Hope	Pre-test	21.3	3.69	22.25	3.93
	Post-test	27.2	2.71	22.8	2.98
Health concern	Pre-test	168.12	9.53	168.5	10.96
	Post-test	160.85	10.75	168.75	11.01

Table 2: Results of the homogeneity of variances (Levin's) test between dependent variables of the research in experimental and control groups in the pre-test stage

Effect	Dependent variable	Degree of freedom 1	F	Degree of freedom 2	Sig.
Group	Psychological well-being	1	0.956	38	0.33
	Hope	1	0.406	38	0.52
	health concern	1	0.942	38	0.33

dependent variables at the level of $P \geq 0.05$ and it can be said that at least in one of the dependent variables (psychological well-being, hope, and worry) health) between the two groups, there is a significant difference. To understand this difference, four covariance analyses were performed in the text of Mankwa. According to the calculated effect size, 67% of the total variances of the experimental and control groups were due to the effect of the independent variable. Also, the statistical power of the test was equal to 1.00, which means that the test was able to reject the null hypothesis with 100% power.

According to the contents of Table 6, the F value for the psychological well-being variable was 16.65, which was significant at $P = 0.01$. Therefore, it can be stated that receiving stem cells has increased psychological well-being in the experimental group compared with the control group. Also, the F value for the hope variable was 21.86, which was significant at $P = 0.01$. Therefore, it can be stated that receiving stem cells has increased hope in the experimental group compared with the control group. Also, based on the contents of Table 6, the F value for the health

concern variable was 48.98, which was significant at $P = 0.01$. Therefore, it can be stated that receiving stem cells has reduced health concerns in the experimental group compared with the control group.

Discussion and Conclusion

Cancer is one of the terrible and terrifying diseases that unfortunately human beings suffer from and constantly feel at risk of it.^[28] Cancer with more than a hundred types of malignant tumors can appear in all ethnic, racial, age, gender, and economic and social groups, and all people have the ability to get this disease. According to the report of the World Health Organization (WHO), the incidence of 10 million people in 2000 is expected to reach 15 million people in 2020, 60% of which are related to the less developed countries of the world. The organization predicts an increase in cancer deaths to 9 million people in 2015 to 11 million people in 2030 with a ratio of about 70% of deaths in low- or middle-income countries. The annual incidence of cancers in our country is about 70,000 cases and the death rate is about 30,000 people. Considering the increase in life expectancy and the increase in the percentage of old age in the country, it is expected that the incidence rate will increase significantly in the coming decades. Traditionally, the diagnosis of cancer was considered as imminent death with pain and loss of function; however, today, despite the new possibilities and treatments, this disease is considered a chronic disease in more than half of the cases.^[29] Esfahani^[30] states that the mentioned cases, in addition to the increasing prevalence of various types of cancer, multiply the need to address the psychological problems of this group. However, in the research conducted in the country, there were very few studies that directly dealt with the psychological problems of cancer patients. Therefore, in this research, we aimed to investigate the status of these variables in the study population by comparing psychological well-being, hope, and health concerns in leukemia patients before and after receiving stem cells. The results of the present study showed that receiving stem cells in patients with blood disorders significantly increases psychological well-being and hope and reduces health concerns. In explaining

Table 3: Results of the homogeneity test of the regression slope between dependent variables of the research in the experimental and control groups in pre-test and post-test stages

	After the tests	Sum of squares	Degrees of freedom	Mean square	F	Sig.
Interaction of pretests at the factor level	Psychological well-being	0.466	2	0.23	0.49	0.61
	Hope	0.243	2	0.12	0.04	0.95
	Health concern	2.22	2	1.11	1.43	0.25

Table 4: Kolmogorov–Smirnov results for checking the assumption of normality of distribution of variables

Pre-tests	Z	Sig.
Psychological well-being	0.35	018
Hope	0.40	0.69
Health concern	0.25	0.61

Table 5: Results of multivariate covariance analysis on the mean post-test scores of psychological well-being, hope, and concern of psychological health of subjects in experimental and control groups

Title of exam	Value	F	Hypothesis df	Error df	Sig.	Partial Eta-squared	Observed power
Pillai's trace	0.671	22.46	3	33	0.001	0.67	1.00
Wilks' lambda	0.329	22.46	3	33	0.001	0.67	1.00
Hotelling's trace	2.04	22.46	3	33	0.001	0.67	1.00
Roy's largest root	2.04	22.46	3	33	0.001	0.67	1.00

Table 6: Results of the analysis of covariance in the Mankwa text on the mean post-test scores of psychological well-being, hope, and health concern of experimental and control groups

Dependent variable	Sum of squares	Degrees of freedom	Mean square	F	Sig.	Partial Eta-squared	Observed power
Psychological well-being	11.94	1	11.94	16.65	0.001	0.32	0.97
Hope	69.27	1	69.27	21.86	0.001	0.38	0.99
Health concern	139.52	1	139.52	48.98	0.001	0.58	1.00

these results, it can be stated that psychological well-being can act as a control mechanism against the physical and cognitive problems of patients with leukemia and help them to think of solutions to the problems of this disease and adopt a suitable one.^[23] Psychological well-being means living well. Also, hope effectively affects many areas of life because hopeful people are better able to set effective goals and make appropriate decisions about these goals. Research findings show that a person's higher hope is positively related to self-esteem and perceived competence and negatively related to symptoms of depression;^[22] in other words, because receiving treatment and hoping to improve the disease. Adaptation of people is effective and leads to adaptation of people, thus increasing their level of hope. Receiving stem cells and trying to cure a person's illness increases the factors of hope, that is, direction and agency. Adaptability increases pathfinding, that is, moving toward future goals, and agency thinking, which means one's own ability to move toward goals also increases with increasing adaptability and receiving support from others. Studies conducted in cancer patients show that the severity of symptoms and emotional pressures have an effect on the quality of life. Cancer threatens a person's independence and ability to participate effectively in the family and society and leads him to feel incompetent and unsure of himself. In explaining these findings, it can be said that hope is a factor that enriches life and enables people to observe a vision beyond their current situation and disorder, and pain. Among the positive results of improving the hope of making life meaningful, energy for work, maintaining happiness and life, self-confidence and peace, adaptation, and adaptability to conditions and superiority in life can be mentioned.

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Conflicts of interest

There are no conflicts of interest.

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