

Comparative Analysis of the Effect of Person-Centered and Family-Centered education on Quality of Life of Patients with Covid-19 in Bank Melli Hospital in 2020

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1 Introduction

An approach to health care planning, delivery, and evaluation known as "person- and family-centered care" is based on partnerships that are advantageous to patients, families, and healthcare providers. By emphasizing collaboration with individuals of all ages, at all care levels, and in all healthcare environments, it redefines the connections in the health care industry. In patient- and family-centered care, patients and families define their "family" and determine how they will participate in care and decision-making. A key goal is to promote the health and well-being of individuals and families and to maintain their control. This viewpoint is founded on the understanding that patients and their families are crucial allies for quality and safety—not just in the context of direct patient care, but also in the context of quality improvement, safety campaigns, health professional education, research, facility design, and policy formation. Better health outcomes, a better patient and family experience of care, higher levels of satisfaction among staff members and clinicians, and more prudent use of resources are all associated with patient- and family-centered care.

1.1 Advantages of Person and Family-Centered education

Person and Family-Centered education will result in many benefits, including:

- improved clinical decision making that is based on better information
- a greater understanding of the individual's and family's strengths and needs
- better follow-through when the treatment plan is developed collaboratively
- more effective communication leading to fewer misunderstandings
- better outcomes and greater satisfaction with services

1.2 Purposes of this project

- Main purpose
Determining and comparing the effect of person-centered and family-centered education on quality of life of patients with covid-19.
- Specific purposes
 - Determining and comparing the average score of the quality of life of patients with covid-19 in the person-centered education group before and 6 weeks after the educational intervention.
 - Determining and comparing the average score of the quality of life of patients with covid-19 in the family-centered education group before and 6 weeks after the educational intervention.
 - comparing the average score of the quality of life of patients with covid-19 in the person and family-centered education group before educational intervention.
 - comparing the person-centered education with family-centered education on quality of life of patients with covid-19.

2 Methods

Three statistical techniques were applied to analyze the dataset including independent samples t-test, dependent sample t-test, and analysis of covariance (ANCOVA).

2.1 Independent Samples T-test

The independent samples t-test is used to compare two sample means from unrelated groups. The purpose of this test is to determine if the samples are different from each other. This technique was used to compare the mean value of the quality of life of patients in the person-centered group with the mean value of the quality of life of patients in the family-centered group. The basic hypotheses are as follows:

NULL: The sample mean from person-centered group is not different from the sample mean from family-centered group.

Alternative: The sample mean from person-centered group is significantly different from the sample mean from family-centered group.

2.2 Dependent Samples T-test

The dependent samples t-test is used to compare the sample means from two related groups. This means that the scores for both groups being compared come from the same source. The purpose of this test is to determine if there is a change from one measurement (group) to the other. This technique was used to investigate the change for mean value of quality of life of patients in both groups before the intervention and after the intervention. The basic hypotheses are as follows:

Null: The mean difference between the two groups is not different from 0.

Alternative: The mean difference between the two groups is different from 0.

2.3 ANCOVA

Within the field of statistical analysis, Analysis of Covariance (ANCOVA) is a flexible method that blends the ideas of linear regression with analysis of variance (ANOVA). It functions as an expansion of ANOVA, allowing researchers to investigate the correlation between an independent and dependent variable while accounting for the impact of one or more covariates, or extraneous variables. This technique was used to compare the two methods of education to explore that which method is more effective to improve the quality of life of patients with Covid-19. The basic hypotheses are as follows:

Null: There is no relationship between the independent variable and the dependent variable, controlling for the covariate.

Alternative: There is a relationship between the independent variable and the dependent variable, controlling for the covariate.

2.4 Data and Data Preparation

88 patients with Covid-19 randomly divided in two groups (44 patients in each group). The patients of one group received person-centered education and the patients of the other group received family-centered education. In family-centered group, a family member received healthcare advice and provided them to the patient.

3 Results

This section presents the results of this project. In this section, the collected data, methods used to analyze the data, and findings of our analysis are presented. In order to have more clear and concise results, we have used tables and figures to illustrate our findings whenever possible.

3.1 Summary Statistics

Table 1 summarizes the key features of two groups of study, the person-centered group and the family-centered group, both before and after an intervention (education). The table includes the mean, standard deviation, minimum, and maximum values for the score of quality of life and groups. Figure 1 depicts the distribution of quality of life of patients for both groups before and after education.

Table 1: Summary statistics for groups before and after intervention.

		statistics			
		mean	SD	min	max
person	Before intervention	26.77	4.46	19	35
	After intervention	27.9	4.21	20	37
family	Before intervention	25.62	3.9	18	32.5
	After intervention	29.2	4.14	20	38

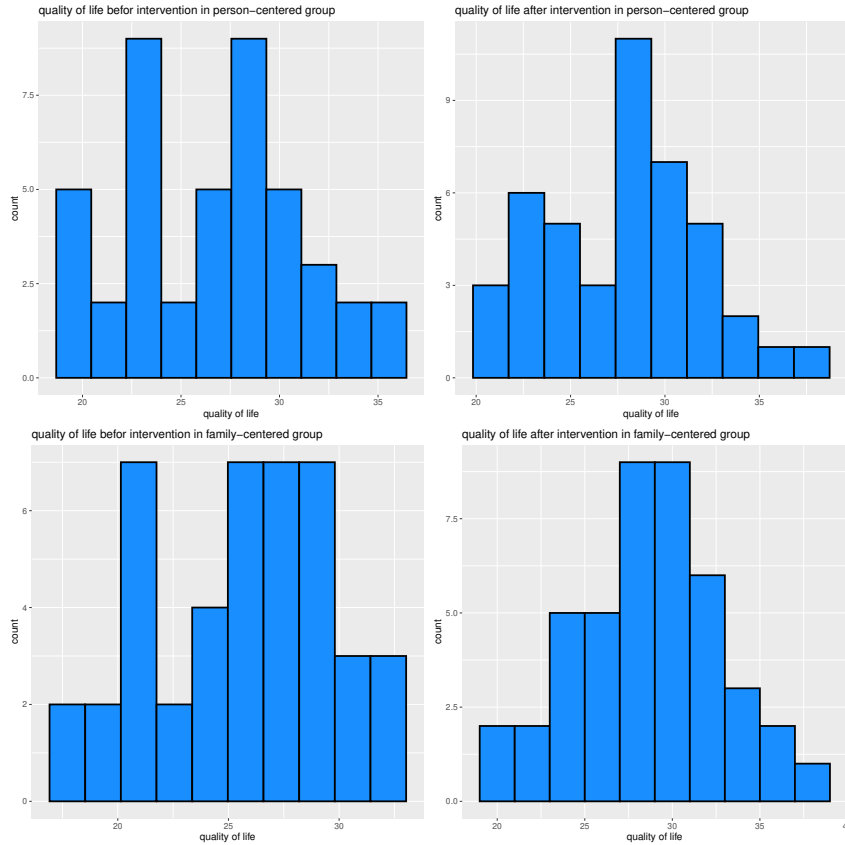


Figure 1: Histogram for groups before and after intervention.

3.2 Analysis of Quality of Life Before Intervention

To assess whether there was a statistically significant difference in quality of life between the person-centered and family-centered groups before the intervention, an independent t-test was conducted. According to Table 2, the results of the t-test indicated no statistically significant difference between the two groups ($t(88) = -1.28$, $p = 0.202$). The boxplot in Figure 2 further illustrates the similarity in quality of life scores between the two groups before the intervention.

3.3 Analysis of Quality of Life Before and After Intervention

To evaluate the impact of the educational intervention on patient quality of life, paired t-tests were conducted for both the person-centered and family-centered groups. The results

Table 2: Independent t-test results for quality of life before intervention.

Mean1	Mean2	df	statistic	p-value
26.77	25.62	86	-1.28	0.202

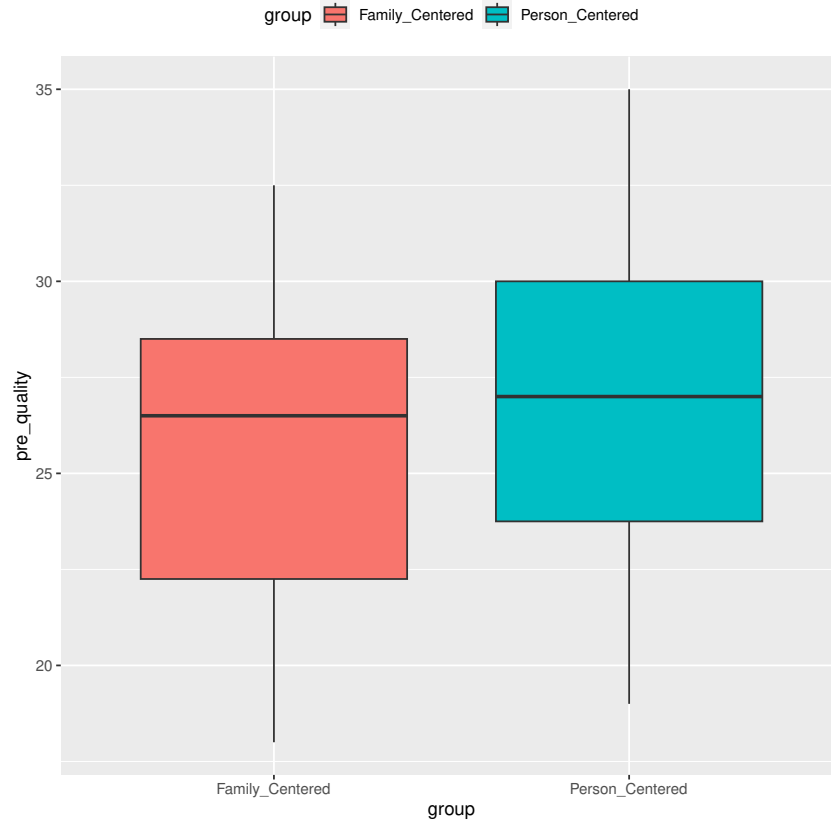


Figure 2: Boxplot of quality of Life before intervention.

in Table 3 revealed that the intervention had a significant positive effect on quality of life for both groups. The boxplots in Figure 3 further illustrate the positive impact of the educational intervention, with both groups exhibiting substantial gains in quality of life scores after receiving the intervention.

Table 3: Paired t-test results for Quality of Life before and after intervention.

group	Mean difference	df	statistic	p-value
Person centered	-1.136	43	-2.3	0.026
Family centered	-3.57	43	-8.22	<0.001

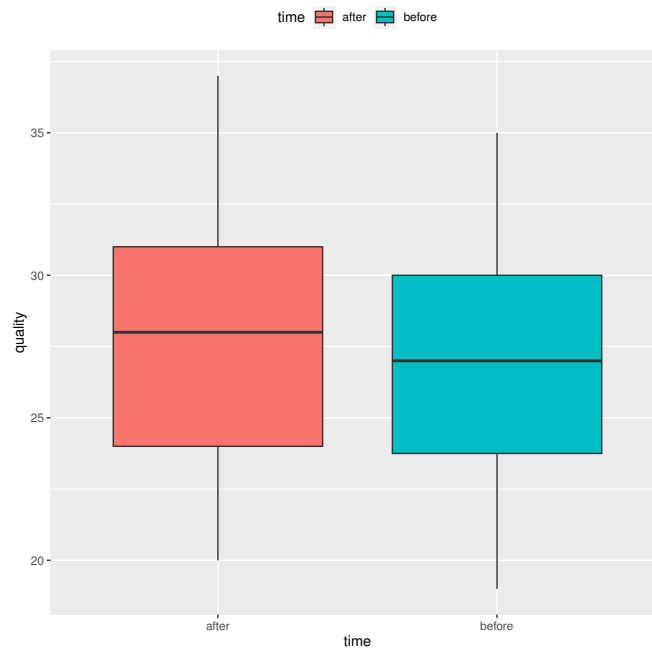


Figure 3: Boxplot of person-centered group before and after intervention.

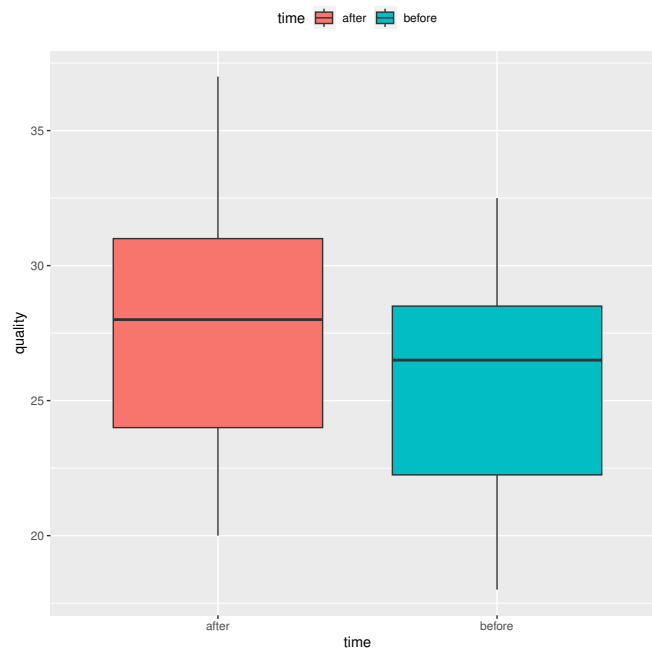


Figure 4: Boxplot of family-centered group before and after intervention.

Table 4: Homogeneity of regression slopes test results.

effect	Df1	Df2	F statistic	p-value
group	1	84	11.71	0.0009
Before intervention	1	84	95.41	<0.001
Group*before intervention	1	84	0.55	0.45

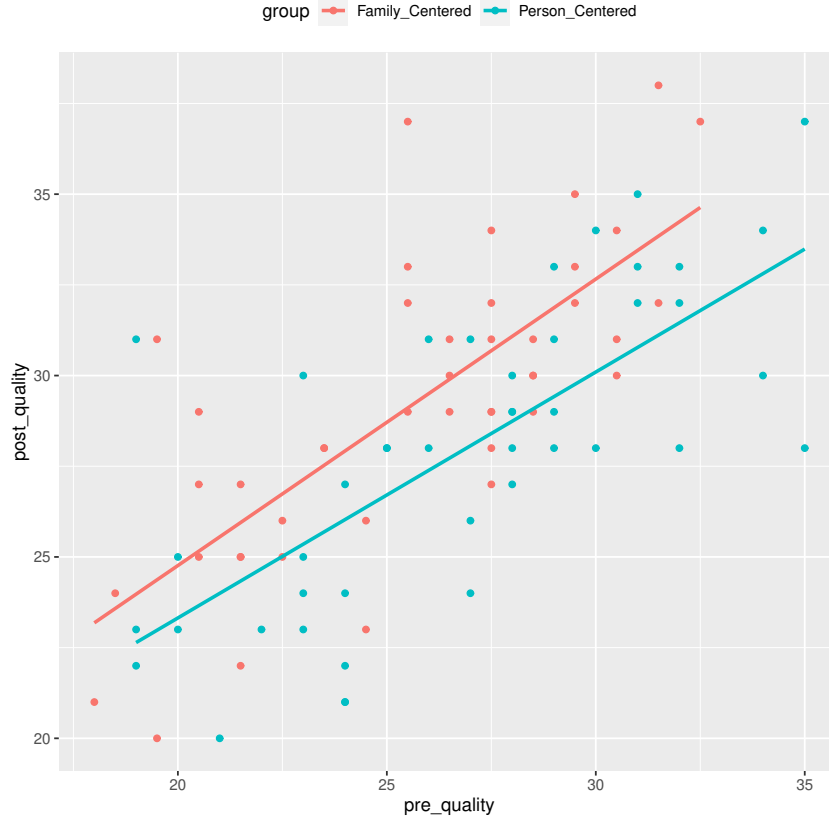


Figure 5: Relationship between quality of life score before and after education for each group

3.4 Analysis of Covariance (ANCOVA)

3.4.1 Linearity assumption

To ensure the validity of the ANCOVA analysis, it was crucial to assess whether the regression slopes between the dependent variable (quality of life) and the covariate (pre-intervention) were homogeneous across the two groups (person-centered and family-centered). This was accomplished by conducting a homogeneity of regression slopes test. The results in Table 4 indicated that the interaction term between the covariate and the group was not statistically significant ($F(1, 84) = 0.55, p = 0.45$). This finding suggests that the regression slopes are equal across the two groups, supporting the assumption of homogeneity for ANCOVA. The plot of the regression lines in Figure 5 further illustrates the parallel nature of the slopes, visually confirming the homogeneity assumption. This allows for the use of ANCOVA to assess the effect of the intervention on quality of life.

Table 5: Normality of residuals.

variable	statistic	p-value
residuals	0.98	0.255

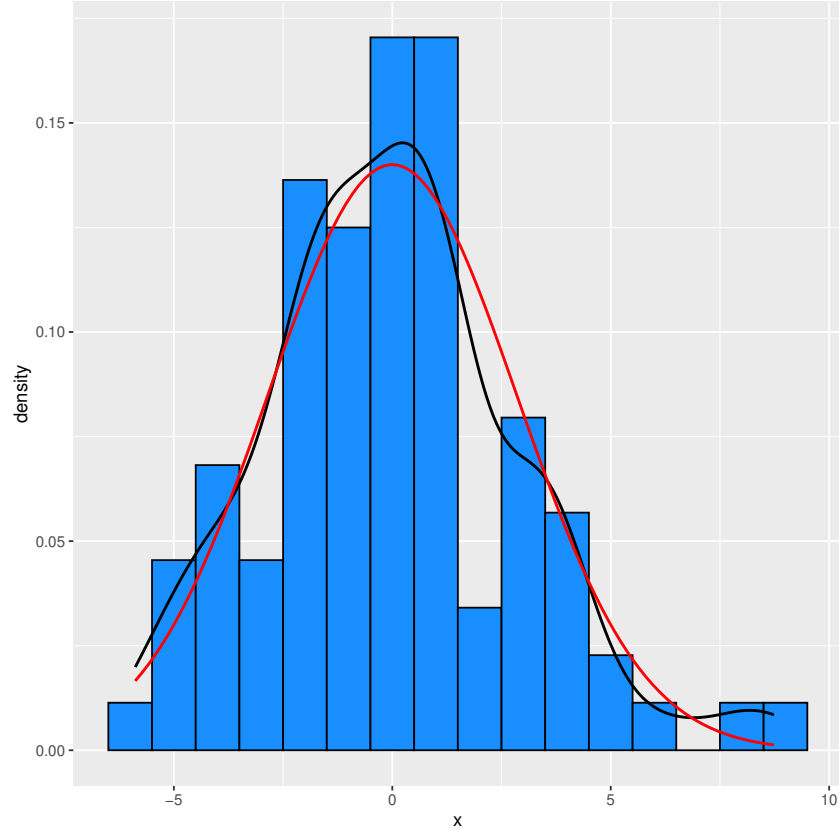


Figure 6: Histogram of residuals

3.4.2 Normality of residuals

To assess the normality of residuals from the ANCOVA model, a Shapiro-Wilk test was conducted. The results in Table 5 indicate that the residuals are normally distributed ($W = 0.98$, $p = 0.255$). This finding suggests that the assumption of normality for the ANCOVA model is met, providing further support for the validity of the analysis. To visually inspect the distribution of residuals, a histogram of residuals was created. The histogram in Figure 6 reveals a bell-shaped distribution, further confirming the normality assumption.

3.4.3 Comparison of two methods of education

The results of the ANCOVA analysis in Table 6 revealed that there was a significant difference in quality of life scores between the two education groups, $F(1, 85) = 11.78$, $p = 0.0009$. An error bar plot was created to visualize the difference in quality of life scores between the two education groups (Figure 7). As indicated in Figure 7, the mean of the person-centered group is not included within the error bar of the family-centered group mean, which suggests a significant difference between the two groups.

Table 6: Comparison of two methods using analysis of covariance.

effect	Df1	Df2	F statistic	p-value
group	1	85	11.78	0.0009
Before intervention	1	85	95.92	<0.001

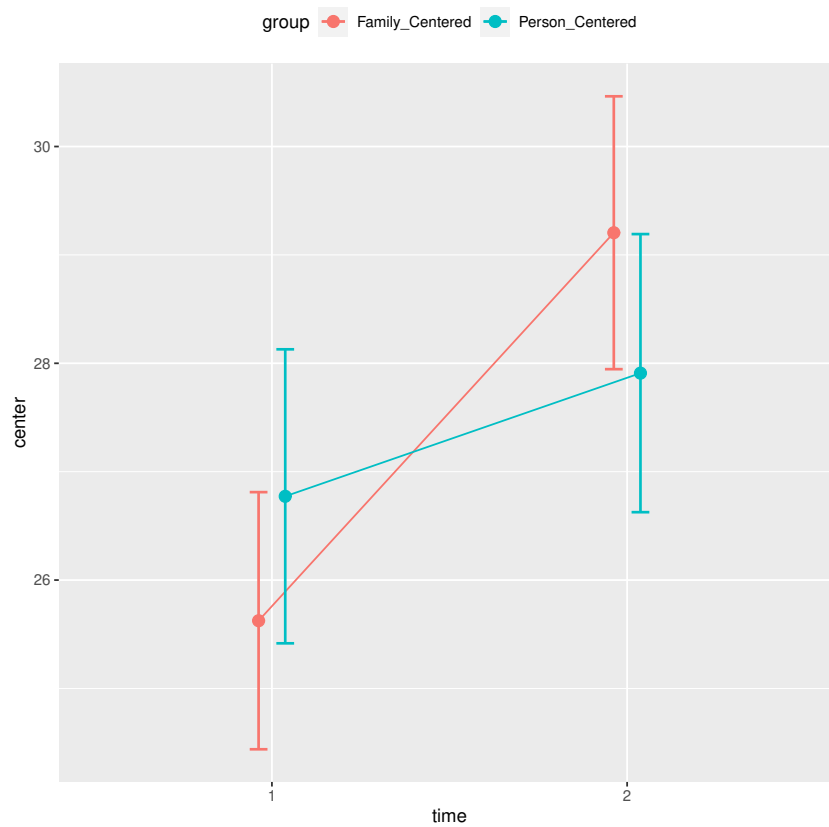


Figure 7: Error bar plot comparing the quality of life scores for two education methods.

4 Conclusion

In this project, quality of life of patients with Covid-19 was analyzed and compared before and after two different methods of education. 88 patients divided into two groups with 44 patients and one group received a person-centered education, other group received family-centered education. The score for two groups compared before the education using independent t test. The results suggested that the two groups were comparable in terms of quality of life before the educational intervention began. This provides a baseline for evaluating the effect of education on quality of life. In addition, the paired t-tests demonstrated that both education methods were effective in significantly improving quality of life scores within their respective groups. These findings suggest that the educational intervention was effective in enhancing the quality of life for both groups. Finally, the results of analysis of covariance (ANCOVA), revealed a statistically significant difference in quality of life score after the education between the person-centered and family-centered groups. The family-centered group demonstrated a significantly greater improvement in quality of life compared to the person-centered group, indicating that this method was more effective than person-centered education in enhancing quality of life.