The Statistical Sleuth (3rd Edition)

Problem

Effect of Group Therapy on Survival of Breast Cancer Patients. Researchers randomly assigned metastatic breast cancer patients to either a control group or a group that received weekly 90-minute sessions of group therapy and self-hypnosis, to see whether the latter treatment improved the patients' quality of life. The group therapy involved discussion and support for coping with the disease, but the patients were not led to believe that the therapy would affect the progression of their disease. Surprisingly, it was noticed in a follow-up 10 years later that the group therapy patients appeared to have lived longer. The data on number of months of survival after beginning of the study are shown in Display 4.17. (Data from a graph in D. Spiegel, J. R. Bloom, H. C. Kraemer, and E. Gottheil, "Effect of Psychosocial Treatment on Survival of Patients with Metastatic Breast Cancer," Lancet (October 14, 1989): 888–91.) Notice that three of the women in the treatment group were still alive at the time of the follow-up, so their survival times are only known to be larger than 122 months. Is there indeed evidence of an effect of the group therapy treatment on survival time and, if so, how much more time can a breast cancer patient expect to live if she receives this therapy? Analyze the data as best as possible and write a brief report of the findings.

DISPLAY 4.17 Months of survival after beginning of study for 58 breast cancer patients

Control Patients ($n = 24$)
2, 6, 8, 10, 12, 12, 14, 14, 14, 16, 16, 16, 18, 18, 18, 20, 22, 22, 26, 34, 36, 38, 40, 48

Patients Given Group Therapy for One Year ($n = 34$)
2, 2, 4, 4, 4, 6, 6, 8, 10, 10, 12, 14, 16, 16, 16, 18, 20, 22, 32, 36, 46, 46, 48, 48, 58, 58, 66, 72, 72, 82, 122, 122*, 122*, 122*

*These three patients were still alive at the end of the 122-month study period.

Step-by-step solution

Step 1 of 4

There is information about the effect of group therapy on survival of breast cancer patients.

The objective is to test whether there is indeed evidence of an effect of the group therapy treatment on survival time.

For this testing, need to give hypothesis, rank-sum (Mann-Whitney) test statistics and find *p*-value then take decision basis on *p*-value.

Comment

Step 2 of 4

The null and alternative hypothesis can be defined as follows:

H_0 : There is no effect of the group therapy treatment on survival time.

H_a : There is an effect of the group therapy treatment on survival time.

The Mann-Whitney test statistic is calculated as follows:

4) Click **Define Groups** and enter the group value.

5) Click **Continue**.

6) Select **Mann-Whitney U** in **Test Type**.

7) Click **Ok**.

Comment

Step 3 of 4

SPSS Output:

Ranks

	CancerGroup	N	Mean Rank	Sum of Ranks
SurvivalMonth	Control	24	26.54	637.00
	Therapy	34	31.59	1074.00
	Total	58		

Test Statistics[a]

	SurvivalMonth
Mann-Whitney U	337.000
Wilcoxon W	637.000
Z	-1.123
Asymp. Sig. (2-tailed)	.262

a. Grouping Variable: CancerGroup

Comment

Step 4 of 4

From the SPSS output, the Mann-Whitney test statistic is -1.123 and the one-sided *p*-value is 0.262.

Decision:

The *p*-value is greater than 0.05 which is 0.262, so do not reject the null hypothesis. There is insufficient evidence that there is an effect of the group therapy treatment on survival time, so it is not possible to give time for breast cancer patient expect to live if she receives this therapy.

Comments (1)

Isn't the p-value two sided here?

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Was this solution helpful? 1 0

Salvage Logging. When wildfires ravage forests, the timber industry argues that logging the burned trees enhances forest...

See solution

Motivation and Creativity. Find a 95% confidence interval for the treatment effect (poem creativity score after intrinsic motivation questionnaire minus poem creativity score after extrinsic motivation questionnaire, from Section 1.1.1 (file...

See solution

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