

Week 6 Discussion

Select a practice-change problem and, from the literature, an intervention to impact outcomes. Imagine you are attempting to determine if the intervention is more effective than current practice. Explain the various types of non-parametric statistical tests that might be used to analyze the data collected during the implementation of the intervention. Provide a rationale for the use of non-parametric tests for this data set.

Liver cancer is the sixth most common type of cancer and the third leading cause of death from cancer (Singh et al., 2020). According to Singh et al. (2020), in hepatocellular carcinoma (HCC), dysplastic macro nodules evolve early and develop into cancer. Therefore, screening should enable us to find lesions early. The research study by Zheng et al., 2018 discussed the lab tests to detect the serum lncRNA urothelial carcinoma associated 1 (UCA1), which is effective in identifying patients with HCC, aids in the diagnosis, and helps with clinical practice for patients with early-stage HCC along with imaging studies. Various nonparametric statistical tests can be used to analyze the data when parametric test data distribution assumptions still need to be met (Schober & Vetter, 2020). For example, the Mann-Whitney U test compares two independent groups nonparametrically. The Kruskal–Wallis test can replace one-way analysis of variance for groups with more than two (ANOVA). The Wilcoxon signed rank test compares two paired (not independent) groups or two repeated tests done on the same person, assuming that differences between the groups are the same. The Friedman test compares more than two paired groups nonparametrically. Nonparametric correlation analysis uses Spearman rank correlation (Schober & Vetter, 2020).

The sample size is an essential assumption in selecting the appropriate statistical method (Schober & Vetter, 2020). The applicable parametric test can be used if a sample size is reasonably large. However, if the sample size is too small, it is possible that you will not be able to validate the distribution of the data. Thus, the application of nonparametric tests is the only suitable option (Schober & Vetter, 2020). The Mann-Whitney U-test was used to compare the data between groups in Zheng et al. (2018) study. Categorical data were analyzed using the chi-square test. Receiver-operating characteristic (ROC) curves were used to determine how good serum UCA1 is at diagnosing HCC. Overall survival was compared by the Kaplan–Meier method. Univariate and multivariate Cox regression analyses were performed to examine the relationships between patient survival and prognostic variables.

Schober, P., & Vetter, T. R. (2020). Nonparametric statistical methods in medical research. *Anesthesia & Analgesia*, *131*(6), 1862-1863.
<https://doi.org/10.1213/ane.00000000000005101>

Singh, G., Yoshida, E. M., Rathi, S., Marquez, V., Kim, P., Erb, S. R., & Salh, B. S. (2020). Biomarkers for hepatocellular cancer. *World Journal of Hepatology*, *12*(9), 558-573. <https://doi.org/10.4254/wjh.v12.i9.558>

Zheng, Z., Pang, C., Yang, Y., Duan, Q., Zhang, J., & Liu, W. (2018). Serum long noncoding RNA urothelial carcinoma-associated 1: A novel biomarker for diagnosis and prognosis of hepatocellular carcinoma. *Journal of International Medical Research*, *46*(1), 348–356. <https://doi.org/10.1177/0300060517726441>