Misinterpretation of Statistical (In)Significance in Scientific Researches / Bilimsel Araştırmalarda İstatistiksel Anlamlılığın-Anlamsızlığın Yanlış Yorumlanması

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Dear Editor,

I would like to comment on the statistical misinterpretation present in the manuscript of Demirbüken et al. with the title "The Effect of Type 2 Diabetes Mellitus on The Motor Behaviour of Elderly Individuals During Sit to Stand Activity" published in MÜSBED 2012;2(2):72-77.

Choosing the appropriate statistical method(s) that fits the research design best in research articles is of great importance. Besides, interpretation of the results of the statistical analyses is also one of the most crucial factors in researches as the misinterpretation of these results could be misleading for further similar studies (1). Although Demirbüken et al. stated in the "Results" section of their manuscript that *"No significant difference was found for all measured parameters …"*, in the following parts they used several expressions meaning that "one of the investigated groups either performed better or worse than the other group in regard to measured parameters, although this better/worse performance was statistically insignificant". These expressions are not consistent with the results of their study. As clearly stated in the publications of İlker et al. (2007) and Kline (2004), if the result of a hypothesis test shows that the "p" value is greater than 0.05, this indicates that the absolute numeric difference in the means of the groups is insignificant (let's say mean of group-A is greater than mean of group-B) (1,2). In other saying, this indicates that when the same research is repeated under the same conditions and with the same sample size taken from the same population,

there is a probability that, this time, mean of group-B can be greater than mean of group-A, but this difference is still statistically insignificant (1). Therefore, expressions used by Demirbüken et al. seemed to be misleading.

More importantly, they should have focused the discussion section of their manuscript on the explanation of possible causes of "absence of significant differences" in the investigated variables between groups which contradicted their expectations (hypotheses). However, in the discussion section, Demirbüken et al. did not discuss any possible causes, rather they tried to relate the "insignificant differences" in the investigated variables between groups to some literature knowledge and explain the "insignificant differences" based on the literature. It is of importance to note that the differences in their study are just descriptive statistics and have no generalizability as no statistical significance is present.

Graphical representation in their manuscript is also misleading. Weight transfer time, COG sway degree and left-right symmetry seems to be two-fold (may be more) greater and rising index seems to be two-fold (may be more) smaller in diabetic group than non-diabetic one. Finally, presenting means and standard deviations in the statistical analyses in their study is not appropriate since the Mann-Whitney U test compares sum of ranks between groups (3). Presenting medians and 25%-75% percentiles might have been a more appropriate method.

I hope that Demirbüken et al. will regard my criticisms as a contribution to their research and already now I wish them success in their planned future researches.

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