

## LETTER TO THE EDITOR

### Mean difference effect size: Complementary contributions<sup>☆</sup>



### Tamaño del efecto para diferencia de medias: aportes complementarios

Dear Editor,

Studies in the health sciences have the aim of determining the occurrence of phenomena in a population by analysing sample data.<sup>1</sup> To achieve this end, some years ago it was recommended that measurements of effect size (ES) be reported in all papers subjected to evaluation in scientific journals in the field of health.<sup>2</sup> This complements the information on the occurrence or not of a phenomenon with evidence on the magnitude of the said occurrence.<sup>3</sup> The calculation of ES is all the more necessary if its practical utility is taken into account, as it makes it possible to estimate and state whether the changes observed are clinically relevant.

In studies that compare the averages of two independent populations to discover if they are equal, the most appropriate procedure is to compare the averages of two samples extracted from these populations. This analysis makes it possible to determine whether there are any statistically significant differences between them or not, depending on the *P* value of the *t*-test for independent samples. This is the case in the valuable study by Carrillo-García et al.,<sup>4</sup> who studied the level of work-related stress in a sample of professional nurses in an intensive care unit. They reported significant differences in the level of work-related stress depending on professional category, as the professional nurses had higher average perceived psychological demands (*P* = .000) and perception of being in control of their work (*P* = .003) than the auxiliary nurses. However, the study did not report data on size or differences. The aim of this short letter is therefore to complement the valuable findings of Carrillo-García et al. with a measurement of ES.

ES is calculated for this case using Cohen's *d* coefficient<sup>1</sup> according to the formula  $d = (M_1 - M_2) / SD_{\text{weighted}}$ ; where  $M_1$

and  $M_2$  are the average scores in the groups being compared, and  $SD_{\text{weighted}}$  is the weighted standard deviation. To interpret this, values of 20, 50 and 80 express a small, moderate or large ES.<sup>1,3</sup> The value of *d* is complemented with the calculation of its confidence intervals (CI) which offer information on its possible values in association with a specific level of confidence.<sup>5</sup> If zero is included within the CI then the reported results will not be statistically significant; on the contrary, if zero is absent then information on the statistical significance of the findings will be offered.

The data contained in Table 4 of the study by Carrillo-García et al. were re-analysed. Based on this, the differences in psychological demands ( $d = 1.04$ ; CI 95%: .517–1.512) and being in control of their work ( $d = .749$ ; CI 95%: .262–1.237) between professional nurses and auxiliary nurses have a large and moderate ES, respectively, and these results are statistically significant. Thus belonging to one professional category or another would lead to a major difference in psychological demands and a moderate difference in terms of their control of their work in the sample of nurses. The ES may also be interpreted in percentage terms, by converting the *d* value into a proportion of the variance explained by the independent variable (in this case, professional category) by calculating the general determination coefficient ( $R^2$ ),<sup>5</sup> using the formula  $R^2 = d^2 / (d^2 + 4)$ . This calculation makes it possible to state that differences between being a professional nurse or an auxiliary nurse explain 12% and 20% of the variability in the scores corresponding to the areas of being in control of their work and psychological demands, respectively.

Based on these results, the aim of this letter is to complement the important study by Carrillo-García et al. with a report on ES measurements, as these add to its precision and provide empirical evidence for the size of the differences. They also increase the practical utility of their conclusions. It is also important to consider that standardised ES values are useful in nursing meta-analysis studies, as they make it possible to systematise the results of studies which form the basis for evidence-based public healthcare policies.

DOI of original article: <http://dx.doi.org/10.1016/j.enfi.2017.05.001>

<sup>☆</sup> Please cite this article as: Caycho-Rodríguez T. Tamaño del efecto para diferencia de medias: aportes complementarios. *Enferm Intensiva*. 2018;29:48–49.

## References

1. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Hillsdale: Erlbaum; 1998.
2. International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *N Engl J Med.* 1997;336:309–16.
3. Ferguson CJ. An effect size primer: a guide for clinicians and researchers. *Prof Psychol Res Pr.* 2009;40:532–8.
4. Carrillo-García C, Ríos-Risquez MI, Martínez-Hurtado R, Noguera-Villaescusa P. Nivel de estrés del personal de enfermería de la Unidad de Cuidados Intensivos de un hospital clínico universitario. *Enferm Intens.* 2016;27:89–95.
5. Bologna E. Estimación por intervalo del tamaño del efecto expresado como proporción de varianza explicada. *Evaluar.* 2014;14:43–66.

T. Caycho-Rodríguez (MSc)

*Facultad de Ciencias de la Salud, Universidad Privada del Norte, Trujillo, Peru*

*E-mail address: tomas.caycho@upn.pe*