A comment on a study of parity in centenarian women of Sardinia

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Lipsi et al (2015) have published a descriptive study of centenarians of Sardinia in *Demographic Research*. One of their main conclusions is that "centenarian women have on average fewer children, and at an older age, particularly for their last child". However, these conclusions are not warranted.

The authors write that "centenarian women (excluding childless women — we restricted the analysis to women that had experienced a 'birth event') had an average of 5.4 children compared with 5.6 children for women in the same cohorts deceased at ages 70-79 and 5.8 children for women in the 1905-1910 cohorts". However, the number of children for women deceased at ages 70-79 is not 5.6, but 5.1 (Table 3), while that for women deceased at ages 60-69 is 5.6. Thus, the number of children of the ca 60 centenarian women is intermediate between those of women dying at rather young ages and the conclusion that centenarian women had "on average fewer children" is not justified. In addition, the authors report in the caption of their Table 3 that "the differences between centenarians and controls are significant at a level of $\alpha<0.05$ (Student's t-test)". In other words, they have increased the type-1 error risk by computing several successive t-tests (probably 5 tests, because there are 5 control groups), and there is a high risk that at least one of these tests was significant by chance (for computations of this risk see Table 11.1 in Zar, 1984). This risk could have been avoided by computing a table-wide significance level by dividing the minimal p-level by the number of tests (Bonferroni correction: in this example $p = 0.05/5 = 0.01$), or a sequential Bonferroni correction (Holm, 1979; Rice, 1989). Computing an analysis of variance would also have been an appropriate strategy, but there is no ground to rely on successive t-tests.

The age at last birth of centenarian women was 38.5 years while that of the various controls was in the 37.7-39.2 range. These differences are rather small but, in any case, Student's t-tests cannot be used to compare the centenarians to each of the control groups for the reasons described above.

This study appears to be an example of conclusions led by a favourite hypothesis rather than by hard data, not only because of limitations described above, but also because the reported effects, even if they were significant, are of a very low magnitude and should thus lead to conclude that the effects of being a centenarian on parity are of a minor importance. Many articles have been devoted to the relationship between fertility and lifespan and it is a cautious conclusion that there is probably no clear relationship between parity and lifespan (references in Le Bourg, 2007, see also e.g. Chereji et al., 2013). Regarding the citation of Westendorp and Kirkwood (1998) by the authors, it is needed to recall that this study is flawed, as shown in *Demographic Research* by Gavrilova and Gavrilov (1999), who concluded that the ‘‘British database unfortunately can NOT be used in scientific analysis in its present form’’.

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