Benford´s law validates mortality in Gaza Strip

La ley de Benford valida la mortalidad en la Franja de Gaza

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Recently, a letter to The Lancet´s editor written by Benjamin Q Huynh and colleagues reported that figures of mortality in Gaza between October 7 to November 10, 2023, were not inflated[1]. To support this affirmation, they analysed the daily trends of Gaza Ministry of Health's mortality along with data of reported staff member deaths from the United Nations Relief and Works Agency for Palestine Refugees in the Near East. They found no evidence of abnormal increases. This contrasts with what has been pointed out by various voices from Israel, who indicate that the data is false, even going so far as to say that the images published by the media and social networks are made by actors, which constitutes a "Pallywood" (disparaging combination of "Palestine" and "Hollywood")[2].

However, due to the sensitive nature of data, assessing its quality is required. More than 12 years ago we proposed using Benford's law[3] in epidemiology to evaluate data quality during epidemics[4]. According with this law, for a determined set of numbers, those whose leading digit is the number 1 will appear more frequently than those numbers that begin with other digits; the other digits appear with decreasing frequency. Benford's law was used extensively during the COVID-19 pandemic[5], even with Colombian data[6,7], and has also been used to evaluate mortality data during wars[8]. This is not strange because epidemic and war data have similar properties.

We decided to analyse the same data reported by Huynh et al, and to test with the likelihood ratio, X^2 and Kuiper tests the fulfilment of Benford's law. Findings consistently suggest that reported data comes from a good quality source, and analyses are free of the effect of bad reporting (see **Figure 1**). As mentioned by Huynh and colleagues, data in this situation is sensitive to be adjusted with time, hence we recommend attaching to statistical analysis of trends, methods to assure the trustworthiness of information used. For us, Benford's law validates mortality reported by Gaza Ministry of Health, thus data shows objectively the magnitude of the current humanitarian disaster in this conflict. We hope that the violent actions that have serious repercussions on the health of those in the Gaza Strip, Israel and in many other places in the world will soon stop.

We declare no competing interests.

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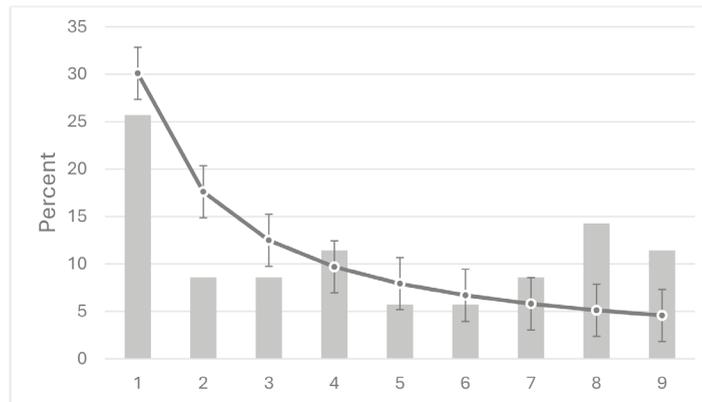
| Expected distribution % | 30.103 | 17.609 | 12.494 | 9.691 | 7.918 | 6.695 | 5.799 | 5.115 | 4.576 |

Pearson's X2, p-value=0.131
Log likelihood ratio, p-value=0.272
Kuiper test, p-value>0.1.

Figure 1. First-digit frequencies for the Benford distribution of reports of cumulated deaths in Gaza Strip (Oct 7 - Nov 10, 2023)

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