

Letter to the Editor

# Do “Disease Awareness Days” Work? A 5-Year Investigation Using Google Trends

## 1. INTRODUCTION

The so-called “disease awareness days” are promoted by many renewed healthcare associations and organizations with the aim of increasing awareness on the burden of a specific disease and emphasizing the need for more effective actions, especially underscoring the unrecognized threat and serious consequences. Among the various campaigns, some of these were specifically planned for increasing alertness on the most frequent worldwide human pathologies [1], including diabetes (World Diabetes Day, organized by the International Diabetes Federation on November 14), thrombosis (World Thrombosis Day, organized by the International Society on Thrombosis and Haemostasis on October 13), cancer (World Cancer Day, organized by the Union for International Cancer Control on February 4), myocardial infarction (World Heart Day, organized by the World Heart Federation on September 29), and thyroid disorders (World Thyroid Day, organized by the American Thyroid Association on May 25).

The success of these initiatives, which is basically reflected by their worldwide popularity in the general population, is often difficult to be ascertained. Google Trends (Google Inc., Mountain View, CA, USA) has recently been proposed as a reliable tool for estimating the popularity among the general population of certain topics, including important healthcare issues [2]. Basically, this freely available Web-based software enables analyzing the popularity of specific search queries in Google Search across many different regions. The final output of a Google Trend search for a given search term is a relative value of popularity (i.e., the weekly Google Trend score), where 100 is the highest peak of Google searches throughout the search period, 50 implies that the search term had half popularity compared to the peak, and 0 reflects <1% the number of Google searches corresponding to the peak.

With the aim of obtaining objective information about the potential success of some of the most popular disease awareness days, we carried out an electronic search in Google Trends limited to five past years (i.e., between November 24, 2013, and November 23, 2018) and without geographical restrictions, using the following search terms: “diabetes” OR “thrombosis” OR “cancer” OR “myocardial infarction” OR “thyroid disease.” The weekly Google Trends score, reflecting the number of weekly Google searches, was then compared between the week corresponding to the specific disease awareness day for diabetes (November 14),

thrombosis (October 13), cancer (February 4), myocardial infarction (September 29), or thyroid diseases (May 25) and the remaining period of the year.

The results of this Google Trend analysis are shown in Table 1. Briefly, the week corresponding to World Diabetes and Thrombosis Days was associated with a remarkable peak of Google searches for diabetes and thrombosis, respectively, 21% ( $p < 0.001$ ) and 9% ( $p = 0.001$ ) higher than in the rest of the year. Unlike these findings, the week corresponding to the World Cancer Day was associated with a borderline significant increase of Google searches for cancer (+5%;  $p = 0.048$ ), while the number of Google searches for myocardial infarction and thyroid diseases was found to be virtually identical during the World Heart Day ( $p = 0.368$ ) or World Thyroid Day ( $p = 0.257$ ) and in the rest of the year (Table 1).

The results of our analysis seemingly suggest that the success of the so-called “disease awareness days,” as reflected by the number of Google searches for the relative pathology, is variably heterogeneous. Albeit the Google searches for diabetes and thrombosis remarkably increased by 21% and 9%, respectively, during the respective disease alertness day, thus corroborating earlier published evidence [3], those for the other diseases remained virtually unchanged or only modestly increased in the week corresponding to the disease awareness day. With some inherent limitations (e.g., Google Trends only captures search behaviors of the part of population with Internet access, and it cannot identify increased healthcare counseling for a given disease) [4], these findings would actually mean that additional efforts should be made for increasing the pervasiveness of disease awareness days among the general population.

**Table 1** | Google Trends score (mean and standard deviation) for some of the most prevalent human diseases

Disease	Weak of awareness day	Rest of the year	<i>p</i>	Mean difference (%)
Diabetes	89 ± 7	74 ± 6	<0.001	+21
Thrombosis	67 ± 4	61 ± 6	0.001	+9
Cancer	75 ± 5	72 ± 6	0.048	+5
Myocardial infarction	64 ± 6	64 ± 5	0.368	+1
Thyroid	59 ± 10	62 ± 13	0.257	+4

## CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

## AUTHORS' CONTRIBUTION

GL and GC were responsible for study conceptualization and writing (original draft) the manuscript. Data curation and formal analysis were carried out by GL and CM. Project administration and supervision were carried out by GL. Review and editing of the final manuscript were done by GL, CM and GC.

Giuseppe Lippi<sup>1\*</sup>, Camilla Mattiuzzi<sup>2</sup>, Gianfranco Cervellin<sup>3</sup>

<sup>1</sup>Section of Clinical Biochemistry, University of Verona, Verona, Italy

<sup>2</sup>Service of Clinical Governance, Provincial Agency for Sanitary Services, Trento, Italy

<sup>3</sup>Emergency Department, University Hospital of Parma, Parma, Italy

\*Corresponding author. Email: [giuseppe.lippi@univr.it](mailto:giuseppe.lippi@univr.it)

## REFERENCES

- [1] Lippi G, Plebani M. Biomarker research and leading causes of death worldwide: a rather feeble relationship. *Clin Chem Lab Med* 2013;51;1691–93.
- [2] Cervellin G, Comelli I, Lippi G. Is Google Trends a reliable tool for digital epidemiology? Insights from different clinical settings. *J Epidemiol Glob Health* 2017;7;185–9.
- [3] Scheres LJ, Lijfering WM, Middeldorp S, Cannegieter SC. Influence of World Thrombosis Day on digital information seeking on venous thrombosis: a Google Trends study. *J Thromb Haemost* 2016;14;2325–8.
- [4] Nuti SV, Wayda B, Ranasinghe I, Wang S, Dreyer RP, Chen SI, et al. The use of Google Trends in health care research: a systematic review. *PLoS One* 2014;9:e109583.