

## Short Communication

# Investigating sarcopenia awareness using Google Trends

Sandrine Gilliot, Sophie Bastijns, Stany Perkisas, Anne-Marie De Cock

ZNA Middelheim (Antwerp), Geriatric Department, Belgium

**Abstract**

Sarcopenia is reported as an important health issue. This study investigates with Google Trends whether the clinical importance of sarcopenia is reflected in public interest in the disease. The study was performed between January and March 2020. Data were collected using Google Trends (worldwide). The compared topics were dementia, frailty, polypharmacy, osteoporosis and sarcopenia. A comparison of the topics revealed that “dementia” displayed the highest relative search volume followed by “osteoporosis” and “frailty”. The relative search volume of “sarcopenia” was very low and the lowest relative search volume was contributed to “polypharmacy”. In conclusion, despite the growing interest in the clinical and research community, it is still a relatively unknown topic for the general public. Taking in account the preventive potential of interventions against sarcopenia, it is important to increase the awareness among lay people. In this set-up, Google Trends could be an important tool to evaluate public interest in geriatric topics. It could help to convince policy makers that there is need for awareness programs on sarcopenia.

**Keywords:** Awareness, General public, Geriatrics, Google trends, Sarcopenia

Sarcopenia is a progressive and generalized skeletal muscle disorder<sup>1</sup>. Prevalence rates are variable according to the definition used with values up to 40,4% in older adults<sup>2</sup>. As sarcopenia increases the risk of physical disability, it is associated with a higher rate of falls and fractures, a higher incidence of hospitalizations and a higher rate of mortality<sup>3</sup>. Consequently, sarcopenia has been reported to impose a significant economic burden on healthcare services<sup>4,5</sup>. Both the costs and negative health outcomes imply that the screening for and treatment of sarcopenia are big health care challenges for the coming decade. Unfortunately, sarcopenia is still a lesser-known entity within medicine, although the ageing of the population induces an increase in the prevalence of sarcopenia in both geriatric medicine and in other medical specialties<sup>6,7</sup>. However, efforts have been done to increase awareness among health care professionals. The introduction of an ICD-10 code for sarcopenia in 2016 illustrates the growing importance and interest in this syndrome, and helps health care workers recognize sarcopenia as a disease<sup>8</sup>. Since 2010, with an update in 2018, the European Working Group on Sarcopenia in Older People (EWGSOP) published a clinical algorithm for sarcopenia case finding to encourage healthcare professionals to take actions in view of promoting early detection and treatment<sup>1</sup>. Taking into account the importance of preventing rather than trying to cure sarcopenia, it is also important to increase the awareness among lay people. As sarcopenia is an insidious condition,

many patients only attend their physician when symptoms of muscle weakness are already pronounced. Making an early diagnosis therefore depends largely on the medical education and self-awareness of laymen.

This study investigates the awareness for sarcopenia among lay people by using Internet search data. A well-known example of utilizing Internet data in health is the surveillance of influenza outbreaks with accuracy comparable to traditional methods. This so-called grey literature, or evidence not published in commercial publications, can make important contributions to systematic reviews<sup>9</sup>. One tool that allows users to practice with Internet search data is Google Trends of the American company Google LLC founded in 1998. Google, as a subsidiary of the holding company Alphabet Inc., is the most used search engine on the World Wide Web

*The authors have no conflict of interest.*

**Corresponding author:** Dr. Sandrine Gilliot, ZNA Middelheim, Lindendreef 1, 2020 Antwerp, Belgium

**E-mail:** sandrinegilliot@msn.com

**Edited by:** Charlotte Beaudart

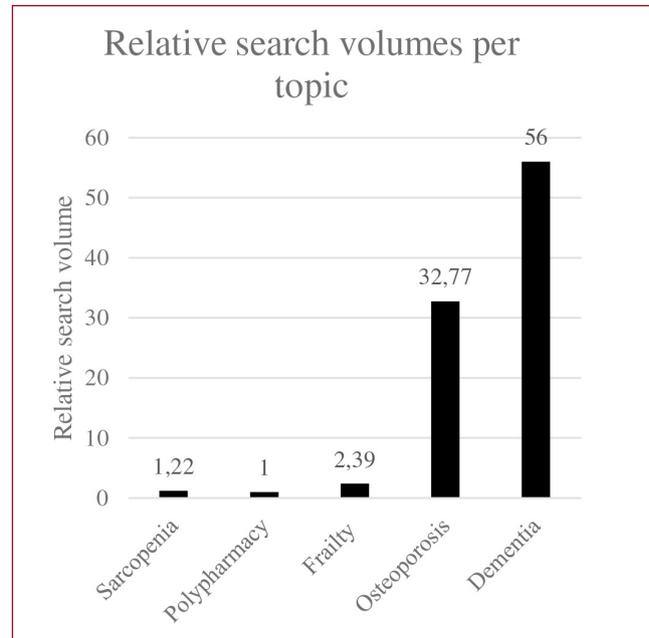
**Accepted 8 December 2020**

across all platforms, with 92.62% market share as of June 2019. Their search tool, Google Trends, is an easy to use, free and publicly accessible tool analyzing web queries made via the Google search engine and displaying the results on a normalized scale. The obtained 'no-cost' information could give an impression of a certain situation and provide valuable insights into population behavior and could thereby help organizations with limited resources setting up policy plans for important topics in public health, like sarcopenia. So, this study investigates the awareness for sarcopenia among lay people and explores the possibility of using Google Trends for that purpose. The study was performed between January and March 2020. Data were collected using the public web facility Google Trends<sup>10</sup>. Google Trends gives access to Internet search patterns by analyzing a portion of all web queries on the Google Search website. Users are able to download the output of their searches to perform further analyses. Google Trends determines the proportion of searches for a user-specified term among all searches performed on Google. It then provides a relative search volume (RSV), which is the query share of a particular term for a specified geographic region and time period normalized by the highest query share of that term over the time-series. The user can specify the geographic area and choose a time period to study, ranging from January 2004 to present, divided by months or days. The user can compare the RSV of up to five different search terms<sup>11</sup>.

The RSV ranges from 1 to 100, representing search interest relative to the peak popularity for the used search term. An RSV value of 100 indicates peak popularity and a score of 0 indicates the term is below 1% of its peak popularity<sup>12,13</sup>.

To rule out any bias for absolute search volume measurements, RSV indirectly corrects for internet access and population size, which both rise over time and would bias any absolute search volume measure. Google Trends automatically excludes duplicate searches, if made by the same person in a short period of time. Search queries in Google Trends are defined either as a term or as a topic. The latter includes all terms that have the same idea or semantic in every language. For example, the topic "London" includes also the Spanish word "Londres" as well as the query "capital of the United Kingdom". Importantly, Google Trends also allows for a direct comparison between the RSV of different topics<sup>14</sup>.

The database retains no information about the identity, internet protocol address or specific physical location of any user. Furthermore, any original web search logs older than 9 months are being anonymous in accordance with Google's privacy policy. Because of the nature of this study, approval by an ethical comity was not needed. To identify the topics reflecting geriatrics, five important pathologies related to 'geriatric giants' were used namely dementia, frailty, polypharmacy, osteoporosis and sarcopenia. These topics were chosen



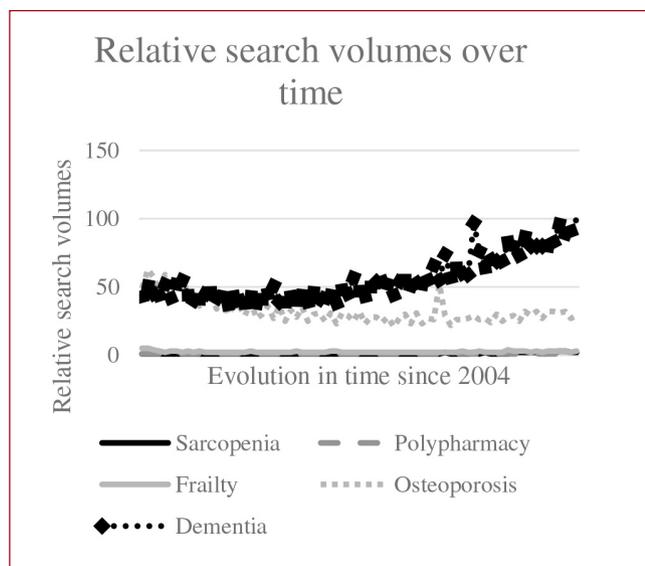
**Figure 1.** The relative search volumes (mean) per topic.

among synonymous topics suggested by Google Trends. The topic with the highest relative search volume was finally included in the analysis. The term 'geriatric giants' was coined by Bernard Isaacs in 1965. He named these 'giants' as immobility, instability, incontinence, and impaired intellect/memory. These 'giants' evolved over the past 60 years to the understanding of 'modern geriatric giants' namely frailty, sarcopenia, the anorexia of ageing, and cognitive impairment<sup>15</sup>. These syndromes are the precursor of falls, hip fractures, affective disorders and delirium with their associated increase in morbidity and mortality<sup>15</sup>. Anorexia was not included as a topic because of the bias of 'anorexia nervosa'.

On 30<sup>th</sup> of January 2020, Google Trends was queried and data downloaded from the first of January 2004 until the 30<sup>th</sup> of January 2020 for the above-mentioned topics. All query categories were used. The interest by region option was set to worldwide and not limited to a specific geographic area.

A comparison of all search topics revealed that "dementia" displayed the highest RSV with a mean value of  $56 \pm 13,71$  (Figure 1). The second most frequent topic was "osteoporosis" with a mean value of  $32,77 \pm 8,18$ , followed by "frailty" with a mean value of  $2,39 \pm 0,54$ . The RSV of sarcopenia was very low with a mean value of  $1,22 \pm 0,36$ . The lowest RSV is contributed to "polypharmacy" with a mean value of 1.

For dementia, an excessive rise in RSV since 2004 was observed. For osteoporosis a decrease was seen in RSV. The three other parameters did not show a significant change in RSV over time (Figure 2).



**Figure 2.** The relative search volumes over time.

The observed data suggest that topics like “dementia” and “osteoporosis” are commonly searched by the public. For dementia, this can be explained by the longer existence of the concept but also by the recognition of the World Health Organization (WHO) as a public health priority. As a result of that recognition, a Global Action Plan on the public health response to dementia 2017-2025 was made in May 2017.

The peak in 2015 for dementia can reflect several things. In 2015 the Prime Minister of the United Kingdom launched his “Challenge on Dementia 2020” which set out to build on the achievements of the Challenge on Dementia 2012-2015. Another possible explanation can be the movie “Dementia”(2014). It won international awards in 2015 at the St. Tropez International Film Festival and was nominated at the Soho International Film Festival of New York City. Both examples could have influenced the general public.

Similar, for osteoporosis, the WHO helps professionals by recommending guidelines for preventing and treating this disease. Despite that effort, a decrease in RSV was seen for osteoporosis. A clear reason for this decrease is not known. Possibly the decrease in relative search volume doesn't necessary reflect a decrease in absolute search volume.

On the contrary, the current data show few searches for sarcopenia. This could be interpreted as a significantly lower public interest in sarcopenia. Sarcopenia is perhaps not fully understood or is considered as a normal consequence of aging.

In short, sarcopenia seems to be poorly searched. Most likely, the awareness for sarcopenia among laymen is insufficient or even non-existing. This is also reflected in the absence of regional or worldwide action plans to improve that awareness.

Because of the impact of sarcopenia on quality of life,

disability and mortality, a greater awareness is necessary in order to correctly identify the condition in community settings<sup>16</sup>. Sensibilization campaigns are necessary, aiming at raising awareness not only among healthcare professionals but certainly also among laymen. Thanks to the improved definition of sarcopenia provided by EWGSOP, healthcare professionals are already supported in recognizing and identifying the disease. By gaining public interest for this pathology, research and funds in this domain might increase, leading to a better understanding of the disorder. This way, better treatment and preventive strategies can be designed for people to apply during their lifetime<sup>17</sup>.

By making campaigns and sharing the information through health insurance funds, magazines, television spots and social media also younger people can be reached. That way, laymen are encouraged to recognize sarcopenia and to identify it as a health problem.

Although the current data show interesting aspects related to the global interest in sarcopenia, there are potential limitations. First, grey literature through Google is not peer-reviewed; the quality, review and production of it can vary considerably. Thorough documentation is necessary to ensure the reproducibility and replicability of the results and provide transparency. Secondly, the data output of this study is a relative number. Therefore, an increase in search volumes related to other important topics might affect RSV. Thirdly, there is no information available about the individuals who searched for the analyzed terms or topics. A bias related to high numbers of search queries by healthcare professionals or industry cannot be excluded. Fourthly, the kind of searches that users perform could be a good proxy for the public's interests and concerns, but these searches do not necessarily represent user opinions. Last, the physical phenotype of frailty, described by Fried and co-workers<sup>18</sup>, shows significant overlap with sarcopenia. Where frailty and sarcopenia are distinct as concepts, sarcopenia can contribute to the development of physical frailty, but the syndrome “frailty” is much broader than that. Using these two terms as topics could have possibly biased the results.

The strength of this study is related to the fact that it is an observational and retrospective study with reproducible information by clearly stating the search variables and the rationale search strategy. The study includes trends only and can be followed over time. Google Trends filters its information through a series of controls – for instance by deleting duplicate searches if made by the same person in a short period of time - which helps to rule out bias.

Although grey literature is not peer-reviewed, its use in a non-scientific methodology is justified as it is aligned with the overall topic of the study (diffusion among laymen).

In conclusion, sarcopenia is poorly searched and the current awareness is insufficient for the total burden of this disease. Google Trends as a tool can be useful to assess the awareness in geriatric topics. Although Google Trends cannot give absolute data, it can be used to collect, analyze, and

report health data to policy makers to help create awareness programs on specific subjects that are under highlighted, as in the case of sarcopenia.

#### **Authors' contributions**

**SG wrote the article. SP, ADC and SB provided feedback on the manuscript.**

#### **References**

1. Cruz-Jentoft AJ, Bahat G, Bauer J, et al. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing* 2019;48(1):16-31.
2. Mayhew AJ, Amog K, Phillips S, et al. The prevalence of sarcopenia in community-dwelling older adults, an exploration of differences between studies and within definitions: a systematic review and meta-analyses. *Age Ageing* 2019;48(1):48-56.
3. Beaudart C, Zaaria M, Pasleau F, Reginster JY, Bruyere O. Health Outcomes of Sarcopenia: A Systematic Review and Meta-Analysis. *PLoS One* 2017; 12(1):e0169548.
4. Mijnders DM, Luiking YC, Halfens RJG, et al. Muscle, Health and Costs: A Glance at their Relationship. *J Nutr Health Aging* 2018;22(7):766-773.
5. Janssen I, Shepard DS, Katzmarzyk PT, Roubenoff R. The healthcare costs of sarcopenia in the United States. *J Am Geriatr Soc* 2004;52(1):80-85.
6. Roubenoff R. Origins and clinical relevance of sarcopenia. *Can J Appl Physiol* 2001;26(1):78-89.
7. Cruz-Jentoft AJ, Landi F. Sarcopenia. *Clin Med (Lond)* 2014;14(2):183-186.
8. Anker SD, Morley JE, von Haehling S. Welcome to the ICD-10 code for sarcopenia. *J Cachexia Sarcopenia Muscle* 2016;7(5):512-514.
9. Paez A. Gray literature: An important resource in systematic reviews. *J Evid Based Med* 2017;10(3):233-240.
10. Support.google.com. Trends Help. 2019. <https://support.google.com/trends#topic=6248052>
11. Nuti SV, Wayda B, Ranasinghe I, et al. The use of google trends in health care research: a systematic review. *PLoS One* 2014;9(10):e109583.
12. Nuti SV, Wayda B, Ranasinghe I, et al. The Use of Google Trends in Health Care Research: A Systematic Review, 2014.
13. Boehm A, Pizzini A, Sonnweber T, et al. Assessing global COPD awareness with Google Trends. *Eur Respir J* 2019;53(6).
14. Support.Google.com TrendsHelp, sd
15. Morley JE. The New Geriatric Giants. *Clin Geriatr Med* 2017; 33(3):xi-xii.
16. Marzetti E, Calvani R, Tosato M, et al. Sarcopenia: an overview. *Aging Clin Exp Res* 2017;29(1):11-17.
17. Cruz-Jentoft AJ, Sayer AA. Sarcopenia. *Lancet* 2019; 393(10191):2636-2646.
18. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci* 2001; 56(3):M146-156.