

## An Analysis of Trends in Internet Searches about Dementia in Turkey

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### Abstract

**Background:** As the frequency of dementia increases, it becomes one of the topics of interest. The number of caregivers and researchers who searches about dementia on the internet is increasing. However, it is necessary to reveal what the subjects that are searched on the internet area. **Objectives:** The aim of this study is to examine internet search topics and situation related to dementia in Turkey using by Google Trends. **Methods:** Review design was used. Internet searches of [dementia] and related keywords between 2007 and 2017 have been reviewed by using Google Trends. **Results:** Internet searches about dementia are showing an increase over time. All of the keywords specified have exceeded the Google trend threshold and the volume has been calculated and reported. The subjects and related questions are different according to the cities. Key words related to dementia have become frequently searched topics on the internet. **Conclusion:** Although it is not known directly who the searchers are, it is thought that the vast majority of the searchers are made up of patient relatives. For this reason, it will be useful to know what is the most searched topic to develop training materials for the educational initiatives to be given to caregivers. **Keywords:** Internet, Dementia, Alzheimer's Disease.

### Öz

#### Türkiye’de Demans ile İlgili İnternet Taramalarının Trend Analizi

**Giriş:** Demans görülme oranı arttıkça daha fazla ilgi çeken konulardan biri haline gelmiştir. İnternette demans hakkında tarama yapan bakım veren ve araştırmacıların sayısı artmaktadır. Bununla birlikte, internette taranan konuların belirlenmesi gerekmektedir. **Amaç:** Bu çalışmanın amacı, “Google Trends” kullanılarak Türkiye’de demans ile ilgili yapılan internet tarama konularını ve durumlarını incelemektir. **Yöntem:** Araştırmanın türü inceleme yazısıdır. Demans ve ilgili anahtar kelimelerin 2007 ve 2017 yılları arasındaki internet taramaları Google Trends kullanılarak incelenmiştir. **Bulgular:** Demansla ilgili internet taramaları zamanla artış göstermektedir. Belirtilen anahtar kelimelerin tümünün Google trends eşiği ve hacmi hesaplanmıştır. Konu ve konuya ilişkin sorular şehirlere göre farklılık göstermektedir. Demansla ilgili incelenen anahtar kelimelerin internette sıkça taranan konular haline geldiği belirlenmiştir. **Sonuç:** Tarama yapan araştırmacıların doğrudan kim olduğu bilinmemekle birlikte, araştırmacıların büyük çoğunluğunun hasta yakınlarından oluştuğu düşünülmektedir. Bu nedenle, bakım verenlere verilecek materyalleri geliştirmek için en çok taranan konuların ne olduğunu bilmenin faydalı olacağı düşünülmüştür. **Anahtar Kelimeler:** İnternet, Demans, Alzheimer Hastalığı.

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As is the case in the world, the elderly population is also increasing in our country (1,2). The rate of dementia frequently seen with age is also increasing (3,4). Dementia is a disease that is progressing day by day and makes the patients in need of care by someone else. Caregivers who have to cope with increasing care needs are family members who usually try to care for their patients at home (5). Family members often try to care for their patients without having as much knowledge about the care, management and process of dementia. As a result of the study, it is concluded that people in our country do not have enough knowledge about dementia. When the information sources of caregivers are examined, it is seen that various sources of information are used. These sources of information are reported as print media, nurses, doctors, television, friends, neighbors and the internet (6).

As in the whole world, the use of the internet in our country is becoming widespread and a part of everyday life. Household Information Technology Usage Survey reported that the rate of using internet in individuals in the 16-74 age group was found to be 66.8% and was reported to be having internet access opportunities in eight of every ten households in 2017 in Turkey (7). Today access to electronic information resources becomes extremely easy and many people prefer information sources that are accessible via Internet when information is needed (8,9). In a survey for internet users; it is reported that internet use affects 47% of decisions about treatment or care and decisions about going to doctor over 40%, and 70% of those using health information on the internet feel strong and make better choices in their lives (10). It is also stated that the Internet has shaped people's perceptions of illnesses, and affects patients' compliance with treatment and, consequently, general health conditions (11). Høybye, Johansen and Tjornhoj-Thomsen (2005) reported that the internet was frequently used by patients with cancer to obtain disease-specific information (12). Fogel et al. (2002) conducted a study with 188 breast cancer patients and found that 41.5% of the patients used internet for information on breast cancer related issues (13). In another study, women with breast cancer were found to use the internet as the second source for the next 16 months after diagnosis (14). The Internet is used in accessing information on dementia syndrome as well as in other health issues (15). Caregivers of people with dementia are expected to go to fast, cheap, easily accessible sources of information, such as the internet, because they spend most of their time at home, especially while they are caring for their patients. However, it is stated that the quality of current and reliable, useful links that can be reached by those interested in dementia syndrome in our country is insufficient and that the information content in these sites should be developed in terms of reliability and update (16). In addition to the caregivers, there is an important group that use internet search is scientists who work on dementia. Researchers frequently search the internet for literature review. From this point of view, this study will help us to understand what are being searched about dementia to help caregivers and to contribute to the literature. Researchers should learn what patients and caregivers are curious about on a free platform, such as the internet, in order for people with dementia and caregivers to reach accurate, understandable and reliable information.

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Surveys show that internet search engines like Google are the most common way to get online information (Google Inc., Mountain View, California). Although it is not known that caregivers and researchers have high rates of information on the internet, no publications have been found on search topics on the internet about dementia. Knowing about the frequent search topic about dementia on the internet will help health professionals to organize the information they will present to patients and their relatives. It is important for health professionals to be aware of the potential of the internet on patients and their relatives, and to plan the care they will provide. The purpose of this study is to examine internet search topics related to dementia in Turkey using by Google Trends.

## Methods

### Study Design

This study was carried out as a review design by using Google Trends Tool between 2007-2017. Over the last 10 years, the temporal tendency of the searches on dementia on the internet has been evaluated.

### Study Population and Sampling

The data for the study is determined by researchers and collected via one of the frequent search engine <https://trends.google.com/trends/>. Google Trends is a Web-based free tracking system of Google search volumes. It started in 2004. Google Trends algorithmic normalize data for the overall number of searches on a scale from 0 (search volume <1% of the peak volume) to 100 (peak of popularity), presenting them as a weekly relative search volume (RSV). RSV values are by definition, as presented in the y-axis (Figure 1), always less than 100, and display a proportion compared with the highest search volume. This approach corrects results for population size and Internet access, both of which increased during the study period. The search results on the Google search engine between January 2007 and December 2017 have been reviewed with key words in Turkish [demans <dementia>, bunama <dotage>, Alzheimer, Alzaymır, unutkanlık <forgetfulness>, demans belirtileri <dementia syntomps>, Alzheimer belirtileri <Alzheimer symptoms>, demans bakımı <dementia care>, demanslı hasta bakımı <demented patient care>, Alzheimerlı hasta bakımı <Alzheimer's patient care>]. Google trends is updated weekly. This study contains the searches made between 18.12.2017-22.12.2017. Health was chosen as subject and Turkey was chosen as the country. Only the searches related to health subcategory have been examined to minimize data from other categories such as advertising, music, and shopping.

### Data Analysis

Percentages relative to total search volume are given. Graphical representations were produced from Google Trends and Excel. The weekly and monthly RSV values were compared with annual means, and a graph was plotted adding up annual means to highlight differences between weekly RSV series.

### Ethical Considerations

In order to perform research, ethics committee approval (3674-GOA / 2017 / 28-06) was taken from of X University non-interventional studies research ethics committee evaluation commission.

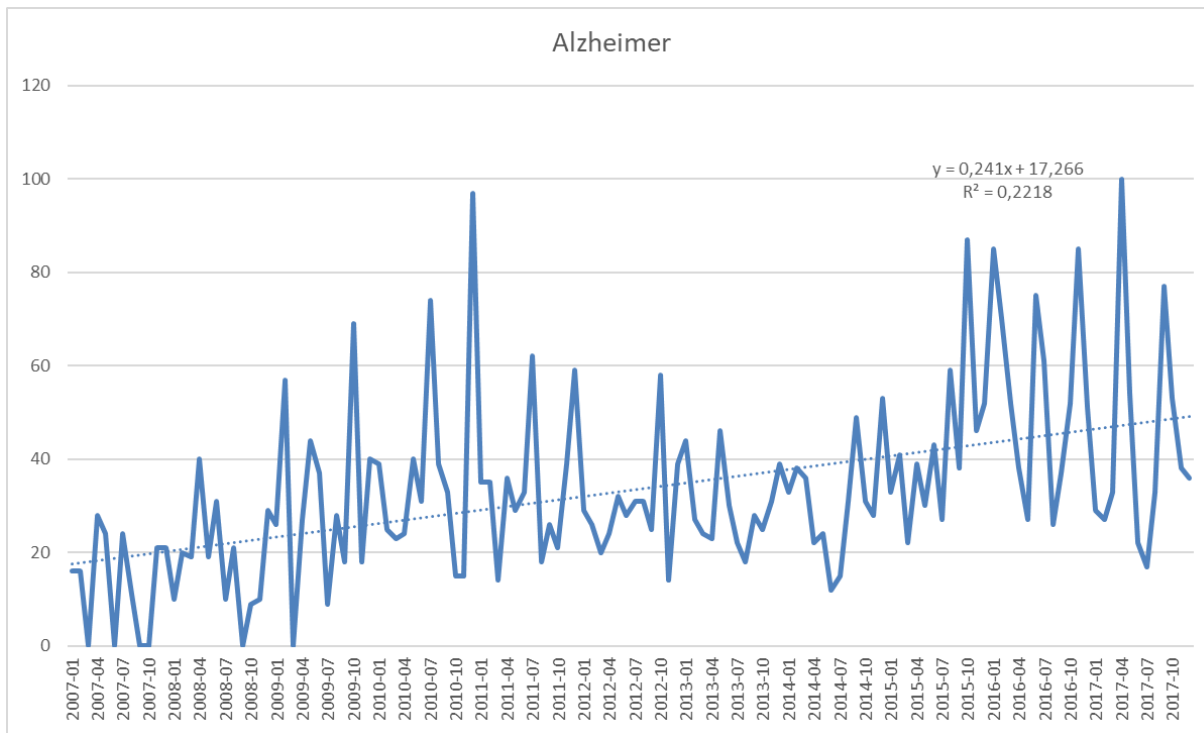
## Results

Google searches about dementia have increased over time. All of the keywords specified have exceeded the Google trend threshold and the volume has been calculated and reported. Google searches for [Alzheimer] are increasing over time (Figure 1). The trend line for RSV against time was linear with an increase in search volume [ $R^2=0.22$ , 95% CI,  $y=0.241x+17.26$ ].

Google searches for [Alzaymır] and [unutkanlık <forgetfulness>] are increasing over time, respectively (Figure 2 and 3 [ $R^2=0.33$ , 95% CI,  $y=0.2297x+26.33$ ;  $R^2=0.20$ , 95% CI,  $y=0.1873x+49.08$ ). RSV of first keyword [demans <dementia>] was determined as 11% in January 2007 while 18% in January 2017 and 24% in September 2017. Different rates of search results were found in 65 cities in Turkey. The most popular place of search in the specified time period is "Karaman".

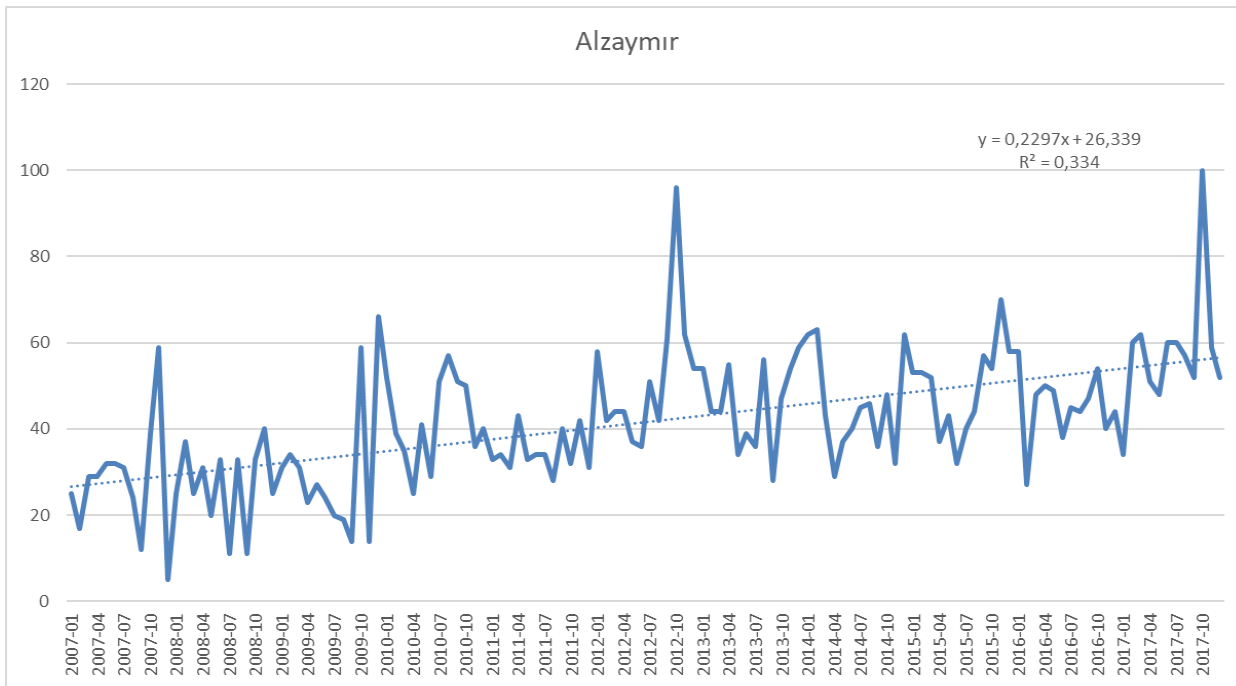
Dementia keyword related search topics were identified as [What is dementia, dementia symptoms, What does dementia mean, dementia treatment, frontotemporal dementia, dementia stages, dementia test...] (Table 1). When the [Alzheimer hastalığı <Alzheimer's disease>] keyword was given, in April 2007, RSV made a quick call with 47%, and in April 2017 RSV reached 100%. Keyword [Alzheimer hastalığı <Alzheimer's disease>] has the most popular place of search for the phrase "Gaziantep". It exceeded search threshold in 9 cities. The big issues related to the subject and questions about [Alzheimer] keyword are almost similar to those of dementia (Table 1). RSV was 30% in February 2007, while RSV was 100% in October 2017 for the keyword [Alzheimer]. A total of 33 cities exceeded the search threshold. Related questions are similar to other keywords (Table 1). RSV was 62% in January 2007 and RSV was 94% in October 2017 when for the [unutkanlık <forgetfulness>] keyword. The search exceeded 50 different search thresholds. The city where the most frequent search was done in the specified time period was determined as "Karabük". The most rapidly growing research questions and topics, according to the keywords, are shown in Table 1.

Fig 1. Google Search Trends for Alzheimer



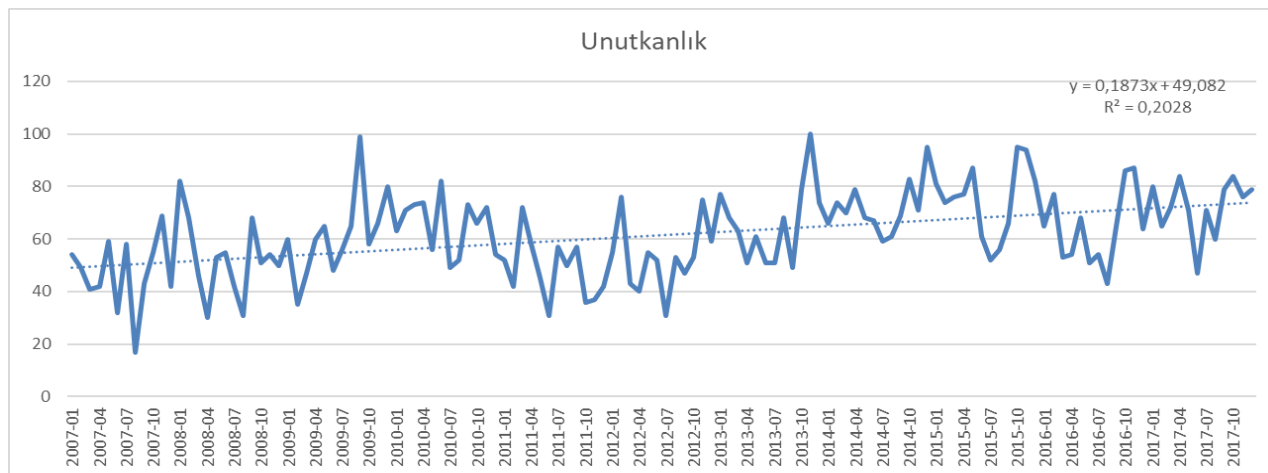
\*Search volume over time for input term [Alzheimer], in Turkey from January 2007 to December 2017. Numbers represent search volume relative to the highest point on the chart, which is 100. This does not convey absolute search volume. Data source: Google Trends ([www.google.com/trends](http://www.google.com/trends))

Fig 2. Google search trends for Alzaymır



\*Search volume over time for input term [Alzaymır], in Turkey from January 2007 to December 2017. Numbers represent search volume relative to the highest point on the chart, which is 100. This does not convey absolute search volume. Data source: Google Trends ([www.google.com/trends](http://www.google.com/trends))

**Fig 3. Google Search Trends for Forgetfulness**



\*Search volume over time for input term [unutkanlık <Forgetfulness>], in Turkey from January 2007 to December 2017. Numbers represent search volume relative to the highest point on the chart, which is 100. This does not convey absolute search volume. Data source: Google Trends ([www.google.com/trends](http://www.google.com/trends))

**Table 1. Google Trends ‘Rising Searches’ Related to Dementia over the Study Period 2007-2017**

Keyword [dementia]	Jan 2007-Dec 2017	Growth <sup>a</sup>
	What is dementia	Big growth >5000%
	What is dementia disease	Big growth >5000%
	Dementia Symptoms	Big growth >5000%
	Frontotemporal dementia	Big growth >5000%
	Vasküler demans	Big growth >5000%
	Demans stages	Big growth >5000%
	Lewvy body dementia	Big growth >5000%
	Difference between dementia and Alzheimer’s	Big growth >5000%
	Demantia medication	Big growth >5000%
Keyword [Alzheimer]	Alzheimer test	Big growth >5000%
	What is Alzheimer’s disease	Big growth >5000%
	Alzheimer’s stages	Big growth >5000%
	Alzheimer’s causes	Big growth >5000%
	Alzheimer’s last stage	Big growth >5000%
	Alzheimer’s symptoms	Big growth >5000%
	Alzheimer’s beginning	Big growth >5000%
	Alzheimer’s medication	Big growth >5000%
	Alzheimer’s disease	Big growth >5000%

<sup>a</sup>Big growth is expressed in percentage growth relative to the previous time period.

### Discussion

Internet searches about dementia are showing an increase over time. However, Google trends does not provide total but a relative search volume. Although it is not known who the searchers are, increase in number of people with dementia and the widespread use of the internet led that topic to be among the topics that are often searched by the patient (early stage), patient relatives and researchers.

According to a research conducted in the literature on internet users, 70% of the participants stated that they can make better choices by using health information on the internet and they feel stronger, and also 40% of the participants stated that internet use influences the decision not to go to the doctor (11). It is believed that early-stage dementia patients also have an influence on their tendency to go to the doctor even if they do health screening about themselves on the internet. Likewise, it is believed that the results of internet search about symptoms affect patients’ relatives’ tendency to take their patient to doctor. In this context, awareness that patients and patients’ relatives use internet search excessively should be acquired and necessary precautions should be taken so that they can access accurate and reliable information. According to the results of Akpınar, Gönen and Küçükgüçlü (2012), it was concluded that the quality of current and available links for those interested in dementia in our country is insufficient and that the information content in these sites should be improved in terms of reliability and update (17).

Considering that researchers were also present in foreign literature reviews, search results were found that showed variability

over time when dementia was searched with English keywords. It is concluded that increase in frequency of search about Alzheimer's disease topic since 2010 and increase in recent and related inquiries about frontotemporal dementia and lewy body dementia are the most striking results. These two types of dementia are common after the type of Alzheimer's dementia. For these reasons, it is not surprising that dementia types with increase in prevalence are frequently searched by researchers.

There are strong and limited sides of searching with Google trends. It is a strong tool since it is free, easily accessible, and it allows access to more than 70 countries in different languages and regions. In addition Google trends is updated weekly. However, the fact that it does not provide information on who is searching is a limitation. Because the majority of the keywords are selected in Turkish, it is thought that the group of searchers is mostly family relatives.

### Conclusion

The internet has become an indispensable tool of information for individuals who are seeking information about dementia as well as other health issues. The tendency to search about dementia has increased over the last 10 years. Knowing the topics that are searched frequently will be helpful to arrange training contents for researchers who will especially make web-based interventions for patients and their relatives.

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