Letter to Editor

Simplified internet-based diarrhoea and fever epidemiology in Balkh, Afghanistan

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Abstract

Introduction: The low-income country Afghanistan requires disease frequency information for infectious diseases as essential tool for prevention and management. We propose the use of internet searches for the collection of diarrhoea and fever frequency data to support doctors when treating diarrhoea and fever outbreaks. *Methods:* A computer with internet connection was used to search Google Trends for frequency data for Balkh, Afghanistan, in 2019. We used search terms in English and the two languages of Afghanistan, Pashto and Dari. *Results:* Diarrhoea searches were conducted in Afghanistan throughout 2019 and especially between March and November. Diarrhoea searches were submitted in Balkh throughout the year. Searches for fever and بت were submitted throughout the year and especially during the last 2 thirds of 2019. *Conclusion:* Internet search engines are a low-cost tool to provide search frequency data for diarrhoea and fever and can support healthcare in remote parts of the world such as Balkh.

Keywords: Afghanistan; diarrhoea; fever; internet search; low-cost tool; epidemiology

Introduction

In the low-income country Afghanistan in Asia disease frequency and epidemiological data for infectious diseases are essential tools for prevention and management of diarrhoea[1] and fever[2].

Even the most remote places on Earth have internet access and are potential sources for the collection of a large variety of data including epidemiological data[3]. We therefore proposed that in remote areas of Afghanistan the development of simple internet tools to generate epidemiological data would be useful for healthcare decision making and to inform doctors during clinical care. Internet search engines have already been used for searches for epidemiological data of infections, e.g. influenza[4], Ebola[5], plague[6], and measles[7].

In an effort to investigate this further in Afghanistan we present in the following report the application of the internet search engine Google Trend to collect search frequency data for diarrhoea and fever in 2019.

Methods

A computer with internet access to study Google Trends (https://www.google.com/trends) was used. We collected data for diarrhoea and fever in Afghanistan and Balkh, a province in Afghanistan.

Google Trends manages data that represent web searches of internet users.

The data are provided as "interest over time".

Interest over time of Google trends are: Numbers present search interest relative to the highest point on the chart. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term (https://www.google.com/trends).

We selected screenshots of Trends data figures and included the figures into this article and citied "Data source: Google Trends (https://www.google.com/trends)."

The Table provides a summary of the search terms used.

Results

We identified Google Trend data with the following search terms: diarrhea, اسهال ("diarrhoea" in Dari), fever, تب ("fever" in Dari) (Table).

Table. Search terms used in this study with Google Trends.

The following search terms were used:

 diarrhoea, diarrhea, پیچش ("diarrhoea" in Pashto), نس

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("diarrhoea" in Pashto), اسهال ("diarrhoea" in Dari), gastroenteritis, food-poisoning, dysentery, malaria, rigor, body pain, chills, vomiting, nausea, کانگی ("vomiting" in Pashto), fever, تب ("fever" in Dari)

The following search terms identified user searches:

diarrhea, اسهال ("diarrhoea" in Dari), fever, تب ("fever" in Dari)

The search with Google Trends resulted in interest over time hits with diarrhea topic and the Dari word اسهال search term in Afghanistan throughout 2019 (Figure 1).

The highest interest over time was observed between March and November 2019 for both diarrhea and اسهال searches (Figure 1).
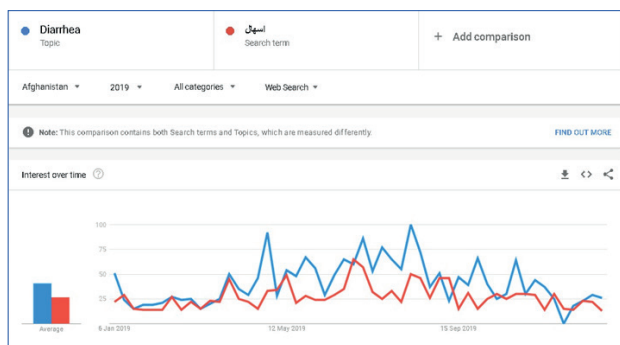
Fig. 1: Google Trend data for diarrhoea searches in Afghanistan in 2019.

The term "diarrhea topic" was used and compared with Dari search term اسهال for diarrhoea.

Interest over time of Google trends: Numbers present search interest relative to the highest point on the chart. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term.

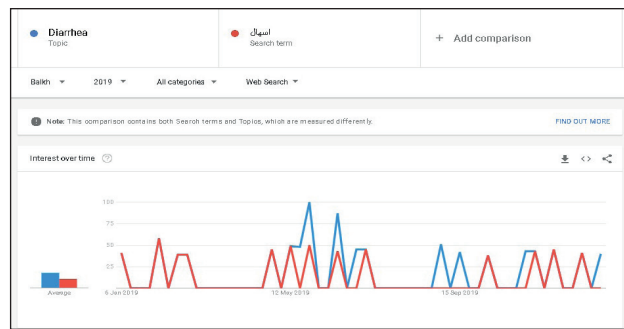Topic term: group of terms collected and grouped by Google

Search term: single term used with search

Data source: Google Trends (https://www.google.com/trends)

We selected Balkh for further studies, because of the remote location of Balkh in Afghanistan.

We used Trend data for searches in 2019 with diarrhea topic and اسهال search term, the Dari word for diarrhoea (Figure 2).

Fig. 2: Google Trend data for diarrhoea searches in Balkh in 2019.

The term "diarrhea topic" was used and compared with Dari search term اسهال for diarrhoea.

Interest over time of Google trends: Numbers present search interest relative to the highest point on the chart. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term.
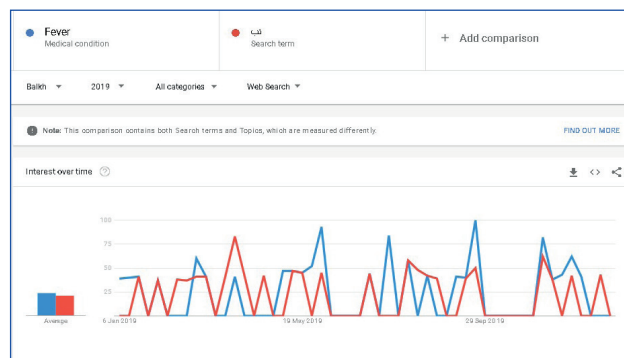
Topic term: group of terms collected and grouped by Google

Search term: single term used with search

Data source: Google Trends (https://www.google.com/trends)

Searches were submitted throughout 2019 and especially in June with diarrhea topic (Figure 2).

Testing of search terms (Table) resulted in search hits for fever and تب ("fever" in Dari) in Balkh(Figure 3). Searches were conducted throughout the year with the greatest interest during the last two thirds of 2019 (Figure 3).

Fig. 3. Google Trend data for fever searches in Balkh in 2019.

The term "fever topic" was used and compared with Dari search term تب for fever.

Interest over time of Google trends: Numbers present search interest relative to the highest point on the chart. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as

popular. A score of 0 means that there was not enough data for this term.

Topic term: group of terms collected and grouped by Google

Search term: single term used by search

Data source: Google Trends (https://www.google.com/trends)

Discussion

The origin of this research is the idea that World Wide Web access in even remote parts of the world[3] can be used more effectively to collect useful health information and support healthcare.

For example, Cleaton et al 2016[5]used news reports from web-based news groups to collect data for epidemiology of Ebola virus infections, an infectious disease in Congo in Africa, and for help with making management decisions. The authors demonstrated in their study that the internet has the potential to provide health information relatively easily and provide data that may otherwise require elaborate and expensive data research facilities such as a department of public health with epidemiologists and support staff.

In the present study Google Trend data were initially obtained for the entire country (Fig. 1) Afghanistan, followed by data collection for Balkh province (Fig. 2 and 3).

The key question regarding the quality of our data is if interest over time tells us anything about disease frequency. The assumption that Google Trend data correlate with disease frequency is supported by previous investigations, e.g. for flu[8], measles[7], plague[6] and large reviews of Google Trend data[9], that all suggest that internet searches correlate with disease frequency.

Therefore, we conclude that the interest over time data (Fig. 1 - 2) correlate with disease frequency for diarrhoea episodes and probable infectious diarrhoea, gastroenteritis, food-related gastroenteritis and food poisoning.

For the interest over time data (Figures 3) for fever the findings suggest that fever searches can correlate with illness that commonly causes fever and for Afghanistan this can be malaria as an important cause of fever[2]. Clearly, an investigator could compare in the future Kabul department of public health data with the collected data of this study to assess the validity of the collected data.

This study aims to contribute to the development of internet search tools that support doctors in Balkh and elsewhere with identifying disease outbreaks and quantifying disease frequency, e.g. infectious gastroenteritis, food poisoning, and malaria.

We know little about how internet searches in different languages compare with each other[10]. The searches of this study in Figures 1-3 demonstrate that Afghan people conduct disease internet searches in both English and Dari languages.

6% of Afghans speak English language[11] and the role of foreign language health-related internet searches remains to be defined.

The people of Balkh are people of a low-income country and have internet access through personal computer and cell phone and seem to be using the internet for searching healthcare questions[12].

More information through analysis of web searches could be useful to understand the significance of internet use for symptoms, e.g. haemoptysis (coughing up blood) for tuberculosis, oral thrush for human immune-deficiency virus (HIV) infection, penile discharge for sexually transmitted disease (STD), yellow eyes for hepatitis, intravenous drug use for heroin use, leg swelling for heart disease, chest pain for myocardial infarction, and polyuria (passing more urine) for diabetes in Afghanistan and elsewhere[13-14].

Conclusion

Internet search engines are a low cost tool to provide epidemiological data for diarrhoea and fever and can support healthcare in remote parts of the world such as Balkh in Afghanistan in central Asia.

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