European Journal of Therapeutics
pISSN: 2564-7784
eISSN: 2564-7040

Eur J Ther. 2024;30(3):277-284.
https://doi.org/10.58600/eurjther2079

Original Research

A Series of Suicides and Homicides by Cyanide in Türkiye: Exploring the Role of Media Reports and the Copycat Effect

Cemyiğit Deveci [1], Mehmet Atılgan [2]

[1] Council of Forensic Medicine, Antalya Group Administration, Antalya, Türkiye
[2] Department of Forensic Medicine, Faculty of Medicine, Akdeniz University, Antalya, Türkiye

Received: 2024-03-06 **Accepted:** 2024-04-30 **Published Online:** 2024-05-05

Corresponding Author
Cemyigit Deveci, MD
Address: Council of Forensic Medicine, Antalya Group Administration, Pinarbasi Mh., Akdeniz University Campus, 07070 Antalya, Türkiye
E-mail: cemyigit.deveci@gmail.com

ABSTRACT

Objectives: This paper focuses on the intentional deaths by cyanide that occurred in Türkiye and aims to discuss the effect of internet and the media on these cases.

Methods: Five highly circulated daily newspapers were selected and the term "siyanür", which means "cyanide" in Turkish, were searched within their online search function between 2017-2021. A Google Trends analysis was performed with "siyanür+siyanur" as the keyword, "Türkiye" as the region, and "1/1/2017-12/31/2021" as the custom time range.

Results: Twenty different incidents and news reports of cyanide related suicides and/or homicides with 29 total deaths were found. In Google Trends analysis, seven out of total 8 periods of increased search interest coincided with the news reports related to cyanide deaths.

Conclusions: The authors observed a surge in cyanide-related incidents following a highly publicized case in May 2019, with a peak in November 2019. The study highlights the influence of media coverage on subsequent incidents, with newspapers often using sensational headlines and providing detailed information on suicide methods. Reporting a news article on suicide requires great care and caution. Thus, the guidelines on reporting suicide related news should be implemented nationwide with a collaboration between media professionals and health-care experts.

Keywords: copycat suicide, cyanide, forensic psychiatry, Google Trends, Werther effect

INTRODUCTION

Cyanide has various industrial applications, including gold extraction, metal refining, organic syntheses, and other chemical processes [1, 2]. It can also be found naturally in certain edibles like apple or apricot seeds and bitter almonds [3]. However, it is widely known to be highly toxic to humans. A lethal dose of 0.15-0.3 g/person for potassium cyanide or 0.05 g/person for hydrogen cyanide can rapidly inhibit the electron transportation system in cellular aerobic metabolism. Cyanide poisoning frequently occurs in industrial settings [4]. Additionally, literature reports have documented the use of cyanide for suicidal and homicidal purposes, similar to other toxic substances and drugs [2].

The literature has described the phenomenon of imitation or copycat suicides following widely publicized coverage of a suicide case, known as the "Werther Effect" [5]. This term

originates from Goethe's novel, "The Sorrows of Young Werther," which was banned in several European countries in the 18th century due to its protagonist's suicide. Specific suicide methods, identification with the suicide victim, celebrity suicides, and sensationalized reporting or portrayal of suicide cases contribute to a more "contagious" suicide trend [6]. Numerous studies have investigated this effect in relation to newspaper and television news coverage over the past few decades [7-13]. World Health Organization has issued guidelines for reporting on suicide-related stories [14]. However, the rapid integration of social media and the internet into our lives has facilitated the rapid dissemination of information, which may not adhere to these guidelines and can spread unchecked.

This paper examines homicides and suicides involving cyanide in an 8-month period in Türkiye. Its primary objective is to identify potential future trends, specifically copycat suicide-murder cases, that medical professionals may encounter in their careers. The study investigates the influence of the internet and media on this trend by analyzing online newspaper articles and utilizing Google Trends data.

MATERIALS AND METHODS

Newspaper and Article Selection

According to the official report from the Turkish Statistical Institute in 2020, there were 140 national newspapers in circulation in Türkiye. For this study, the authors selected five highly circulated daily national newspapers: "Hürriyet, Milliyet, Sabah, Sözcü, and Türkiye". These newspapers were chosen based on unofficial online reports, as there are no official statistics on newspaper circulation in Türkiye. The online-only newspapers were excluded in this study, as published newspapers are generally more reliable and professionally moderated.

Main Points;

- The study shows a significant increase in cyanide-related suicides and/or homicides following a sensationalized media coverage.
- Drawing on the concept of "Werther Effect", and utilizing Google Trends data, the paper emphasizes how sensationalized reporting of suicides, may spur copycat incidents.
- The study calls for establishing nationwide guidelines, with collaboration between media professionals and healthcare experts in order to promote accurate and sensitive reporting on suicide and homicide cases.

The selected newspapers, all published in Turkish and available online, were retrospectively reviewed for articles reporting incidents involving deaths from suicides and/or homicides by cyanide exposure between January 2017 and December 2021. The Turkish term "siyanür," meaning "cyanide" in English, was used in the online search function. Duplicate articles were identified and excluded by considering variables such as the date and location of the incident, the person's name, age, and occupation, and other distinct factors. Ultimately, the review process identified 20 distinct events reported in these newspapers, which were related to deaths from suicides and/or homicides by cyanide exposure within the study's reviewed time range.

Google Trends Exploration

Google Trends, introduced by Google in 2004, is a free and publicly accessible tool. It allows users to explore the search frequency of a chosen term or phrase within a specified time range. Researchers have found Google Trends valuable in analyzing population behavior regarding health-related topics, including its potential to predict disease and suicide trends or outbreaks [15-19]. This tool proves particularly advantageous in countries where official health data may not be publicly available. Moreover, it offers benefits over surveys when analyzing sensitive diseases or behavioral topics that could lead to stigmatization, such as AIDS, drug use, and mental illness. By collecting anonymous web search data, Google Trends provides valuable insights.

Google Trends is designed to indicate the popularity of a search term within a specific time frame. It provides data on population-adjusted search volume, meaning that a high number of searches does not necessarily indicate significant search interest if the population size is also large. The output values in Google Trends range from 0 to 100. A value of 0 does not imply zero searches; rather, it suggests that the search volume is too low to be included in the results. On the other hand, a value of 100 represents the peak popularity of the search term within the selected time range.

The authors followed the analytical framework proposed by Mavragani and Ochoa [20] to examine the search interest for the designated terms using Google Trends. The keyword "siyanür" was chosen, with "Türkiye" selected as the region and "1/1/2017-12/31/2021" set as the custom time range, aligning

with the period analyzed in the newspaper study. No specific category was selected for the analysis. To accommodate spelling mistakes and the absence of Turkish letters on some keyboards, the "+" feature was utilized to include "siyanur" and overcome this limitation.

Data Analysis

The data extracted from the news reports included the article date, location of the incident, nature of the event (murder/suicide), gender, age, and the number of victims. This information was recorded in Microsoft Excel for Windows 10 (Microsoft Corporation). To examine potential statistically significant differences in the number of deaths across years, the Chi-Square test was performed using IBM SPSS Statistics v25. A significance level of $p < 0.05$ was employed.

RESULTS

Table 1 provides a summary of the news articles gathered through retrospective review. The study identified a total of 20 different incidents involving cyanide-related suicides and/or homicides, resulting in 29 deaths. The first incident occurred on April 19th, 2017, but the first major incident that generated multiple articles throughout the year was documented in report #8 on May 5th, 2019. This incident marked the beginning of a series of events.

In report #8, a chemistry major deliberately poisoned his family with cyanide mixed drinks, resulting in the death of his parents and hospitalization of one sibling. Over the following eight months, nine more cases with an additional 17 deaths were recorded, with the last incident taking place on January 12th, 2020. Prior to this starting point, there were seven incidents, all of which were suicides, from the beginning of 2017 until January 12th, 2020. From January 12th, 2020, until the end of 2021, only three additional incidents were recorded, all of which were suicides.

The annual death counts related to cyanide exposure, as gathered from the reviewed newspapers, were compared and a statistically significant higher number of reported deaths was found in 2019, with 19 deaths, compared to the other years included in the study ($\chi^2(4) = 38{,}069$, $p < 0.001$).

Figure 1 displays the search output for the terms "siyanür" or "siyanur," which mean "cyanide" in Turkish, using Google Trends. Typically, the selected terms had a value of ≤ 2 during the designated time range. Each surge in search interest for the selected terms with a value higher than "2" is indicated by a letter on top of the corresponding period. Out of a total of 8 periods of increased search interest, 7 coincided with news reports related to cyanide deaths. Only the period of interest "a" did not correlate with any of the reviewed news articles. The highest search interest for the selected terms occurred between November 3rd, 2019, and December 8th, 2019.

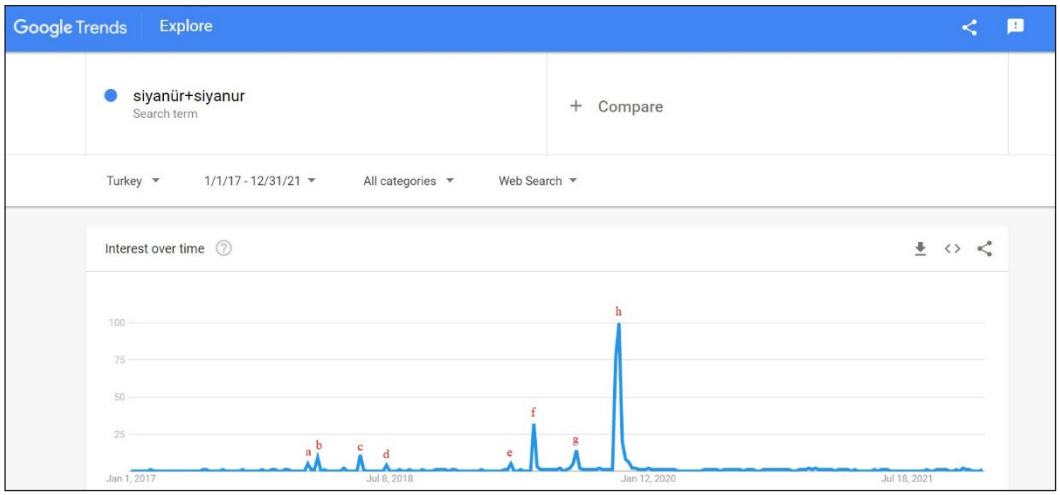

Figure 1. Google Trends analysis for the search term "siyanür+siyanur", which translates into cyanide in Turkish. The periods of increased search interest are each labelled with a letter on top. The start and the end of each period of increased search interest and highest google trends value for each period: **a-** January 14th-21st, 2018 with a value of 5, **b-** February 04th-11th, 2018 with a value of 9, **c-** May 6th-13th, 2018 with a value of 11, **d-** July 1st-8th, 2018 with a value of 4, **e-** March 24th-31st, 2019 with a value of 5, **f-** May 12th-26th, 2019 with a value of 32, **g-** August 4th-18th, 2019 with a value of 14, **h-** November 3rd-December 8th, 2019 with a value of 100

Table 1. A summary of the news-reports that includes the time and location of the incidents, manner of death, sex, age and number of the victims

Report Number	Date (dd/mm/yyyy)	City	Manner of Death	Number of the Victims	Sex and Age (Years) of the Victim
1	19/04/2017	Nigde	Suicide	1	• Male - 19
2	02/11/2017	Diyarbakir	Suicide	1	• Female - 32
3	05/02/2018	Antalya	Suicide	1	• Male - 33
4	09/05/2018	Istanbul	Suicide	1	• Female - 45
5	03/07/2018	Istanbul	Suicide	1	• Female - No data
6	24/11/2018	Ankara	Suicide	1	• Male - No data
7	27/03/2019	Denizli	Suicide	1	• Male - 27
8	16/05/2019	Izmir	Homicide	2	• Male - 46 • Female - 39
9	17/06/2019	Mersin	Suicide	1	• Male - 21
10	14/08/2019	Istanbul	Suicide	1	• Male - 25
11	12/10/2019	Denizli	Suicide	1	• Male - 22
12	06/11/2019	Istanbul	Mass Suicide	4	• Female - 54 • Female - 60 • Male - 48 • Male - 56
13	09/11/2019	Antalya	Homicide-Suicide	4	• Male - 36 (Suicide) • Female - 38 (Homicide) • Male - 5 (Homicide) • Female - 9 (Homicide)
14	15/11/2019	Istanbul	Homicide-Suicide	3	• Male - 38 (Suicide) • Female - 38 (Homicide) • Male - 6 (Homicide)
15	28/11/2019	Antalya	Suicide	1	• Male - 30
16	06/12/2019	Sakarya	Suicide	1	• Male - 21
17	12/01/2020	Van	Suicide	1	• Female - 27
18	16/08/2020	Aydın	Suicide	1	• Female - 30
19	03/11/2021	İstanbul	Suicide	1	• Female - No data
20	17/11/2021	İstanbul	Suicide	1	• Male - 20

DISCUSSION

Cyanide is a highly toxic substance to humans, yet it has been easily accessible in many places, including Türkiye, where it could even be purchased online until recently. Cyanide-related deaths can occur through various means such as injection, inhalation, ingestion, and dermal absorption, and these cases have been extensively documented and reported in the literature. Newspapers have always considered cyanide-related deaths as newsworthy.

During the period from January 2017 to May 2019, the authors of the study encountered a total of 7 separate incidents of cyanide poisoning reported in the reviewed articles. However, a significant increase in such incidents occurred after a chemist murdered his parents with cyanide mixed drinks in Izmir on May 16th, 2019. This event received extensive coverage in the news with sensational headlines, leading to a series of deaths over the subsequent eight months, resulting in a total of 10 incidents and

19 deaths. The peak of this trend occurred in November 2019, with four different incidents related to cyanide poisoning and a total of 12 deaths within a single month.

Coinciding with this peak trend, the Turkish government took action by implementing strict regulations on the sale of cyanide, including limiting its availability to the public and making online sales of cyanide compounds illegal. Following the last incident in this eight-month period on January 12th, 2020, and the prohibition of online cyanide sales, only three news reports dealing with similar incidents were noticed until the end of 2021.

The series of deaths in 2019, along with the significantly lower number of deaths in the years before and after, prompted the authors of the article to investigate whether the Werther effect, which refers to imitation or copycat suicides after highly publicized suicide cases, played a role in these events.

While suicides can be influenced by various factors, including mental health problems and social factors, one important area of research examines the potential impact of media stories on subsequent suicidal behavior [5]. The rapid advancement of technology, the internet, and social media has significantly enhanced communication in recent decades. Electronic media, in particular, can be more concerning than print media due to its ability to reach a larger population. However, it is important to note that the study being referred to predates the widespread use of the internet and social media platforms, which means that news stories can now reach an even larger and more vulnerable population.

It is speculated that various forms of media, such as news stories, books, movies, or video games, can potentially lead to copycat suicide or murder cases within a population. Individual, demographic, media-related, and cultural factors can all play a role in whether someone mimics the behaviors they see in the media. Examples of such factors include age, sex, mental state, personality, substance abuse, socioeconomic status, and the media's attention to and language used in a particular story. Research suggests that young individuals and those with previous suicidal thoughts or attempts may be more vulnerable to suggestion or the "Werther effect" triggered by news reports [21-24]. With the ease of accessing information worldwide, it is possible that the incidence of copycat crimes or suicides may increase in the future.

In recognition of the potential harm caused by irresponsible reporting, World Health Organization (WHO) has published guidelines [14] for media professionals on reporting suicide-related news stories. These guidelines, last updated in 2017, explicitly state that media professionals should avoid repetitive stories about suicide, sensational language or headlines, and detailed descriptions of suicide methods or locations. However, in the newspaper review conducted by the authors of the present study, it was observed that most of the news articles used sensational headlines and provided detailed descriptions of suicide methods. Some of the incidents were repeatedly highlighted in newspaper articles over a span of several months, specifically incidents #8, #12, #13, and #14. This repetitive coverage may have contributed to the prolonged exposure of these incidents to the public. Furthermore, it is worth noting that all of the articles were easily shareable through social media platforms, which could have potentially amplified their reach and impact.

However, despite the wide dissemination of these articles, none of them were effectively utilized to promote suicide prevention or provide information on where individuals could seek help. This missed opportunity to raise awareness about available support and resources for those in need reflects a gap in the responsible reporting of suicide-related news.

It has been proposed that the influence of the copycat effect may vary across different regions due to variations in the implementation of international guidelines on reporting suicide [21]. In the present study, it was evident that the newspapers reviewed did not adhere to the WHO guidelines on reporting suicide. This finding aligns with the results of another study conducted in Türkiye, which also highlighted the inadequate implementation of these guidelines in suicide-related news reports [25].

Furthermore, in a separate study analyzing news reports of 11 cases related to cyanide deaths between January 2018 and December 2019 (which are also included in the present study), it was discovered that detailed information about suicide notes was provided in 9 out of 11 cases, explicit discussions about the cause of death were present in 5 cases, and the method of obtaining cyanide was clearly stated in all cases [26]. These findings underscore the lack of responsible reporting practices observed in the coverage of cyanide-related incidents.

In the field of medical literature, there is extensive discussion about the potential role of unregulated media reports in suicide contagion. Research by Niederkrotenthaler et al. [27] introduced the concept of the "Papageno effect," suggesting that media reports on suicidal ideation without accompanying suicide attempts or completed suicides can have a preventive effect. The main finding highlighted by the authors was that such articles may positively impact individuals with suicidal tendencies by creating empathy and offering a sense of hope, as they read about others who continue to live. Importantly, these types of reports constituted only a small proportion (8.8%) of the news reports in their study, further emphasizing the importance of the wording used in suicide-related articles.

While many studies on the Werther effect have focused on celebrity suicides, the present study supports the hypothesis that non-celebrity suicide-related news can also influence copycat suicide cases [28, 29]. In the current study, the authors attended the autopsies of five cases reported in two different news articles, and detailed crime scene investigations revealed suicide notes warning others about cyanide. This indicates that the individuals who carried out these acts were aware of the effects of cyanide exposure and had conducted preliminary research on the substance. The high demand for information on cyanide during this period, as indicated by Google Trends analysis, may have resulted in increased availability of online information on cyanide, including not only its effects but also information on how and where to obtain it. Given that cyanide ingestion as a method of suicide is relatively uncommon and unconventional, the cases in the present study can be considered as potential copycat suicides.

As previously mentioned, all the news reports reviewed in this study were easily shareable on social media platforms, as they included share buttons for popular platforms. The Google Trends analysis revealed a surge in search interest related to cyanide after each news report on a death by cyanide poisoning. The first significant increase in search interest occurred with report #8, which contained sensational and newsworthy details. The search interest reached its highest point in November 2019, coinciding with the peak of cyanide-related suicides and/or homicides. These news reports, starting from report #8 until the end of the year, likely reached millions of people across the country, contributing to the series of events related to cyanide in Türkiye during the latter half of 2019. It is important to note that all these news reports had unregulated content without adhering to the guidelines set by the WHO.

The Google Trends analysis showed that seven out of eight periods of increased search interest correlated with news reports on cyanide-related deaths. The only period that didn't correlate with any reviewed news article was associated with a celebrity homicide case, where the perpetrator's search history included the term "siyanür." The news story also contained extensive information on cyanide, its effects, and its uses, which the authors considered unnecessary and in violation of international guidelines. This anecdote further supports the importance of regulating news reports according to guidelines. It is also essential to periodically educate journalists on reporting suicide and homicide-related news. The arguments presented in this study do not advocate for media censorship. Instead, the authors emphasize the need for careful reporting on sensitive topics and the potential impact these reports can have, positive or negative, on vulnerable individuals. To ensure positive outcomes and responsible reporting, media professionals and healthcare professionals should collaborate and establish a framework that implements international guidelines for safe news reporting.

Limitations

While Google Trends provides valuable insights into search interest, it does not represent actual behavior or motivations behind searches. Additionally, the study design is observational, and therefore, causal relationships cannot be inferred from the findings. While the study suggests a potential association between media coverage and cyanide-related suicides and homicides, other confounding variables and underlying factors may contribute to these events.

CONCLUSION

This paper highlights the importance of medical professionals staying informed about emerging trends worldwide. In the age of the internet, information spreads rapidly, and what was once an isolated incident can quickly become a new trend. The media, whether print or online, can be both a powerful tool and a potential risk factor in influencing suicide rates and copycat behavior. The writing style and content of news articles on suicide play a crucial role in determining their impact. Careful and cautious reporting is necessary to minimize the risk of negative outcomes and maximize the potential for prevention.

In order to achieve this level of care and caution, it is essential to implement nationwide guidelines on reporting suicide-related

news. This requires collaboration between media professionals and healthcare experts who can provide guidance and expertise. Continuous education of journalists on responsible reporting of suicide is also vital. By working together and fostering a framework that promotes safe reporting practices, media professionals can contribute to suicide prevention efforts and help individuals struggling with suicidal ideations cope more effectively.

Acknowledgment
During the preparation of this work, the authors used an artificial intelligence tool, QuillBot, in order to check the grammar and the academic language of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Competing Interests: The authors declare that they have no competing interests.

Funding: No funding was received for this study.

Ethical Statement: As the data and incidents include previously reported news articles, and all the information is available online, formal ethical clearance was not considered.

Authors' contributions: CD reviewed, analyzed, and interpreted the data, wrote the drafted manuscript. MA corrected, organized, and approved the final manuscript.

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How to Cite;

Deveci C, Atılgan M (2024) A Series of Suicides and Homicides by Cyanide in Türkiye: Exploring the Role of Media Reports and the Copycat Effect. Eur J Ther. 30(3):277-284. https://doi.org/10.58600/eurjther2079