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**Research Article** 

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# Google Trend Analysis of Online Health-Seeking Habits of Nigerians and Britons on COVID-19 and its Symptoms During and After the Pandemic

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#### Abstract

**Background:** A significant source of health-related information is still the internet. This study examines the general public's online healthseeking habits and assesses if there may be a connection between the public's awareness of COVID-19-related symptoms before, during, and after the COVID-19 pandemic. Google Trends' monthly search volumes (MSVs) were examined for the periods of thirty-six months (2020-2022) for searches in Nigeria and the United Kingdom. The rationales for the selection of these two countries were to gain a global perspective based on population and the fact that they are the closest allies.

**Result:** The study found that during the heat of the COVID-19 pandemic evidenced by travel restrictions, social distancing, and economic lockdown there were increasing COVID-19 symptom-specific search terms, but when the COVID-19 measures were relaxed, the searches were reduced in Nigeria and the United Kingdom. It can be noted that public interest and consciousness about a specific search term and other connecting search terms are influenced by the level of government policy action on the term. This happened in the case of COVID-19 symptom-specific search terms.

**Conclusion:** This study found that Fatigue, Dry cough, Sore throat, and Fever were the common symptoms of COVID-19 in Nigeria, while Dry cough, Sore throat, Anosmia, and Fever were the common symptoms of COVID-19 in the United Kingdom. Public interest and consciousness about specific and connecting search terms such as COVID-19 increase when influenced by the level of government policy action on the term which is echoed by the media.

Keywords: Google Trend Analysis; Public Interest; Awareness; COVID-19; Nigeria; United Kingdom

Abbreviations: COVID-19: Coronavirus disease 2019; WHO: World Health Organization

## Background

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The COVID-19 pandemic's consequences on public health are now becoming clearer as we pass the three-year mark since the

first countrywide lockdowns in various nations. The epidemic has permanently altered the way billions of people live; abrupt

governmental limitations severely restricted people's capacity to mingle and engage both at home and work [1,2]. Along with school closings, the obligation of parents to support home-schooling, social distancing and isolation, and mobility restriction, many individuals lost their jobs or experienced unemployment, which will have increased health-related difficulties.

Healthy living is crucial to all fields most importantly public health during anxiety-induced moments. But it comes as no surprise to hear those surveys of multidisciplinary, healthcare professionals and the general public have revealed that poor health conditions were widespread during the pandemic [3,4]. The difficulty in mobility and sleep are part of them. This contributed to public health issues before the pandemic, especially given their link to inadequacies in overall wellness [5,6].

There is a well-documented impact on health-related factors such as fatigue, weight management, cognitive performance, concentration and others, as well as for diseases such as cardiovascular disease, cancer, and diabetes [7,8]. This is true even when symptoms of disorders are not considered clinically relevant according to specific diagnosis criteria. However, recommendations for healthy living may be offered in print or online formats, which should expand public access to this education and information (Irish et al., 2015; Morin, 2010). Statistics show a steady increase in the number of searches for health-related subjects online.

According to the Consumer Health Online Research Report, (2017), fifty-seven per cent of US consumers would instead conduct their initial research online than contact a doctor or other healthcare provider (32%). Examining search patterns may provide a clear indication of the subjects most important to the ordinary individual seeking health information and that would benefit from being covered. Additionally, since the general public relies on Google for health-related searches, it would be interesting to look into how the epidemic and the ensuing lockdowns and lifestyle adjustments correspond with available public searches for health-related information in Nigeria and the United Kingdom.

To evaluate broad public interest and knowledge in various illness areas, the study of internet search patterns is being employed more often [9-11]. In Nigeria and the United Kingdom, Google receives 98.68% and 98%, respectively, of all search traffic on the internet (Statista, 2023). Therefore, examining Google searches in two populous nations on separate continents is a useful method to learn more about the difficulties associated with COVID-19. The study of COVID-19-related searches offers a distinctive perspective on how information regarding COVID-19 is accessed, which is important given the high incidence of health-related problems throughout the world [12,13]. Search volume, and terminology often used by the general public are a few of them.

## **Methods**

## **Google trends tool**

Google Trends is a freely accessible tool that uses periodic search volume to offer information on the temporal patterns of search queries that the general population have entered into the Google search engine. For this study, monthly search volume (MSV) was used. MSV represents the total number of searches made during a given month in a particular nation using Google.

#### Selection of countries and periods for assessment

Google Trends for the period of thirty-six months (2020-2022) for searches specifically related to COVID-19 symptoms across the two countries (Nigeria and the United Kingdom). The rationale for the selection of these two countries was to gain a global perspective based on population and the fact that they are the closest allies in which Google is a commonly used search engine. Data spanned from January 2020-December 2022, which revealed the situation of COVID-19 and the post-COVID-19 pandemic (based on the monthly breakdown and shown in the Google Trends output).

The trend in 2020 was compared with trends in 2021 and 2022, and inferences were drawn. There were comparisons of searches generated for the two countries. The data for each search were compared and correlated with the Coronavirus 2019 searches to achieve further inference on these online search trends.

# Selection of search terms for assessment

COVID-19 symptom-specific terms were selected based on symptoms described by the World Health Organization. The WHO constitution states that 'health is the state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity' [14,15]. This study deals with COVID-19 symptoms. The COVID-19-specific search terms were Coronavirus disease 2019, Fever, Anosmia, Sore throat, Dry cough, and Fatigue. These are shown in Table 1. The trends were drawn using Microsoft Excel for all search terms, and the results were summarized and compared for each country (Table 1).

## Result

Data generated from Google regarding COVID-19 symptomspecific search terms and the general health and wellbeing search terms were detailed in Table 2 which was used to achieve the line graphs shown in Figures 1-6. The line graph is shown in Figure 1 on the comparison of fatigue search terms in Nigeria and the United Kingdom from January 2020 to December 2022. The searches on dry cough and sore throat search terms in both countries are shown in Figures 2 and 3. The searches on Anosmia, Fever, and Coronavirus disease 2019 search terms in both countries were shown in Figures 4, 5 and 6. The relationship between Coronavirus disease 2019 search terms and other related search terms (Fatigue, Dry cough, Sore throat, Anosmia, and Fever) were shown in (Figure 1-6) (Tables 3a and 3b).

#### Discussion

Internet search data are being increasingly used in healthcare studies to provide insights into population behaviour and healthrelated phenomena (Nuti et al., 2014; Tizek et al., 2019; Zink et al., 2019). The current study aimed to assess whether the COVID-19 of 2020 affected health and well-being searches, concerning searches specific to COVID-19 symptoms and searches conducted after the pandemic.



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Figure 4: Anosmia.



Figure 5: Fever.



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Table 1: List of search terms selected for assessment on Google Trends.

COVID-19 symptom-specific search terms							
Coronavirus disease 2019							
Fever							
Anosmia							
Sore throat							
Dry cough							
Fatigue							

Table 2: List of COVID-19 symptom-specific search terms.

	Fatigue		Dry cough		Sore throat		Anosmia		Fever		Coronavirus disease 2019	
Month	Nigeria	United Kingdom	Nigeria	United King- dom	Nigeria	United King- dom	Nigeria	United King- dom	Nige- ria	United King- dom	Nige- ria	United Kingdom
Jan 2020	123	280	25	46	103	71	49	13	44	68	55	0
Feb 2020	156	270	44	46	112	79	0	10	44	74	77	6
Mar 2020	293	383	213	279	296	298	0	141	50	208	186	190
Apr 2020	165	286	88	72	179	104	144	61	27	104	0	47
May 2020	266	352	67	34	175	86	195	143	29	102	30	21
Jun 2020	119	294	39	20	111	58	230	28	20	71	48	15
Jul 2020	134	317	43	22	93	68	134	27	17	56	36	0
Aug 2020	182	352	53	30	89	112	159	27	19	62	66	6
Sep 2020	97	303	18	58	67	156	25	36	13	59	46	10
Oct 2020	161	318	44	40	75	96	130	44	15	51	0	23
Nov 2020	159	362	49	39	110	91	0	47	29	59	26	19
Dec 2020	170	274	54	43	107	98	192	42	19	56	0	19
Jan 2021	191	406	46	38	119	85	57	40	18	62	0	23
Feb 2021	124	326	23	20	88	47	31	26	16	47	0	9
Mar 2021	181	329	30	25	71	66	51	16	14	53	31	21
Apr 2021	151	318	25	28	78	58	35	10	13	61	0	14
May 2021	127	398	29	46	103	95	116	14	16	77	46	15
Jun 2021	140	328	27	42	71	75	30	15	16	107	0	10
Jul 2021	126	324	35	39	107	92	46	29	16	73	0	16
Aug 2021	181	408	37	47	128	114	66	29	20	78	64	9
Sep 2021	153	292	30	57	87	137	161	19	15	63	66	4
Oct 2021	231	356	40	89	113	146	15	39	19	80	70	4
Nov 2021	160	288	46	65	103	105	0	23	16	64	0	0
Dec 2021	104	295	62	75	148	148	14	44	17	74	0	6
Jan 2022	236	436	62	56	136	112	31	50	18	78	40	17
Feb 2022	219	342	57	39	112	82	23	27	17	81	0	0

Mar 2022	245	366	36	46	96	98	18	26	17	85	60	0
Apr 2022	196	360	25	45	108	81	32	20	16	79	0	11
May 2022	243	420	52	51	118	95	0	21	20	107	21	12
Jun 2022	221	331	42	47	122	93	40	16	18	111	24	0
Jul 2022	196	410	62	51	162	110	13	21	25	104	38	11
Aug 2022	164	322	40	31	113	58	37	11	17	60	16	14
Sep 2022	164	277	33	35	111	80	20	5	16	60	100	0
Oct 2022	241	362	54	70	147	106	14	11	21	88	20	14
Nov 2022	215	290	42	58	128	89	48	11	17	104	48	0
Dec 2022	188	251	40	118	147	158	0	12	16	262	54	11

Table 3a: Correlation between Coronavirus disease 2019 search term and other COVID-19 symptom-specific search terms in Nigeria.

	FatNig	DrCNig	SoThNig	AnoNig	FvNIG
CovNIG Pearson Correlation Sig. (2-tailed) N	.345(*)	.538(**)	.502(**)	-0.094	.550(**)
	0.039	0.001	0.002	0.584	0.001
	36	36	36	36	36

\*Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed).

Table 3b: Correlation between Coronavirus disease 2019 search term and other COVID-19 symptom-specific search terms in the United Kingdom.

	FatUK	DrCUK	SoThUK	AnoUK	FvUK
	0.207	.847(**)	.728(**) .698(**)		.488(**)
CovUK Pearson Correlation Sig. (2-tailed) N	0.226	0	0	0	0.003
	36	36	36	36	36

\*\*Correlation is significant at the 0.01 level (2-tailed).

The line graph shown in Figure 1 on the comparison of fatigue search terms in Nigeria and the United Kingdom revealed that this search term in the United Kingdom is more than that of Nigeria. It is expedient to note that the impact of COVID-19 was felt in January 2020 across the world when there were population mobility restrictions. The impact was deepened in February and March 2020. This impact was felt on the fatigue search term in both countries especially in Nigeria because of the high trough shown in Figure 1. In the United Kingdom, there seems to be a culture of searching for fatigue because of the level of seasonal variation shown in Figure 1. The searches on dry cough and sore throat search terms in both countries shown in Figures 2 and 3 clearly show that it is quite evident in February and March 2020 which was the heat of the COVID-19 period in the world.

As shown in Figure 4, the search term for Anosmia in Nigeria is quite more than in the United Kingdom, and the search term in the two countries clearly shows the impact of COVID-19. As shown in Figure 5, the search term Fever in the United Kingdom is more than in Nigeria, and this search term in the United Kingdom clearly shows the impact of COVID-19. The exact impact of COVID-19 in the two countries was shown in Figure 6 where the Coronavirus disease 2019 search term was more evident between February and March 2020. During the post-COVID-19 pandemic, these COVID-19 symptom-specific search terms were reduced. This implies that public consciousness of the deadly diseases was reduced as the mobility restrictions, social and physical distancing, and other related measures were relaxed by various governments.

As shown in Table 3a, the variables are denoted. Coronavirus disease 2019 is represented with CovNIG, Fatigue is represented with FatNig, Dry cough is represented with DrCNig, Sore throat is represented with SoThNig, Anosmia is represented with AnoNig, and Fever is represented with FvNig. The correlation values revealed that there is a positive and significant relationship between the search term of Coronavirus disease 2019 and the

following search terms: Fatigue (R = 34.5%; p-value = 0.039), Dry cough (R = 53.8%; p-value = 0.001), Sore throat (R = 50.2%; p-value = 0.002), and Fever (R = 55.0%; p-value = 0.001) in Nigeria. This implies that the search terms Coronavirus disease 2019, Fatigue, Dry cough, Sore throat, and Fever in Nigeria are related especially during the heat of the COVID-19 pandemic that is evidenced by travel restrictions, social distancing, and economic lockdown. It also implies that Fatigue, Dry cough, Sore throat, and Fever are the common symptoms of COVID-19 in Nigeria.

As shown in Table 3b, the variables are denoted. Coronavirus disease 2019 is represented with CovUK, Fatigue is represented with FatUK, Dry cough is represented with DrUK, Sore throat is represented with SoThUK, Anosmia is represented with AnoUK, and Fever is represented with FvUK. The correlation values revealed that there is a positive and significant relationship between the search term of Coronavirus disease 2019 and the following search terms: Dry cough (R = 84.7%; p-value = 0.000), Sore throat (R = 72.8%; p-value = 0.000), Anosmia (R = 69.8%; p-value = 0.000), and Fever (R = 58.8%; p-value = 0.003) in the United Kingdom. This implies that the search terms Coronavirus disease 2019, Dry cough, Sore throat, Anosmia, and Fever in the United Kingdom are related especially during the heat of the COVID-19 pandemic that is evidenced by travel restrictions, social distancing, and economic lockdown. It also implies that Dry cough, Sore throat, Anosmia, and Fever are the common symptoms of COVID-19 in the United Kingdom.

Furthermore, when comparing the correlation results of Nigeria with that of the United Kingdom, it can be seen that the major difference is the absence of Anosmia among the COVID-19 indices in Nigeria, and the absence of Fatigue among the COVID-19 indices in the United Kingdom. This is because those variables are uncorrelated with the search term of Coronavirus disease 2019 in each country. It can also be seen that the major COVID-19 symptoms in the United Kingdom as identified in the analysis were strongly correlated compared to that of Nigeria. This implies that the Coronavirus disease 2019 in the United Kingdom is more pronounced among the public, and the citizens are more aware of the disease and its symptoms than in Nigeria.

The study found that during the heat of the COVID-19 pandemic evidenced by travel restrictions, social distancing, and economic lockdown there were increasing COVID-19 symptom-specific search terms, but when the COVID-19 measures were relaxed, the searches were reduced in Nigeria and the United Kingdom. It can be noted that public interest and consciousness about a specific search term and other connecting search terms is influenced by the level of government policy action on the term which is echoed by the media. The study by Fiorenzato et al. (2021) on the COVID-19 pandemic has emphasized the nexus between local infection rates and the media, and the study found that people who are often exposed to COVID-19 mass media, as well as those who live in neighborhoods or places with high infection rates, experienced more depressive and anxious symptoms.

Given the increased worldwide media coverage of the pandemic, Starcevic et al. (2020) and Walker, [16] noted that it is

not unexpected that searches for symptoms unique to COVID-19 rose in March and April 2020. Notably, some searches on the symptoms did not increase. For instance, Anosmia searches in Nigeria and Fatigue searches in the United Kingdom did not have any significant increase. Nonetheless, the searches for many COVID-19 symptoms increased such as Fatigue, Dry cough, Sore throat, and Fever in Nigeria, while Dry cough, Sore throat, Anosmia, and Fever in the United Kingdom. From these findings, it could be conceived that a strong relationship exists during such health crises as the pandemic, which is linked with shifts in the general public's online health searches.

This study found a positive and significant relationship between the search term Coronavirus disease 2019 and the following search terms: Fatigue, Dry cough, Sore throat, and Fever in Nigeria. It also found a positive and significant relationship between the search term Coronavirus disease 2019 and the following search terms Dry cough, Sore throat, Anosmia, and Fever in the United Kingdom. Comparable research that utilized Google Trends data to assess the effects of lockdown in Europe and the USA discovered a substantial rise in search intensity for certain wellness phrases as a result of the lockdown [17,18]. This correlation may be evidence for the existence of this link. Unfortunately, the wider impact of such online health searches may be a sign that people tend to ignore non-COVID symptoms, which has negative effects on reporting, referrals to secondary care, and health outcomes (Riemann et al., 2017). This is something that has already been reported in many regions.

It is yet unclear if such a substantial correlation between online search behaviours and other studies' findings about excessive internet use. It is intriguing to note, nevertheless, that there may be a connection between such a significant association with online behavioural patterns, such as compulsive online research for health-related information, especially for certain symptoms [19]. Additionally, some studies have identified a syndrome known as "information overload" in which people are overloaded and unable to digest all of the communication and information accessible [20].

## Conclusion

The results of this study emphasize the significance of heightened healthcare professionals' awareness and aggressive outreach to the general public during public health emergencies like COVID-19. When media and public communication become heavily focused on a particular issue like COVID-19, such techniques will aid in the development of solutions to promote the quality of overall health and wellness. In populations with lower health literacy and a variety of health-seeking behaviours, the pandemic has raised awareness of the importance of public health communication [20,21]. Now is the time to look to the future and consider how we can use what we've learned to improve the general health of the population, both in the event of future pandemics and as ongoing public health interventions.

## Implications of the study

It is well-documented that the COVID-19 pandemic significantly decreased the population's overall health (Zhang et al., 2020; Ge et al., 2021). Social-distancing laws implemented in 2020 led

to a decrease in health-seeking and primary care consultations, according to studies that have highlighted the pandemic's hidden toll on other facets of healthcare and health services [23] Riemann et al., 2017; The Health Foundation, 2020). Researchers, healthcare professionals, and economists are becoming more aware of the long-term effects of mobility restrictions and social-distancing policies on both health outcomes and healthcare resource requirements as the COVID-19 pandemic's periods in many countries, including Nigeria and the United Kingdom, are coming to an end (Cena et al., 2021).

#### Limitations of the study

There are several restrictions on the Google Trends tool and the selection criteria in this study. Google Trends does not take into consideration factors like age, gender, or underlying medical issues when analyzing internet searches at the population level. Because some internet users may utilize search engines other than Google, there are no conclusive interpretations available for this study. Although the quality and repeatability of Google Trends as a source for scientific study may be called into doubt due to its usage of a proprietary algorithm, the service is nonetheless valuable (Nuti et al., 2014).

Nigeria and the United Kingdom were chosen for this study. It would be beneficial to compare the searches that emanate from other nations in future studies. Only COVID-19 symptom-specific search terms were employed in this study. Additional search terms may be included in future study studies to provide a more comprehensive picture of internet searches linked to COVID-19 or other infectious disorders [22-33].

### **Declarations**

Ethics approval and consent to participate.

Not Applicable

#### **Availability of Data and Material**

The datasets generated and/or analyzed during the current study are available from Google and embedded in the manuscript.

#### **Competing Interests**

The author declares that there is no competing interest.

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Not Applicable.

## **Authors' contributions**

AOA designed the manuscript, gathered and analyzed the data; JOI gathered the data and proofread the manuscript; FMI designed the review and methodology; OTL proofread and corrected the manuscript.

All authors have read and approved the manuscript.

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#### References

- Bajaj S, Blair KS, Schwartz A, Dobbertin M, Blair RJR (2020) Worry and insomnia as risk factors for depression during the initial stages of the COVID-19 pandemic in India. PLoS ONE, 15(12): e0243527.
- Fiorenzato E, Zabberoni S, Costa A, Cona G (2021) Cognitive and mental health changes and their vulnerability factors related to COVID-19 lockdown in Italy. PLoS ONE 16: e0246204.
- Lai J, Ma S, Wang Y, Cai Z, Hu J, et al. (2020) Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open 3: e203976.
- Zhang Y, Zhang H, Ma X, Di Q (2020) Mental health problems during the COVID-19 pandemics and the mitigation effects of exercise: a longitudinal study of college students in China. Int J Environ Res Public Health 17(10): 3722.
- Zaharna M, Guilleminault C (2010) Sleep, noise and health: a review. Noise Health 12(47): 64-69.
- Riemann D, Baglioni C, Bassetti C, Bjorvatn B, Dolenc-Groselj L, et al. (2017) European guidelines for the diagnosis and treatment of insomnia. J Sleep Res 26(6): 675-700.
- 7. Besedovsky L, Lange T, Born J (2012) Sleep and immune function. Pflugers Arch 463(1): 121-137.
- Patel SR, Hu FB (2008) Short sleep duration and weight gain: a systematic review. Obesity (Silver Spring) 16(3): 643-653.
- Nuti SV, Wayda B, Ranasinghe I, Wang S, Dreyer RP, et al. (2014) The use of google trends in Health care research: a systematic review. PLoS ONE 9(10): e109583.
- Tizek L, Schielein MC, Ruth M, Szeimies RM, Philipp-Dormston, et al. (2019) Interest in skin cancer in urban populations: a retrospective analysis of Google search terms in nine large German cities. Acta Derm Venereol 99(9): 797-804.
- 11. Zink A, Schuster B, Ruth M, Pereira MP, Philipp-Dormston WG, et al. (2019) Medical needs and major complaints related to pruritus in Germany: a 4-year retrospective analysis using Google AdWords Keyword Planner. J Eur Acad Dermatol Venereol 33(1): 151-156.
- 12. Liu Y, Wheaton AG, Chapman DP, Cunningham TJ, Lu H, et al. (2016) Prevalence of healthy sleep duration among adults - United States, 2014. MMWR Morb Mortal Wkly Rep 65(6): 137-141.
- 13. Wang Y, Li Y, Liu X, Liu R, Mao Z, et al. (2019) Gender-specific prevalence of poor sleep quality and related factors in a Chinese rural population: the Henan rural cohort study. Sleep Med 54: 134-141.
- Mills SEE, Nicolson KP, Smith BH (2019) Chronic pain: a review of its epidemiology and associated factors in population-based studies. Br J Anaesth 123: e273-ee83.
- Baxter AJ, Scott KM, Vos T, Whiteford HA (2013) The global prevalence of anxiety disorders: a systematic review and meta-regression. Psychol Med 43(5): 897-910.
- Walker A, Hopkins C, Surda P (2020) Use of Google Trends to investigate loss-of-smell-related searches during the COVID-19 outbreak. Int Forum Allergy Rhinol 10(7): 839-847.
- Adelhoefer S, Berning P, Solomon SB, Maybody M, Whelton SP, et al. (2021) Decreased public pursuit of cancer-related information during the COVID-19 pandemic in the United States. Cancer Causes Control 32(6): 577-585.
- Brodeur A, Clark AE, Fleche S, Powdthavee N (2021) COVID-19, lockdowns and well-being: evidence from Google trends. J Public Econ 193: 104346.
- 19. Starcevic V, Schimmenti A, Billieux J, Berle D (2021) Cyberchondria in the time of the COVID-19 pandemic. Hum Behav Emerg Technol 3(1): 53-62.

- 20. Beaudoin CE (2008) Explaining the relationship between internet use and interpersonal trust: taking into account motivation and information overload. J Comput-Mediat Commun 13: 550-568.
- 21. Basch CH, Mohlman J, Hillyer GC, Garcia P (2020) Public health communication in time of crisis: readability of online COVID-19 information. Disaster Med Public Health Prep 14(5): 635-637.
- 22. Paakkari L, Okan O (2020) COVID-19: health literacy is an underestimated problem. Lancet Public Health 5(5): e249-ee50.
- 23. Gray DP, Sidaway-Lee K, Harding A, Evans P (2020) Reduction in face-toface GP consultations. Br J Gen Pract 25(70): 328.
- 24. Ahmed S, Ajisola M, Azeem K, Bakibinga P, Chen YF, et al. (2020) Impact of the societal response to COVID-19 on access to healthcare for non-COVID-19 health issues in slum communities of Bangladesh, Kenya, Nigeria and Pakistan: results of pre-COVID and COVID-19 lockdown stakeholder engagements. BMJ Glob Health 5(8): e003042.
- 25. Cena L, Biban P, Janos J, Lavelli M, Langfus J, et al. (2021) The collateral impact of COVID-19 emergency on neonatal intensive care units and family-centred care: challenges and opportunities. Front Psychol 12: 630594.

- 26. Consumer Health Online Research Report (2017).
- 27. Ge F, Zheng A, Wan M, Luo G, Zhang J (2021) Psychological state among the general Chinese population before and during the COVID-19 epidemic: a network analysis. Front Psychiatry 12:591656.
- Irish LA, Kline CE, Gunn HE, Buysse DJ, Hall MH (2015) The role of sleep hygiene in promoting public health: a review of empirical evidence. Sleep Med Rev 22: 23-36.
- Morin CM (2010) Chronic insomnia: recent advances and innovations in treatment developments and dissemination. Can Psychol 51: 31-39.
- 30. Statista (2023) Share of desktop search traffic originating from Google in selected countries as of May 2023.
- 31. The Health Foundation (2020). Use of primary care during the COVID-19 pandemic.
- 32. World Health Organization. Coronavirus disease (COVID-19).